DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 27th FIGHTER WING (ACC)
CANNON AIR FORCE BASE, NEW MEXICO

01 SEP 1995

Michael J. Koerner, Colonel, USAF
Vice Commander
100 S DL Ingram Blvd Suite 100
Cannon AFB NM 88103-5214

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Mr. William Honker
Chief, RCRA Permits
US Environmental Protection Agency Region VI
1445 Ross Avenue Suite 1200
Dallas TX 75202-2733

Dear Mr. Honker

Attached for your approval is the final work plan for the RCRA Facility Investigation at Melrose Air Force Range. The final plan includes all changes previously agreed to.

If you have any questions, please contact Mr. Sanford Hutsell at (505) 784-4348.

Sincerely

Michael Koerner

MICHAEL J. KOERNER, Colonel, USAF
Vice Commander

cc:
NMED (B. Hoditschek)
HQ ACC CES/ESVW w/o Atch (M. Calvert)

Volume II
No Enclosed

FINAL
VOLUME I - WORK PLAN

WORK PLAN
RCRA FACILITY
INVESTIGATION PHASE I
FOR MELROSE AIR
FORCE RANGE
CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO

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Prepared for:
U.S. Department of the Army
Corps of Engineers, Omaha District
Omaha, Nebraska

August 1995

EBASCO SERVICES, INCORPORATED

FINAL WORK PLAN

MELROSE AIR FORCE RANGE
RCRA FACILITY INVESTIGATION
PHASE 1

Prepared for
UNITED STATES AIR FORCE
27 CSG/DEV
Cannon AFB, NM 88103-5128
and
U.S. DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

Prepared by

EBASCO SERVICES INCORPORATED

143 Union Boulevard, Suite 1010
Lakewood, Colorado 80228

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 PURPOSE 1-3
1.2 OBJECTIVES 1-4
1.3 SCOPE 1-4
1.4 DATA QUALITY OBJECTIVES 1-5
1.5 ORGANIZATION OF THE PRE-FINAL WORK PLAN 1-6

2.0 INSTALLATION BACKGROUND AND ENVIRONMENTAL SETTING 2-1
2.1 DESCRIPTION AND HISTORY OF MELROSE AIR FORCE RANGE 2-1
2.1.1 Land Use Near MAFR 2-2
2.2 ENVIRONMENTAL SETTING 2-3
2.2.1 Physical Geography 2-3
2.2.2 Climatology 2-4
2.2.3 Geology 2-5
2.2.4 Hydrogeology 2-8
2.2.5 Soils 2-11
2.2.6 Biological Resources 2-13
2.2.6.1 Plant Resources 2-13
2.2.6.2 Wildlife Resources 2-14
2.3 ANTHROPOGENIC INFLUENCES ON PHYSICAL CHARACTERISTICS 2-15

3.0 SOURCE CHARACTERIZATION 3-1
3.1 EXPENDED ORDNANCE AND INDUSTRIAL WASTE BURIAL SITE (MOTOR POOL TRENCHES) (SWMU #114) 3-1
3.1.1 Disposal Area Characteristics 3-1
3.1.2 Waste Characteristics 3-2
3.2 EXPLOSIVES-CONTAMINATED BURIAL SITE (ARROYO BURIAL SITE) (SWMU #115) 3-3
3.2.1 Disposal Area Characteristics 3-3
3.2.2 Waste Characteristics 3-4
3.3 DOMESTIC WASTE BURIAL SITE (SWMU #117) 3-4
3.3.1 Disposal Area Characteristics 3-4
3.3.2 Waste Characteristics 3-5
3.4 NORTHWEST MUNITIONS DISPOSAL SITE (UNNUMBERED POTENTIAL AOC) 3-5
3.4.1 Disposal Area Characteristics 3-5
3.4.2 Waste Characteristics 3-6
3.5 WORLD WAR II CANTONMENT DISPOSAL SITE (UNNUMBERED POTENTIAL AOC) 3-6

3.5.1 Disposal Area Characteristics 3-6
3.5.2 Waste Characteristics 3-6
3.6 HELICOPTER PAD DISPOSAL/BURN SITE (UNNUMBERED POTENTIAL AOC) 3-7
3.6.1 Disposal Area Characteristics 3-7
3.6.2 Waste Characteristics 3-7
3.7 DOMESTIC WASTE BURIAL SITE (EAST OF FIRE STATION) (UNNUMBERED POTENTIAL AOC) 3-8
3.7.1 Disposal Area Characteristics 3-8
3.7.2 Waste Characteristics 3-8

4.0 CONTAMINANT CHARACTERIZATION 4-1
4.1 SOIL CONTAMINATION 4-1
4.1.1 Surface Soil and Sediment 4-2
4.1.2 Subsurface Soil 4-3
4.2 GROUNDWATER CONTAMINATION 4-4
4.2.1 Surface Water 4-4
4.2.2 Groundwater 4-4
4.3 SUBSURFACE SOIL GAS CONTAMINATION 4-5
4.4 AIR CONTAMINATION 4-6
4.5 BACKGROUND SOIL SAMPLING 4-7
4.6 COLLECTION OF ADDITIONAL NONSAMPLING DATA 4-8
4.7 MANAGEMENT OF INVESTIGATION DERIVED WASTES 4-9

5.0 POTENTIAL RECEPTOR IDENTIFICATION 5-1

6.0 DATA COLLECTION QUALITY ASSURANCE PLAN 6-1

7.0 DATA MANAGEMENT PLAN 7-1

8.0 SITE SAFETY AND HEALTH PLAN 8-1

9.0 COMMUNITY RELATIONS PLAN 9-1

10.0 PROJECT MANAGEMENT PLAN 10-1

11.0 SCHEDULE AND DELIVERABLES 11-1

12.0 REFERENCES 12-1

APPENDIX A COMMUNITY RELATIONS PLAN
APPENDIX B RESPONSES TO COMMENTS

LIST OF TABLES

Number	Title	Page
Table 2-1	Federal- and State-Protected Animals Potentially Occurring in the Vicinity of MAFR (Curry and Roosevelt Counties)	2-16
Table 4-1	Summary of Field Sampling Activities for Contaminant Characterization	4-11
Table 11-1	Document Submittal Register	11-4

LIST OF FIGURES

Number	Title	Page
Figure 2-1	Vicinity Map	2-17
Figure 2-2	Geomorphic Province Map	2-18
Figure 2-3	Surficial Geology Map	2-19
Figure 2-4	Generalized Geologic Column	2-20
Figure 2-5	Regional Groundwater Contour Map	2-21
Figure 2-6	Soil Map	2-22
Figure 3-1	Site Location Map	3-9
Figure 3-2	SWMU #114 Site Conceptual Model	3-10
Figure 3-3	SWMU #115 Site Conceptual Model	3-11
Figure 3-4	SWMU #117 Site Conceptual Model	3-12
Figure 3-5	Northwest Munitions Disposal Site Conceptual Model	3-13
Figure 3-6	Helicopter Pad Disposal/Burn Site Conceptual Model	3-14
Figure 3-7	Domestic Waste Burial Site Conceptual Model	3-15
Attachment A	U.S. Geological Survey Well Completion Diagram for Monitoring Well 1HW-1	3-16
Figure 4-1	Background Soil Sample Locations	4-12
Figure 11-1	Project Schedule	11-6

LIST OF ACRONYMS AND ABBREVIATIONS

>	greater than
ANOVA	Analysis of Variance
AOC	area of concern
bgs	below ground surface
BP	Before Present
CABF	Cochran's Approximation to Behrens-Fisher
CAFB	Cannon Air Force Base
CEC	cation exchange capacity
CERCLA	Comprehensive Environmental Response, Conservation, and Recovery Act
cm/sec	centimeters per second
CMS	Corrective Measures Study
CRP	Community Relations Plan
DCQAP	Data Collection Quality Assurance Plan
DMP	Data Management Plan
DNAPL	dense non-aqueous phase liquid
DQO	data quality objective
EBASCO	Ebasco Services Incorporated
EOD	explosive ordnance disposal
EPA	U.S. Environmental Protection Agency
FS/RA	Feasibility Study/Remedial Alternative
FSP	Field Sampling Plan
gpm	gallons per minute
HTW	Hazardous and Toxic Waste
ICM	interim corrective measures
IDW	Investigation-derived waste
IDWMP	Investigation Derived Waste Management Plan
IRPIMS	Installation Restoration Program Information Management System
lbs	pounds
LNAPL	light non-aqueous phase liquid
MAFR	Melrose Air Force Range
mg/L	milligrams per liter
mm	millimeter
msl	mean sea level
PA	Preliminary Assessment
PCB	polychlorinated biphenyl
PMP	Project Management Plan
PPE	personal protective equipment
psi	pounds per square inch

QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SI	Site Inspection
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TAL	target analyte list
TERC	Total Environmental Restoration Contract
USACE	U.S. Army Corps of Engineers
USACE-TM	USACE Technical Manager
USAF	U.S. Air Force
UTL	Upper tolerance limit
UXO	unexploded ordnance
VOC	volatile organic compound
°F	degrees Fahrenheit

1.0 INTRODUCTION

This document serves as the Draft Work Plan for a combined Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment/Site Inspection (PA/SI) to be conducted at Melrose Air Force Range (MAFR), located 25 miles west of Cannon Air Force Base (CAFB) in Roosevelt County, New Mexico. The following seven sites, including three identified solid waste management units (SWMUs) and four potential areas of concern (AOCs) are targeted for investigations under this Work Plan:

SWMU	Site Description
114	Expended Ordnance and Industrial Waste Burial Site (Motor Pool Trenches)
115	Explosives-Contaminated Burial Site (Arroyo Burial Site)
117	Domestic Waste Burial Site (SE of Main Building)
Unnumbered—Potential AOC	Northwest Munitions Disposal Site (NW corner of Impact Area)
Unnumbered—Potential AOC	World War II Cantonment Disposal Site
Unnumbered—Potential AOC	Disposal/Burn Site (North of Helicopter Pad)
Unnumbered—Potential AOC	Domestic Waste Burial Site (East of Fire Station)

A preliminary RCRA Facility Assessment (RFA) of these sites, consisting of a preliminary review and visual site investigation, was conducted on behalf of the Environmental Protection Agency (EPA) in 1987 by A. T. Kearney, Inc. (Kearney 1987). The nature and extent of contamination at these sites is presently unknown, and no interim corrective measures (ICMs) have been implemented at this time.

In addition to the sites listed above, four presently unserviceable monitoring wells near the sewage lagoons at CAFB will be inspected to determine the cause of the problems and to recommend actions to repair them. Because the work to be conducted at these wells is not at or near MAFR, the approach to accomplish this task, and associated information, is presented and described under separate cover.

The site specific scope of services (USACE 1995) for which this Final Work Plan has been prepared lists requirements for an RFI. Based on telephone conversations with the U.S. Army Corps of Engineers (USACE) and CAFB personnel, and the applicability of both RCRA and CERCLA requirements to various sites on MAFR, a combination PA/SI and RFI is appropriate. To the extent possible, this Final Work Plan follows the EPA RCRA Facility Investigation Guidance, Volumes 1–4 (EPA 530/SW-89-031) (EPA 1989a), the RCRA Groundwater Monitoring Technical Enforcement Guidance Document (OSWER 9950.1) (EPA 1986), and the Test Methods for Evaluating Solid Waste (SW 846, 2nd. Ed.) (EPA 1982). In addition, the plan is designed to be in general conformance with EPA Guidance for Performing Preliminary Assessments Under CERCLA (EPA/540/G-91-013) (EPA 1991) and the EPA Guidance for Performing Site Inspections Under CERCLA (EPA/540-R-92-021) (EPA 1992a). However, given the limited knowledge available to date about MAFR and the sites to be investigated, some of the work plan requirements specified in RCRA and CERCLA guidance, such as identification of potential receptors, Human Health and Environmental Assessments, and air quality monitoring, cannot be fully addressed at this stage in the development of the

work plan or may not be applicable under the terms of the RCRA Subpart X Permit issued effective December 30, 1994.

The intent of the Total Environmental Restoration Contracts (TERCs) is to provide a streamlined method for identifying, investigating, evaluating, and remediating potential hazardous waste sites, with regulatory participation and approval throughout the process. Therefore, these plans have been prepared with a comprehensive yet flexible set of strategies for conducting the field sampling operations that are integral to the successful performance of a variety of environmental restoration activities. It is anticipated that the work necessary to fully investigate the targeted sites at MAFR will be phased; based on that assumption, this Final Work Plan should be considered as a first-phase approach. It is also anticipated that addenda to this plan may be required as more specific information relevant to these investigations, the targeted sites, environmental media, or potential receptors is discovered. Such addenda would address rationale, approach, and/or specific strategies for targeted sites or tasks associated with the requirements for the work outlined in this plan.

1.1 PURPOSE

For the identified SWMUs, the overall purpose of this investigation is to obtain the data necessary to evaluate whether (1) a release of hazardous constituents into the environment has occurred and, if so, to characterize the nature, extent, and rate of migration of releases of hazardous constituents, (2) a potential threat to human health and the environment exists, and (3) interim corrective measures and/or a Corrective Measures Study (CMS) (Feasibility Study/Remedial Alternatives [FS/RA] under CERCLA) may be necessary.

For the potential AOCs, the purpose of this investigation is to (1) determine whether a site warrants further investigation, (2) collect selective samples to demonstrate the presence of hazardous substances, and (3) determine whether they have migrated from their original locations.

1.2 OBJECTIVES

The objectives of the investigations to be conducted at MAFR are as follows:

- Collect the quantity and quality of data necessary to characterize the physical setting and nature and extent of potential hazardous constituents associated with each SWMU and potential AOC
- Evaluate the data to identify data gaps and determine if additional investigations are required to complete the RFI process
- Evaluate the data collected to identify potential migration pathways for future evaluation of human health and environmental risks (if required) associated with chemicals found in soils beneath each SWMU and potential AOC to be investigated
- Provide data for use in identifying appropriate remedial actions (i.e., to conduct a CMS under RCRA or a FS/RA under CERCLA)
- Recommend no further action if supported by the findings of this investigation

1.3 SCOPE

The scope of services for the investigations to be conducted under this Final Work Plan at MAFR includes the following:

- Records search/interviews
- Geophysical surveys
- Location surveys
- Soil gas surveys

- Surface water sampling
- Surface soil and/or sediment sampling
- Soil borings and subsurface soil sampling
- Monitoring well installation and development
- Groundwater sampling
- Chemical and geotechnical sample analysis

1.4 DATA QUALITY OBJECTIVES

The fundamental goals of the data quality objectives (DQOs) are to acquire data of sufficient quality and quantity to execute the following:

- Identify source areas having the potential to release hazardous constituents into the environment
- Define the nature, extent, and rate of migration of releases of hazardous constituents into the environment
- Determine if additional phases of investigation are needed to address data gaps as well as whether interim corrective measures and/or CMS (FS/RA under CERCLA) may be necessary
- Determine the potential for releases to migrate toward potential receptors
- Support a screening level Health Risk and Environmental Assessment (to be conducted in the future, if required) and address all significant exposure pathways
- Support a recommendation of no further action, if warranted, following the evaluation of the findings of the investigation
- Support any required follow-on study including a CMS

DQOs are discussed in more detail in Section 2.0 of the Quality Assurance Project Plan (QAPP), Part A of the Data Collection Quality Assurance Plan (DCQAP).

1.5 ORGANIZATION OF THE Final WORK PLAN

This Final Work Plan is generally consistent with the outline provided in Module IV, Section R, of the RCRA Subpart X Permit for MAFR. However, to provide a logical flow of information, the facility description is included with the environmental setting in Section 2.0, and because of the very limited information available at press time of this Final Work Plan, many of the necessary maps are presently unavailable and consequently have not been included. In addition, the information presently available regarding each of the sites targeted for investigation, including history, operational practices, waste types, and conceptual models of potential release mechanisms and migration pathways, is presented in Section 3.0.

The remainder of this Final Work Plan is organized as follows. Section 2.0—Installation Background and Environmental Setting—contains a description of the facility and its history, other general information regarding the installation, and information about the environmental setting. Section 3.0—Source Characterization—presents a review of each site to be investigated, including the nature of the problem and a conceptual model of the potential contaminant migration pathways. The overall approach to characterize contamination at the targeted sites is presented in Section 4.0—Contaminant Characterization. Section 5.0—Potential Receptor Identification—is a generalized discussion of the process of receptor identification. Section 6.0—the Data Collection Quality Assurance Plan (DCQAP)—is a separate document (Volume II) comprised of the Quality Assurance Project Plan (QAPP) and the Field Sampling Plan (FSP). Section 7.0—the Data Management Plan (DMP)—is appended to the QAPP. The Site Safety and Health Plan (SSHP) comprises Section 8.0 of the Final Work Plan but is a stand-alone, separate document (Volume III). Section 9.0—the Community Relations Plan (CRP)—is being prepared under a separate project and will be attached as Appendix A to this Final Work Plan. The Project Management Plan—Section 10.0—will be appended to the QAPP. The project schedule and deliverables are discussed in Section 11.0.

Discussions of the DQOs, the analytical program, sampling and field procedures, and Standard Operating Procedures (SOPs) for the various activities comprising these investigations are contained in the DCQAP. The specifics of the investigations planned for each site targeted under this Final Work Plan are delineated in the FSP. The Investigation Derived Waste Management Plan (IDWMP) is an appendix to the FSP.

2.0 INSTALLATION BACKGROUND AND ENVIRONMENTAL SETTING

2.1 DESCRIPTION AND HISTORY OF MELROSE AIR FORCE RANGE

MAFR is an active U.S. Air Force (USAF) bombing and air-to-ground gunnery range located in Roosevelt County, approximately 8 miles southwest of the village of Melrose, New Mexico, and 25 miles west of CAFB (Figure 2-1). MAFR occupies portions of Townships 1 North, 2 North, and 1 South of the New Mexico Baseline and Ranges 29 East, 30 East, and 31 East of the New Mexico Principal Meridian. The area was used by the U.S. Army Air Corps during World War II for training and been in use by USAF since 1952, when the Air Force originally leased 7,771 acres of grassland for use as a bombing and air-to-ground gunnery range to support Clovis AFB (Kearney 1987). Clovis AFB was renamed CAFB in 1957 in honor of the late General John K. Cannon, former commander of the Tactical Air Command. MAFR was expanded between 1968 and 1972 with the purchase of both the leased land and an additional 14,369 acres (Kearney 1987).

MAFR consists of a composite, day-and-night, simulated special and conventional weapons delivery range and a day-only tactical range. Live ordnance has not been used at the range since approximately 1969. Ordnance currently used at the range is limited to practice bombs, inert full-scale bombs, and target practice with live gun ammunition. Operations at the range support the primary mission of CAFB, which is to develop and maintain a tactical fighter wing capable of day, night, and all-weather combat operations and to train replacement combat aircrews for tactical organizations worldwide. Other military units, including the USAF, Air Force Reserve, Air National Guard, U.S. Navy, and U.S. Marine Corps, occasionally use MAFR. In about 1964, MAFR was vacated by the USAF for a short time to allow U.S. Army units, and apparently Naval Weapons Evaluation teams and Navy Seals, to conduct exercises. No information is currently available regarding ordnance that may have been used during the U.S. Army and Navy operations.

According to the 1987 RFA report (Kearney 1987), MAFR was approximately 4.25 miles wide and 7.25 miles long, with a run-in corridor 1 mile wide and 3 miles long on the north end of the range. The range covered an area of about 22,140 acres, of which the central 5,120 acres comprised the primary impact area and was reserved for exclusive USAF use, while the surrounding 17,020 acres served as a safety zone and was leased to local ranchers for grazing. (The scale shown with the location map of Melrose Bombing Range included in Kearney's 1987 report as Figure III-3 is incorrect). The USAF acquired additional land to increase the buffer zone around the impact area in 1989, and according to the site specific scope of services on which this Draft Work Plan is based, the area of MAFR is 77,611 acres. Untitled maps of the range supplied to Ebasco Services Incorporated (EBASCO) by the USACE and USAF in March 1995, indicate that the MAFR land encompasses approximately 93 square miles (~60,000 acres), and additional restricted easement areas enclose roughly another 34 square miles (~22,000 acres). Details regarding the acquisition of additional lands since 1987 are unclear at this time.

MAFR is currently covered under a RCRA Subpart X permit, obtained in December 1994 (No. NM 5572124456-1). The permit covers open burning/open detonation at the Unexploded Ordnance (UXO) Open Burn Treatment Pit (SWMU # 118); SWMU # 118 is not a subject of the investigations to be conducted under this Draft Work Plan. The Part X Permit specifies that SWMU # 114 (Expended Ordnance and Industrial Waste Burial Site, where one trench is still actively used for disposal and burial of expended ordnance, scrap metal, burnt residue from SWMU # 118, and other industrial wastes from CAFB), SWMU #115 (the Explosives-Contaminated Burial Site), and SWMU #117 (the Domestic Waste Burial Site) require an RFI.

2.1.1 Land Use Near MAFR

MAFR is located just south of U.S. Highway 84 in a farming and ranching area (Figure 2-1). The majority of the land surrounding MAFR is grassland. The major land use in the area is cattle grazing. Clovis, New Mexico, is considered the cattle capital of the southwest. In 1992, the

population estimate for Clovis was 33,405 people, and the Melrose population was estimated to be 816 (Totkamachi 1995).

2.2 ENVIRONMENTAL SETTING

The following discussions are drawn from the Draft Work Plan, RCRA Facility Investigation, Phase I, for Landfill No. 5 (SWMU No. 113/IRP No. LF-5), CAFB, Clovis, New Mexico, September 1993, which was prepared for the USACE, Omaha District, Omaha, Nebraska, by Woodward-Clyde Consultants, and provided to EBASCO by the Omaha District office for use in preparing these Draft plans. Because of the proximity of MAFR to CAFB and their common environmental features, the information presented here is considered appropriate and applicable to the MAFR.

2.2.1 Physical Geography

MAFR is situated in the Southern High Plains Physiographic Province in the Llano Estacado subprovince (Figure 2-2) (Hawley et al. 1976). The Llano Estacado is a nearly flat plain sloping gently (10 to 15 feet per mile) to the east and southeast. Elevations in the eastern New Mexico portion of the Llano Estacado exceed 4,000 feet above mean sea level (msl). In the vicinity of MAFR, elevations range from 4,200 to 4,600 feet above msl.

The most prominent geomorphic features in the vicinity of MAFR are two spurs of an escarpment known as "The Mesa", which rises about 200 feet above the average elevation of the range surface. The northern spur ends in a small butte near the center, overlooking much of the range. Other geomorphic features in the region include relict sand dunes and minor playas located along the south side of U.S. Highway 84 north of the range. Neither relict sand dunes nor playas are found on MAFR.

The playas are broad, shallow depressions that may form as a result of soil leaching and wind erosion (blowouts) or from collapse of the surface due to differential erosion of underlying rock. During periods of rainfall, these depressions commonly collect surface runoff from small- to moderate-sized drainage areas to form ephemeral playa lakes. Playas have no external surface drainage. Water is lost by infiltration into the soil and evaporation; without recharge, playa lakes persist for only a few days or weeks. Only minor playa areas are present at the north end of MAFR, but larger playas (>1/3 square mile in area) are present within 1 to 2 miles north of the range.

Stream valleys in the region tend to be fairly broad and widely spaced. Streams are ephemeral and drainages are poorly developed. No streams exist on or near MAFR. The nearest named drainages are Chapman Draw approximately 2 miles west of the range, and Cañada del Tule about 2 miles southeast of the southeast corner of the range. Chapman Draw drains to the north, while Cañada del Tule drains to the east. Neither is a perennial stream. The surface topography of MAFR slopes to the northeast, and overland flow and ephemeral drainage from the area of the sites targeted for investigation is toward the northeast and not toward either drainage.

2.2.2 Climatology

The climate of east-central New Mexico is classified as tropical semiarid, with temperature and precipitation reaching maximum levels in the summer. Average monthly temperatures range from a January low of 39 degrees Fahrenheit (°F) to a July high of 78°F. Extreme daily temperatures range from -11°F to 106°F. Average monthly precipitation ranges from 0.4 inches in winter to 2.7 inches in July. The maximum recorded 24-hour rainfall is 4.7 inches, which occurred in August 1985 (Hale 1992). Rainfall occurs on eight or more days per month during the summer precipitation maximum. Mean annual precipitation is approximately 14 inches at Melrose, and the mean annual evaporation is 69 inches per year. Prevailing winds are from the west at an average of 8 miles per hour (USAF 1990).

The atmosphere around the area of MAFR is generally well mixed. The seasonal and annual average mixing heights can vary from 1,300 feet in the morning to 13,000 feet in the afternoon. The afternoon mixing heights are typically greater during the spring and fall seasons. The morning mixing heights are usually low, due to nighttime heat loss from the ground, producing surface-based temperature inversions. After sunrise, these inversions break up, and solar heating of the earth's surface causes vertical mixing in the atmosphere (USAF 1990).

Dust is frequently entrained into the atmosphere in this region of the country because of gusty winds and the semiarid climate. The Texas Panhandle-eastern New Mexico area is considered the worst area in the United States for windblown dust. Occasionally, this windblown dust is of sufficient quantity to restrict visibility. Most of the seasonal dust storms occur in March and April, when the wind speeds are typically high.

2.2.3 Geology

Assuming that the geologic conditions at MAFR are similar to those at CAFB, the following discussions have been modified from the Draft Work Plan prepared by Woodward-Clyde for the RFI of Landfill No. 5 at CAFB.

The near-surface stratigraphic units of interest at MAFR are the Ogallala Formation, dating from the Late Miocene to Late Pliocene Age, and the Early Triassic Dockum Group, as shown in Figures 2-3 and 2-4, respectively.

The Dockum Group consists of three formations. The stratigraphically lowest unit is the Santa Rosa Sandstone. Overlying the Santa Rosa Sandstone are the Chinle and Redonda Formations. The Chinle and Redonda Formations are composed mainly of red shales with lesser interbedded sands and are known locally as redbeds. The top of the Dockum Group is marked by an

erosional unconformity having relief of up to several hundred feet (Lee Wan and Associates 1990).

Overlying the Dockum Group redbeds is the Ogallala Formation. The Ogallala Formation extends from eastern New Mexico and Colorado into Texas, Oklahoma, Kansas, Nebraska, and South Dakota. Drillers' logs from CAFB indicate that the Ogallala Formation varies from 360 to 415 feet in thickness. The incised upper surface of Triassic redbeds strongly influences the Ogallala thickness. Stream valleys in the post-Triassic unconformity are deep and tend to run east to west. Ogallala thickness may thus vary significantly over short north-south distances.

With respect to CAFB, the Ogallala is erosionally truncated to the south along the abandoned Portales Valley, to the west along the Pecos River Valley, and to the north in a series of ephemeral stream valleys. The Ogallala Formation extends more than 125 miles to the east before terminating as an escarpment in Briscoe County, Texas. Springs and seeps are common along the erosional margins of the Ogallala.

The Ogallala dips gently and monoclinally to the southeast in the vicinity of MAFR. As reported by Lee Wan and Associates (1990), data suggest that some Quaternary warping may have occurred; however, most of the structures are well to the northwest and southwest of MAFR. No faults or buried structural lineaments are known to exist in the vicinity of MAFR.

The Ogallala Formation is composed of unconsolidated, poorly sorted gravel, sand, silts, and clays. The base of the Ogallala is generally marked by a gravel, cobble, and boulder deposit. This basal member contains sediments derived from igneous and sedimentary rocks transported from the mountains to the west. The Ogallala Formation was laid down by stream and overbank deposits formed within coalescing alluvial fans. These fans form a broad pediment along the

eastern flank of the Rocky Mountains. As is typical of alluvial deposits, Ogallala internal stratigraphy varies vertically and horizontally over short distances.

Except where strongly cemented by calcium carbonate (caliche), the sediments of the Ogallala Formation are loose and friable. Authigenic and allogenic clays are found as a trace to abundant matrix mineral (Lee Wan and Associates 1990). As reported by Lee Wan and Associates, five zones have been distinguished within the Ogallala of east central New Mexico on the basis of clay minerals. Smectites (montmorillonites) and attapulgite (with sepeolite) are the dominant clays throughout the Ogallala. Illite is a lesser but persistent clay, as is kaolinite. Smectite is a swelling clay, causing deep cracks to form in dry surface soils. Smectite in particular and, to a lesser extent, attapulgite and illite are clays with moderate to high cation exchange capacities (CEC). The formation as a whole should therefore have a relatively high CEC, which should inhibit the migration of charged contaminants, especially ionic forms of metals.

Caliche is a major feature of the Ogallala Formation, occurring in nearly continuous to discontinuous layers throughout. A generalized geologic section at CAFB (probably representative of MAFR as well) is shown in Figure 2-4. Caliche is hard, white to pale tan on fresh surfaces, weathering to gray, and has a chalky appearance. Caliche forms as calcium carbonate, is leached from overlying sediments by infiltrating water, and precipitates in the pore space of the host sediments. Precipitation is caused by the evaporation of downward percolating water. The caliche may thus mark the position of ancient vadose zones. Lee Wan and Associates (1990) give radiocarbon dates for the upper climax caliche ranging from approximately 27,000 years Before Present (B.P.) to approximately 42,000 years. B.P.

Caliche is relatively soluble in acidic water (pH < 7) or in waters containing dissolved carbon dioxide. The top surface of the upper climax caliche in fresh outcrop shows solution etching.

The Ogallala Formation has numerous continuous to discontinuous caliche layers throughout its thickness. The uppermost caliche, termed the climax caliche, is pisolitic (Lee Wan and Associates 1990). The pisoliths (small, round, "pea-like" accretionary bodies) are thought to have formed as the caliche was repeatedly chemically weathered and brecciated during Pleistocene pluvials and later recemented during drier intervals. This upper caliche outcrops around playas and the bounding escarpments of the Ogallala and is locally termed caprock. The climax caliche is typically 3 to 5 feet thick. Caliches that occur lower in the Ogallala are platy and harder. Caliche is likely thin or absent below playas.

2.2.4 Hydrogeology

The lower portion of the Ogallala Formation is the primary regional aquifer for both potable and irrigation water. MAFR is located near the western margin of the High Plains aquifer (Ogallala aquifer), and, in the southern and western margins of MAFR the aquifer is mapped as unsaturated or saturated only in isolated channels. Most of the facility, including the sites targeted for investigation, is mapped as underlain by saturated Ogallala aquifer materials (Hart and McAda 1985). No deeper aquifers are known to be in use in the vicinity of MAFR.

The Ogallala aquifer is part of the High Plains Aquifer, which extends continuously from Wyoming and South Dakota into New Mexico and Texas. In east-central New Mexico, the Ogallala aquifer rests on Dockum Group redbeds, which serve as the basal confining layer. The Ogallala is a water table, or unconfined, aquifer. In the MAFR region, the Ogallala aquifer had a northeasterly regional gradient of about 70 feet per mile based on 1978 data (Hart and McAda 1985). Figure 2-5 shows water table elevation contours for that period. Depths to water are probably on the order of 100 or more feet beneath most of the facility. Groundwater depths were approximately 27 to 73 feet below ground surface north of MAFR in the time period 1982 through 1987 (USGS 1989). Groundwater depths during this period ranged from approximately 100 to 150 feet below ground surface east of MAFR and from approximately 20 to 125 feet

100 to 150 feet below ground surface east of MAFR and from approximately 20 to 125 feet below ground surface south of the range. Groundwater fluctuated up to 16 fet during the time period of 1982 through 1987. In 1994, groundwater was measured at approximately 96 feet below ground surface in a monitoring well on the east side of MAFR (USGS 1993). The groundwater level in this well rose to approximately 60 feet below ground in 1994 (Larson, personal communication 1995). Based on available data, it appears that groundwater flows from southwest to northeast.

Regional well yields vary from less than one gallon per minute (gpm) in thin silts and sands, to up to 1,600 gpm in thick sands and gravels (Lee Wan and Associates 1990). At MAFR, the production well produced 14 gpm at 35 pounds per square inch (psi) during a pump test in 1985 (William Matotan and Associates 1985). Regional water quality in the Ogallala aquifer is generally good, with dissolved solids ranging from 250 to 500 milligrams per liter (mg/L) (Gutentag et al. 1984) and fluorides ranging from 2.2 to 2.7 mg/L (William Matotan and Associates 1985).

At CAFB, the Ogallala aquifer had an average saturated thickness of 120 feet based on mid-1960s data. Saturated thickness ranges from 93 to 143 feet and is influenced by the configuration of the erosional unconformity surface marking the top of the Dockum Group. Flow within the saturated zone may be influenced by the configuration of the top of the Dockum Group. Yields in tests of CAFB water wells have ranged from 205 to 1,150 gpm. Specific capacities range from 11.4 to 27.9 gal/feet (Lee Wan and Associates 1990).

Based on pump tests conducted in three wells at CAFB, Woodward-Clyde generated rough estimates of hydraulic conductivity using the Theis equation (Woodward-Clyde 1993). The data used in these calculations were obtained to evaluate pump rates, efficiency, and well yield and

were not intended for use in calculating aquifer properties. The results of these calculations should, therefore, be considered as estimates only.

Hydraulic conductivity values were found to be approximately 2.0×10^{-3} centimeters per second (cm/sec) to 2.0×10^{-2} cm/sec. These estimates appeared low when compared to published hydraulic conductivity data for sands and gravels (Freeze and Cherry 1979). As reported in the RFA report (Kearney 1987), a groundwater flow velocity in the area of about 150 feet/year has been estimated. This calculates out to a hydraulic conductivity of approximately 1.0×10^{-1} cm/sec.

The presence of interstitial clays may account for both the variability and low values of hydraulic conductivities. Boring logs from CAFB Installation Restoration Program projects and published reports (Lee Wan and Associates 1990) indicated that interstitial and interstratified clays are abundant in the Ogallala Formation.

Recharge to the Ogallala is primarily through precipitation. A. T. Kearney (1987) indicated that the recharge rate was very low—0.5 to 0.8 inch/year. Because of the high evapotranspiration rate and low precipitation, recharge can occur only during cool months when precipitation may exceed evapotranspiration, or during heavy rainfall events in which the infiltration capacity of the soil is exceeded. When the infiltration capacity of the soil is exceeded, runoff flows to playas and the presence of water in playas may allow deep percolation to the aquifer. The occurrence of this process is evidenced by the presence of clay deposits in playas and the possibility that caliche is thin or absent directly below the playas. Caliche is soluble in acidic rain waters and is leached over time to form percolation pathways.

Discharge from the Ogallala occurs through well pumping and springs located along the eroded margins. Spring discharge does not occur on or near MAFR. One well, the MAFR production

well, is located at the northwest corner of MAFR and is used to provide water for nonpotable domestic uses on the range.

The rate of discharge exceeds local recharge for the Ogallala throughout the region. Water levels in the Ogallala have declined steadily from the 1930s to the present. From the 1930s to 1980, a decline of 50 to 100 feet has been observed in the area around Clovis, New Mexico. Luckey et. al. (1981) states, "the largest area of water level decline exceeding 100 feet occurs south of the Canadian River extending from Curry County, New Mexico, to Crosby County, Texas."

The Ogallala will continue to be used as the primary source of potable and irrigation water for eastern New Mexico. The New Mexico State Engineer designated Curry County as a Water Basin in 1989. This designation allows for regulation of water rights, usage, and well drilling.

2.2.5 Soils

Soils in the vicinity of MAFR are classified as silty sand (SM) to clayey sand (SC) under the Unified Soil Classification System and as aridisols (calciorthids) under the United States Department of Agriculture - Soil Conservation Service Comprehensive Soil Classification System. The following summary is based on the Curry County Soil Survey (USDA 1958). Soil characteristics are briefly described in the following paragraphs. The 1953 Soil Conservation Service map is presented in Figure 2-6.

Common soil types in the region include the Amarillo fine sandy loam, 0 to 2 percent slope phase. This soil consists of a thin sandy A horizon and well defined clayey B_{1-3} horizons, with a calcic B_3 horizon at depths below 40 inches. The calcic B_3 horizon lies on a calcic C horizon or on caliche. The surface soil is brown (7.5 YR 5/5 [based on the Munsell Color Chart], dry), and subsurface soils are reddish brown (5 YR 4/4, dry) to yellowish red (15 YR 5/6, dry). The calcic C horizon underlying the Amarillo Fine Sandy loam is white. The Amarillo fine sandy loam soil

type may be present on relatively flat surfaces but can also be found on slopes associated with playas.

Clovis fine sandy loams, 0 to 2 percent slope phase, and 2 to 5 percent slope phase, are similar to Amarillo fine sandy loams. Clovis soils are reddish brown on the surface and in the subsurface, with a white Calcic C horizon. In the Clovis soils, the depth to the calcic C horizon ranges from 28 to 56 inches. The depth to caliche exceeds 56 inches. Clovis and Amarillo fine sandy loams typically occur in close association.

In a few limited areas, particularly along the steeper slopes around playas, Mansker fine sandy loam, 0 to 2 percent slope phase, and 2 to 5 percent slope phase, may be found. Mansker fine sandy loams have no B horizons and are very calcareous. Mansker fine sandy loam soils are brown (10 YR 5/3, dry) to light brown (7.15 YR 6/4, dry) at the surface with a pink to reddish yellow (7.5 YR 7/5, dry) calcic C horizon. Potter fine sandy loam soils, 0 to 5 percent slope phase, may be associated with the Mansker fine sandy loam soils. This soil typically has a thin A horizon and is grayish brown (10 YR 5/2, dry), with no B horizon; it is similar to Mansker soils. Potter soils are shallow and strongly calcareous and overlie hard consolidated caliche. The calcic C horizon is within 2 feet of the surface.

The A and B horizons of Amarillo and Clovis fine sandy loams are rapidly to moderately permeable. Mansker fine sandy loam A and Ac horizons are rapidly permeable. Permeabilities in calcic B and C horizons are moderate (USDA 1958).

2.2.6 Biological Resources

Land adjacent to MAFR is primarily used for cattle grazing. The few playa lakes in the area are used by upland game for cover, by waterfowl for resting and feeding, and by wildlife in general for drinking. Nearby riverbeds also provide water sources during rainy seasons. During periods of low rainfall, the riverbeds are dry.

2.2.6.1 Plant Resources

The climate of the Range area is considered semiarid. The thin layer of topsoil in the vicinity of MAFR is sandy loam, which is highly susceptible to wind erosion. The undisturbed natural vegetation is mostly shortgrass prairie, including blue grama grassland and mixed grama grassland vegetation types, which have moderately fast recovery rates.

The predominant land use of the region is rangeland, primarily for cattle grazing. In general, moderately grazed rangeland areas such as those occurring in the project area are highly productive in terms of both forage quality and quantity. The rangeland in the vicinity may support up to 15 to 20 head of cattle per section, depending on the rainfall. Large trees do not uniformly exist in the vicinity of the Range except where planted around buildings and other structures. Woodlands composed of large shrubs and small trees are confined to riparian areas and playa lakes in the region.

The following plants are candidate species for the Federal List of Endangered and Threatened Wildlife and Plants and are found within a 50-mile radius of MAFR: chatterbox orchid (*Epipactus gigantea*), spiny aster (*Aster harridus*), Whittmans milkvetch (*Asragalus witmanil*), dune unicorn plant (*Proboscidea sabulosa*), and the tall plains spruce (*Eupjorbia strictior*). The dune unicorn plant is also on the state endangered plant species list (Lee Wan and Associates 1990).

2.2.6.2 Wildlife Resources

The eastern New Mexico area contains many nongame wildlife species that are typically found on the High Plains. Most of these species are distributed widely throughout the western United States. Species diversity is low in most habitats because of the low vegetation diversity. Most amphibian species are associated with riparian habitats and playa lakes. Reptiles are found in all terrestrial habitat types but are most abundant in scrub/grasslands. Nocturnal rodents are the most abundant members of the small mammal community.

Grasslands on the High Plains support a variety of seed-eating sparrows and other ground-dwelling birds, both as residents and migrants. Raptors (hawks and owls) are relatively abundant in all habitats in the region. Insectivorous and tree-nesting species are most abundant in riparian areas. Shorebirds, waterbirds, and migratory waterfowl in general use the rivers, playa lakes, and reservoirs of the region.

Two National Wildlife Refuges, Grulla and Muleshoe, are located within 50 miles of MAFR. These areas provide high-quality habitat for migratory and breeding waterfowl.

Big-game species in the area include mule deer, white-tailed deer, pronghorn, and barbary sheep. Pronghorn are the most abundant game animal in the area. Several species of upland game, such as quail, ring-necked pheasant, and turkey, are common in the area. Reservoirs (Ute Lake, Conchas Lake, and Clayton Lake) and playa lakes are important waterfowl habitats in the region. Numerous species of native and introduced fish inhabit the rivers and perennial streams, and the reservoirs support recreational fishing of warm-water species such as walleye, crappie, channel catfish, largemouth bass, and bluegill.

As determined by the regional office of the U.S. Fish and Wildlife Service, two federally listed endangered animal species, the bald eagle and peregrine falcon, are known to inhabit the area

within a 50-mile radius of MAFR. The New Mexico Department of Game and Fish has also indicated that the state-endangered Mississippi kite, Baird's sparrow, and the black-footed ferret may also occur in the vicinity of the Range. The federal- and state-protected species are listed in Table 2-1.

Within Roosevelt County, the only state-protected bird that is most likely to occur is the Mississippi kite. Since the early 1960s in New Mexico, this kite summers regularly and breeds in the Clovis region. Two other state-protected birds within Roosevelt County that may occur, but not regularly in recent years, are the McCown's longspur and Baird's sparrow. No information is available on the McCown's longspur in New Mexico; however, Baird's sparrow occurs mainly in autumn during migration in the eastern plains and southern lowlands. Migrants appear as early as the first week of August and move further south by November. The species seems to have declined in abundance throughout its range in the Southwest due to the loss of shrubby shortgrass habitats.

State-protected birds known to occur infrequently are the bald eagle and the peregrine falcon. The bald eagle migrates and winters from the northern border of New Mexico to the Gila, lower Rio Grande, middle Pecos, and Canadian valleys. It is seen occasionally in summer and as a breeding bird, with nests reported in the extreme northern and western parts of the state. Winter and migrant populations appear to have increased with reservoir construction. The peregrine falcon is widely distributed but population numbers are low. The American subspecies breeds statewide in New Mexico, mainly west of the eastern plains.

2.3 ANTHROPOGENIC INFLUENCES ON PHYSICAL CHARACTERISTICS

Anthropogenic influences on the physical characteristics at MAFR are related to historical and present-day military activities, the most obvious influence being the aerial bombing exercises at the range. Other influences include road and runway construction, explosive ordnance disposal

(EOD) clearance activities, the construction of range buildings and observation towers, and the operation of SWMU 118—the open burning/open detonation site. The end result of many of these activities has been the generation and disposal of waste products, including industrial waste, UXO and explosives, scrap metal, and domestic waste. The disposal of this waste has resulted in the creation of the present-day SWMUs and potential AOCs at the range. Military activities during the 1940s resulted in the establishment of the potential AOC known as the World War II Cantonment Disposal site. Additional influences include the existence of bombing targets on the range, construction of a helicopter pad, and the installation of fencing around the perimeter of the range.

Table 2-1 Federal- and State-Protected Animals Potentially Occuring in the Vicinity of MAFR (Curry and Roosevelt Counties)

Page 1 of 1

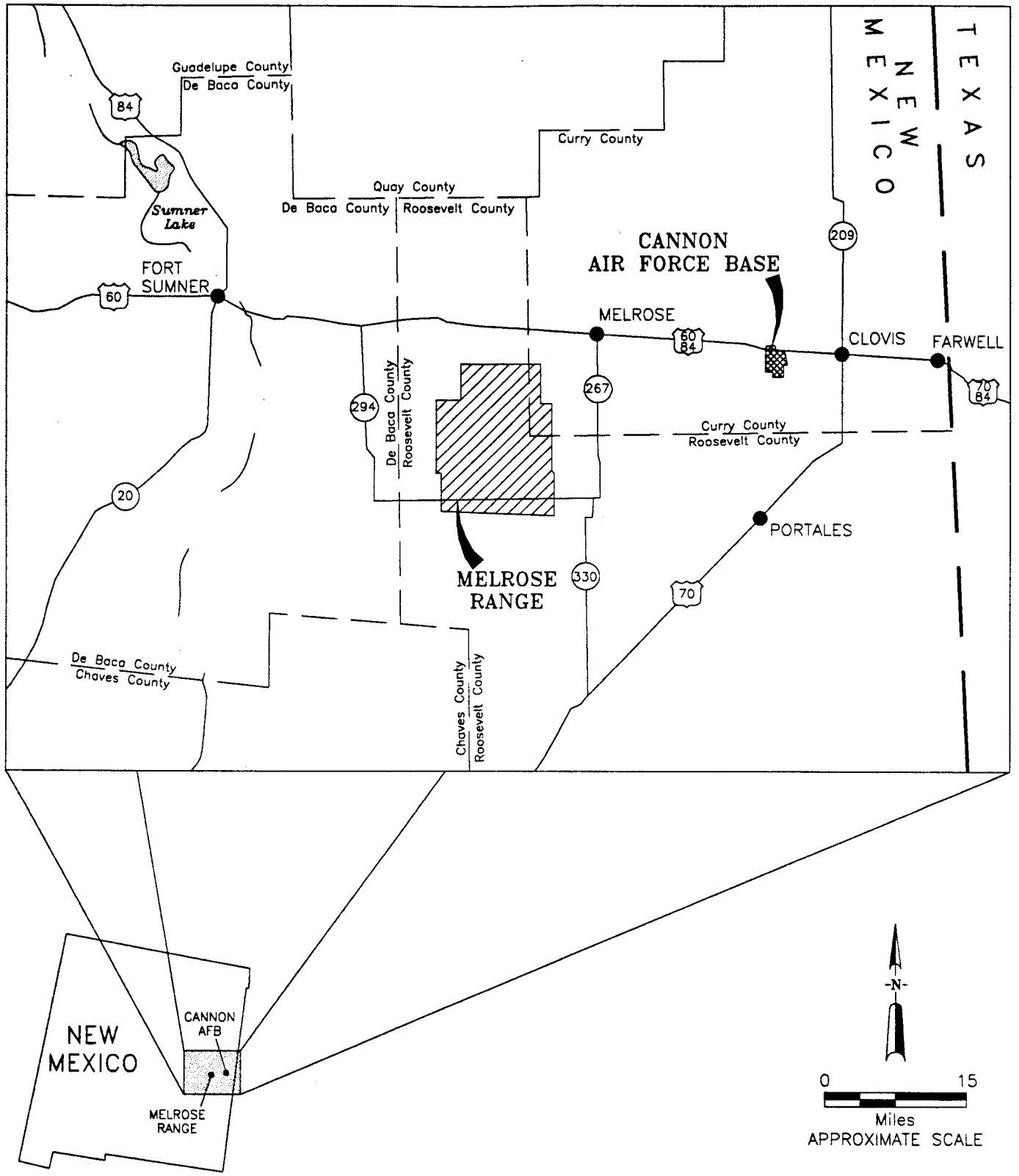
Common Name	Scientific Name	Federal Status	State Status
Birds			
Mississippi kite	*Ictinia mississippiensis*		Endangered (group 2)
Barid's sparrow	*Ammodramus baridii*		Endangered (group 2)
Bald eagle	*Haliaeetus leucocephalus*	Endangered	Endangered (group 2)
Peregrine falcon	*Falco perigrinus*	Endangered	Endangered (group 1)
Mammals			
Black-footed ferret	*Mustela nigripes*	Endangered	Possibly Extinct

Endangered (group 1): Species whose prospects of survival or recruitment within the state are in jeopardy.

Endangered (group 2): Species whose prospects of survival or recruitment within the state are likely to become jeopardized in the foreseeable future.

Possibly Extinct: Potentially no longer in existence in the state.

Source: Modified from Lee Wan and Associates 1990.



Prepared for:

U.S. Army Corps of Engineers, Omaha District
Cannon Air Force Base
Melrose Range

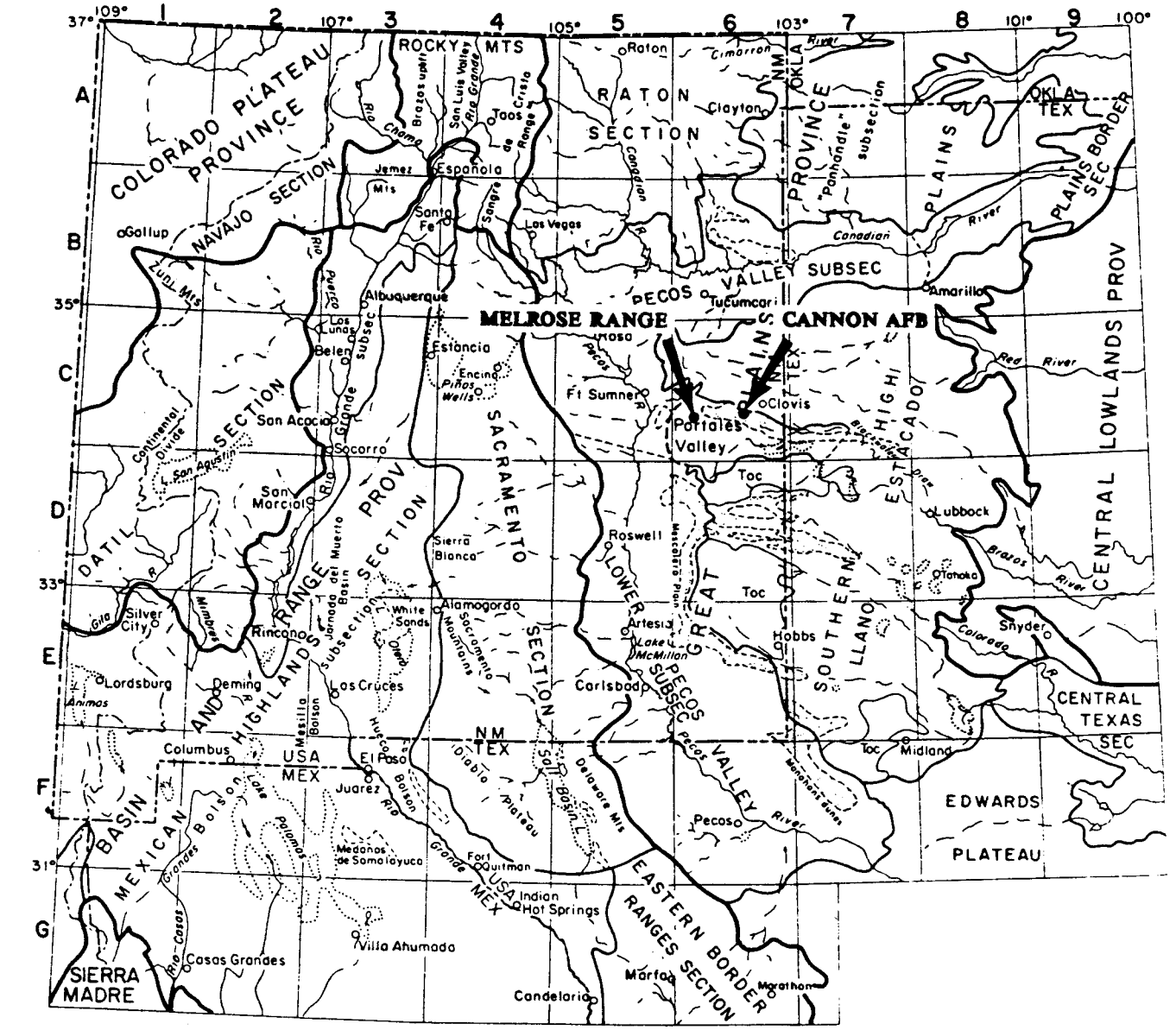
Prepared by:

Ebasco Services Incorporated

Figure 2-1

Vicinity Map

Draft Melrose RFI Workplan April 1995



Prepared for:

U.S. Army Corps of Engineers, Omaha District
Cannon Air Force Base
Melrose Range

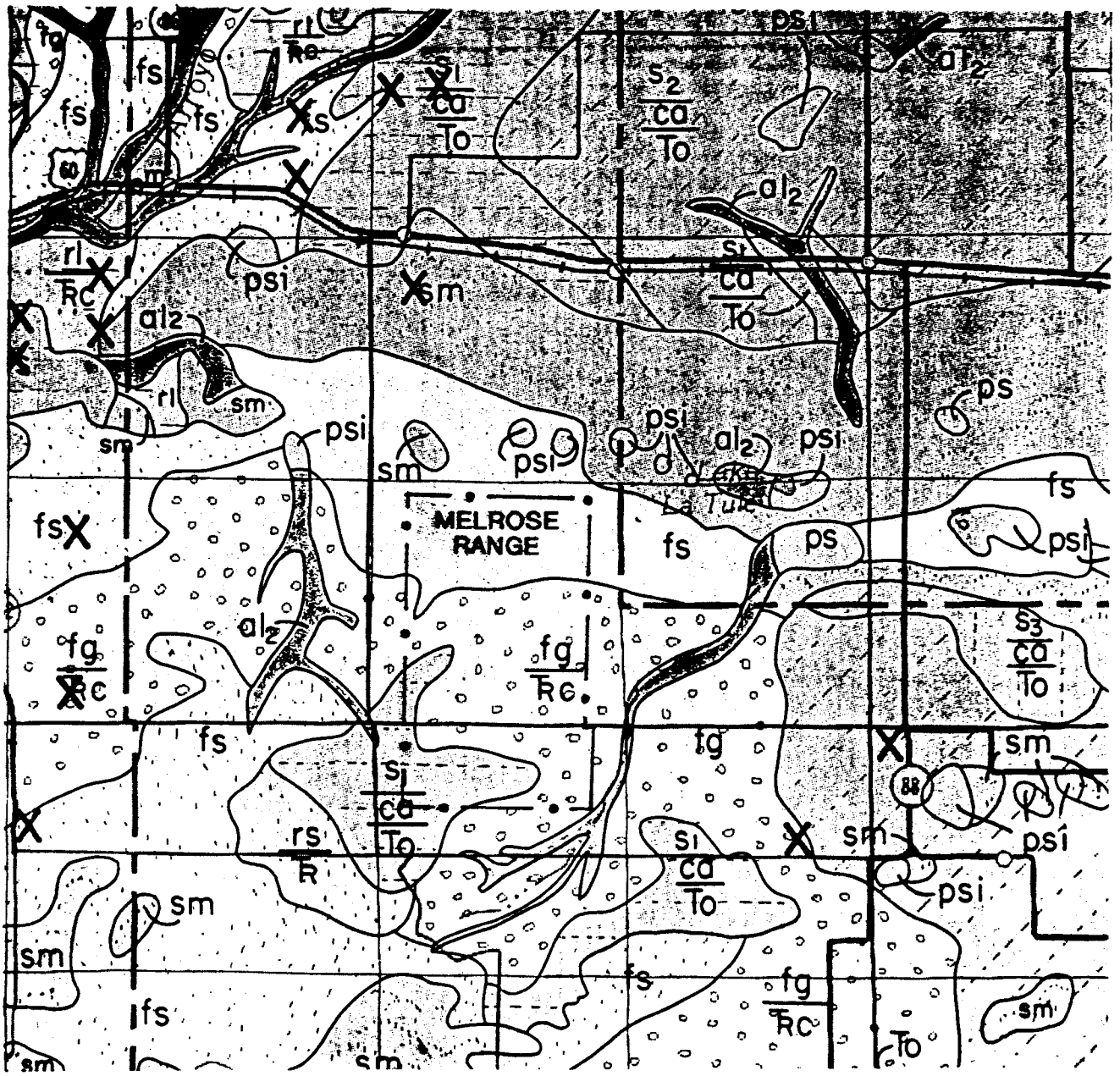
Prepared by:

Ebasco Services Incorporated

Figure 2-2

Geomorphic Province Map

Draft Melrose RFI Workplan April 1995



Prepared for:

U.S. Army Corps of Engineers, Omaha District
Cannon Air Force Base
Melrose Range

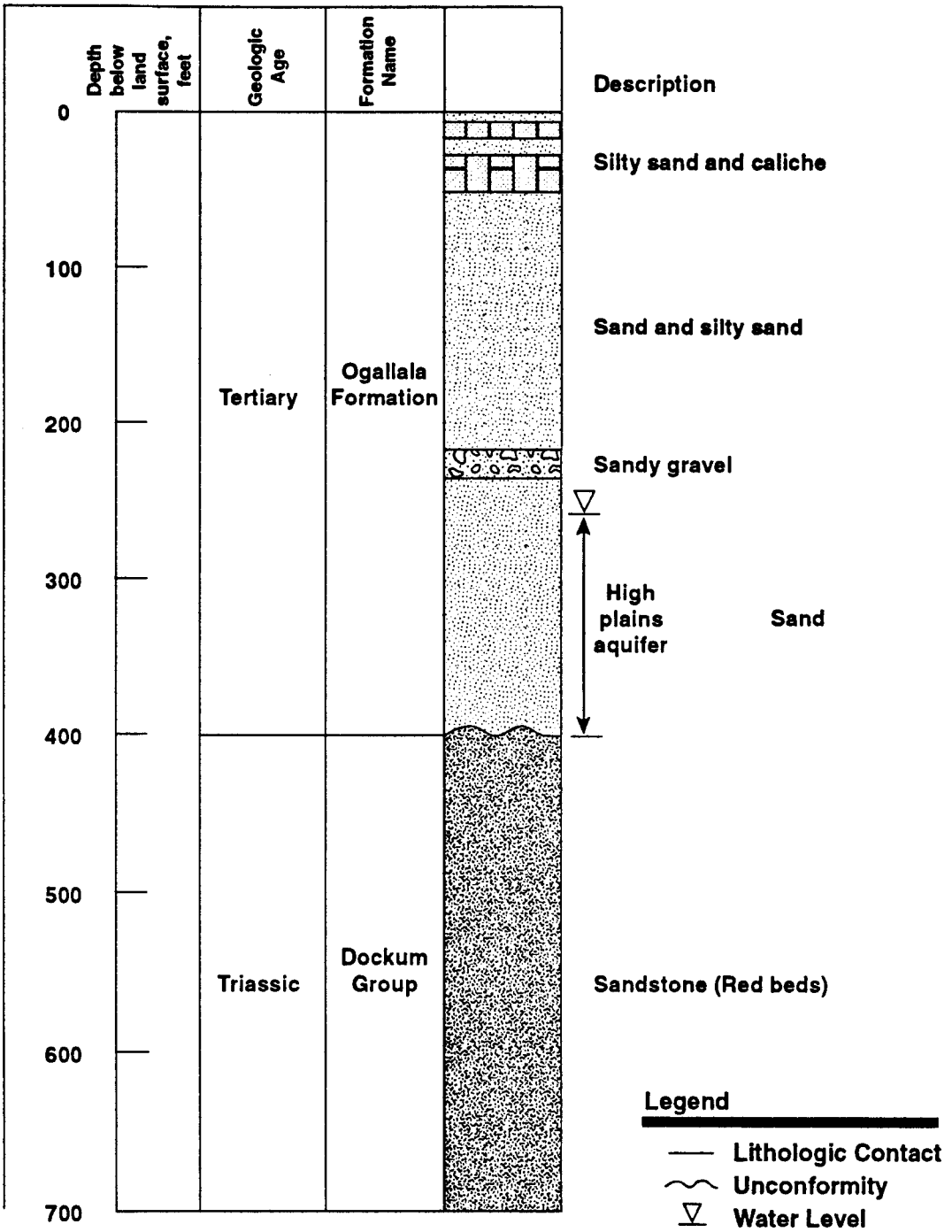
Prepared by:

Ebasco Services Incorporated

Figure 2-3

Surficial Geology Map

Draft Melrose RFI Workplan April 1995



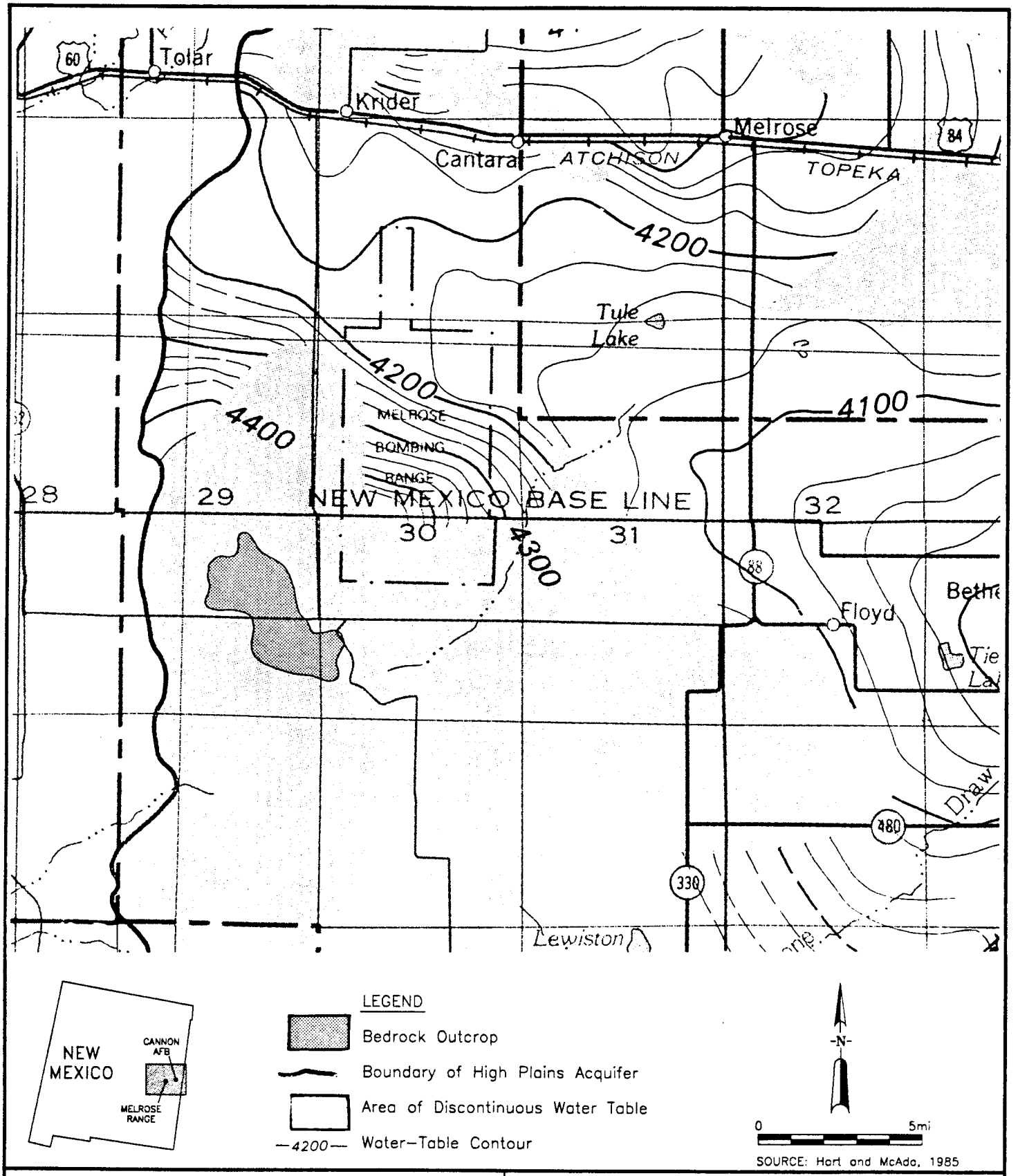
Prepared for:
U.S. Army Corps of Engineers, Omaha District
Cannon Air Force Base
Melrose Range
Prepared by:
Ebasco Services Incorporated

Figure 2-4

Generalized Geologic Column

Draft Melrose RFI Workplan

April 1995



Prepared for:

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Cannon Air Force Base
Melrose Range

Prepared by:

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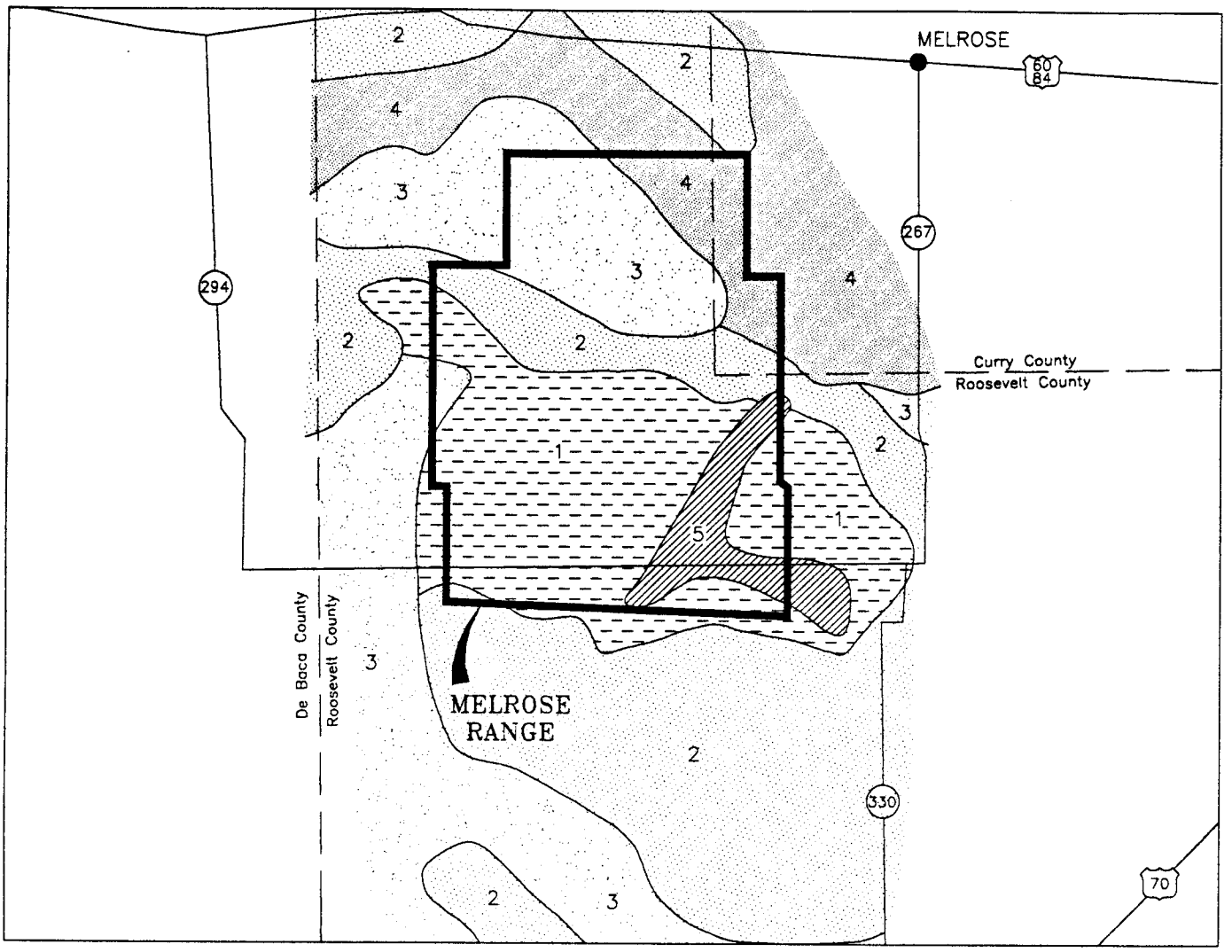
Figure 2-5

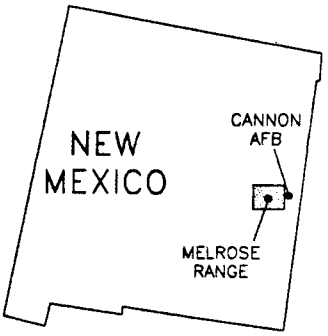
Regional Ground Water Contour Map

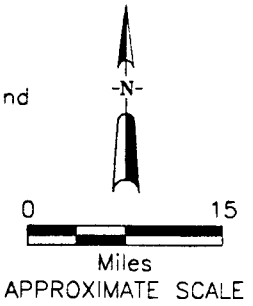
Draft Melrose RFI Workplan April 1995



LEGEND

- 1 Amarillo–Clovis loams association: Deep and moderately deep hardland
- 2 Amarillo–Clovis fine sandy loams association: Deep and moderately deep, moderately sandy land
- 3 Amarillo–Clovis loamy fine sands association: Deep and moderately deep sandy land
- 4 Tivoli–Springer–Brownfield sands association: Deep, loose sandy land
- 5 Potter–Mansker association: Very shallow to moderately deep, calcareous soils





SOURCE: SCS, 1953

Prepared for:

U.S. Army Corps of Engineers, Omaha District
Cannon Air Force Base
Melrose Range

Prepared by:

Ebasco Services Incorporated

Figure 2–6

Surficial Soil Map

Draft Melrose RFI Workplan April 1995

3.0 SOURCE CHARACTERIZATION

This section discusses source characterization on a site-by-site basis for each SWMU and potential AOC covered by this Draft Work Plan at MAFR. Source characterization is first discussed in terms of disposal area characteristics, including site location and site history, followed by a discussion of the known or inferred information on waste characteristics. The source of most of this information is the 1987 RFA Report (Kearney 1987), but additional information has been obtained during a March 1995 site visit by EBASCO, as well as from site maps and other published sources. A conceptual model of each site's potential as a source of contaminant releases to soil, soil vapor and the atmosphere, surface water, and groundwater is included. The sites targeted for investigation are shown on Figure 3-1.

Groundwater is thought to be approximately 100 feet below ground surface at most of the sites discussed but may be considerably less beneath SWMU #117.

3.1 EXPENDED ORDNANCE AND INDUSTRIAL WASTE BURIAL SITE (MOTOR POOL TRENCHES) (SWMU #114)

3.1.1 Disposal Area Characteristics

SWMU #114 is located in the southeast quarter of the southwest quarter of Section 15 and the northeast quarter of the northwest quarter of Section 22, Township 1 North, Range 30 East (SE1/4 SW1/4 S.15, and NE1/4 NW1/4 S.22, T1N, R30E) in Roosevelt County, New Mexico. The SWMU is comprised of 8 unlined burial trenches, the dimensions of which are approximately 20 to 40 feet wide, 100 to 200 feet long, and up to 50 feet deep. Figure 3-2 is a site conceptual model of SWMU #114. The trenches were excavated using a bulldozer. At the time of the site visit one trench was active, one trench was recently deactivated, and six were closed. Closure of the trenches consists of backfilling the trench with native soil, grading to ground level, and marking the site with a sign. The site is approximately 4 to 6 acres in size. The soil cover over the trenches is sparsely vegetated on relatively young trenches, due in large measure to the semi-

arid conditions and the extended time required for vegetation to reestablish on disturbed areas. The area around SWMU #114 is flat with mixed desert scrub consisting of prairie grasses and cactus. Ordnance scrap, bombs, and other munitions were heaped in piles adjacent to the active trench. The MAFR production well is located approximately 1/2 mile northeast of SWMU #114. Depth to groundwater is approximately 100 feet at the well. The well construction diagram for the production well at MAFR cannot be located, therefore, a well completion diagram for U.S. Geological Survey Monitoring Well No. 1MW-1 is included as Attachment 1.

3.1.2. Waste Characteristics

These trenches were used to dispose a variety of military and industrial waste from CAFB and MAFR. The exact dates of operation and types of wastes disposed at SWMU #114 are unclear. Over a period of 10 years (from approximately 1952 to 1962), drummed liquids were poured into the trenches and burned. Full drums of liquids may also have been placed in the trenches. The compositions of the drummed liquids are not exactly known but may have included such compounds as unusable fuels, paints, sludges, and solvents. Approximately 12,000 to 15,000 lbs of scrap metal from practice bombs and munitions were disposed in trenches monthly, including Mark V and Mark VI (F-84 and F-86) munitions and antiaircraft ordnance (40 millimeter [mm]). Approximately 20 to 30 lbs of UXO residue (which had been previously detonated and burned at SWMU #118—(the MAFR open burning/open detonation area) were also disposed in SWMU #114. Live munitions, some of which may have proximity fuses, continued to be buried in SWMU #114 until 1969. Potential contaminants of concern at SWMU #114 include explosives, chlorinated solvents, fuels and related petroleum hydrocarbons, dioxins, furans, polychlorinated biphenyls (PCBs), pesiticides, and metals.

Liquid wastes are characteristically mobile and increase the possibility for seepage from the trenches to subsurface soil and groundwater. If petroleum hydrocarbons (e.g., fuels) were disposed in the trenches at SWMU #114, then the possibility exists that light nonaqueous phase

liquids (LNAPLs) may have migrated to the groundwater and may exist as a floating layer on the water table. If chlorinated hydrocarbons (e.g., solvents, trichloroethylene) were disposed in the trenches then dense nonaqueous phase liquids (DNAPLs) may exist in the lower portions of the aquifer. The presence of organic liquid waste also increases the potential mobility of other contaminants, such as explosives and metals, through cosolvency processes.

Liquid wastes that contain volatile organic compounds (VOCs) also present the possibility that a contaminant vapor plume has developed in unsaturated soil within, and beneath, the site. Vapor plumes follow migration pathways in the soil in which the contaminants migrate vertically upward from source locations in the trenches to surface soil and the atmosphere, or migrate laterally, through previously uncontaminated soils adjacent to and beneath the site.

Based on the history of SWMU #114 and the types of compounds disposed there, the site is considered to have a high potential as a source for significant soil, soil gas, and groundwater contamination with a variety of organic, inorganic, and explosive compounds. There is a significant UXO threat as well.

3.2 EXPLOSIVES-CONTAMINATED BURIAL SITE (ARROYO BURIAL SITE) (SWMU #115)

3.2.1 Disposal Area Characteristics

This SWMU is located in the southeast quarter of the southeast quarter of Section 28 and the northeast quarter of the northeast quarter of Section 33, T1N, R30E, in Roosevelt County, New Mexico. SWMU #115 rests within a small arroyo located in the south-central portion of the range. The SWMU was used for the disposal and burial of UXO in 1989. Figure 3-3 is a site conceptual model of SWMU #115. UXO and other exploded ordnance were collected from the surrounding areas, pushed into the arroyo, and covered with a thin layer of soil. The UXO placed in the arroyo includes 750-lb and 2,000-lb bombs that were live when dropped in the 1960s. The

backfilled portion of the arroyo is approximately 600 feet long, 15 to 20 feet wide, and approximately 15 to 20 feet deep. Surface water may intermittently flow down the unfilled part of the arroyo downgradient of SWMU #115 during heavy rains, eventually draining into a small reservoir in Section 23 on MAFR, approximately 1 mile to the northeast.

3.2.2 Waste Characteristics

The contents of SWMU #115 are believed to consist entirely of UXO used at the range. Live munitions, some of which may have proximity fuses, were buried at the site. Buried munitions include 750-lb and 2,000-lb bombs dropped at the range during the 1960s. Given the history of the site, the waste is mainly composed of explosive compounds. Metals may also be of concern.

Potential contaminant migration pathways include surface water flow and leaching and infiltration of explosives residues. This site is considered to have a moderate potential as a source of soil, sediment, and surface water contamination, principally because of its location in a surface water flow channel.

3.3 DOMESTIC WASTE BURIAL SITE (SWMU #117)

3.3.1 Disposal Area Characteristics

SWMU #117 is located south of the range entrance road in the northeast quarter of the southwest quarter of Section 22, T1N, R30E, in Roosevelt County, New Mexico. This is a low-lying boggy area, approximately 300 feet by 300 feet in size, where domestic waste from the AFR control building was disposed. The site is wet enough that vehicles will sink if driven onto the site. The surrounding area is relatively flat, with the SWMU occupying a slight topographic depression. SWMU #117 is probably a semipermanent playa, receiving surface runoff from the surrounding areas. It is presently unknown if there is any discharge of groundwater to this site. The surrounding land is grassy and flat. Figure 3-4 is a site conceptual model of SWMU #117.

3.3.2 Waste Characteristics

Although it is reported that only domestic waste was disposed at the site, subcontractor personnel indicated in September 1994 that UXO may also have been buried there. Domestic waste disposed at the site could include garbage, food waste, solid waste (paper products), or other common household items. Given the potentially variable nature of domestic waste, it is possible that other substances such as paints, used oil or grease, solvents, batteries, pesticides, herbicides, or other toxic products could have been disposed there. As a result, potential contaminants of concern could range from VOCs, explosive compounds, semivolatile organic compounds (SVOCs), and metals.

This site is considered to have a moderate to high potential as a source of soil, soil gas, atmospheric, and groundwater contamination resulting from migration of contaminants to surrounding media by leaching, dissolution, and vapor migration processes.

3.4 NORTHWEST MUNITIONS DISPOSAL SITE (UNNUMBERED POTENTIAL AOC)

3.4.1 Disposal Area Characteristics

The Northwest Munitions Disposal Site (also referred to as the NW exploded ordnance disposal [EOD] Pit) is located in the east-central part of Section 17, (and may overlap into Section 16), T1N, R30E in Roosevelt County, New Mexico. Figure 3-5 is a site conceptual model of the NW Munitions Disposal Site. The site is flat with native scrub vegetation alternating with occasional areas free of vegetation. The site was in use from approximately 1952 to 1960 and is believed to contain exploded and unexploded ordnance, some of which may contain proximity fuses. Various types of ordnance (mostly small arms) are visible at the surface, and ordnance continues to surface as a result of frost wedging. It is unknown, but believed to be unlikely, that any organic waste has been disposed at this potential AOC. The exact dimensions of the site are also unknown, but it may be as large as 15 acres. A portion of the site extends under the access road. AFR personnel state that a 2,000-lb bomb is buried under the road.

3.4.2 Waste Characteristics

Based on information on site history, the waste at the Northwest Munitions Disposal Site is thought to consist solely of UXO and other munitions. Therefore, the contaminants of concern include explosive compounds and metals.

This site is considered to have a low to moderate potential for soil contamination and a low potential for groundwater contamination, primarily as a result of leaching of explosives residues.

3.5 WORLD WAR II CANTONMENT DISPOSAL SITE (UNNUMBERED POTENTIAL AOC)

3.5.1 Disposal Area Characteristics

The World War II Cantonment Disposal Site is believed to have been located in the northwest quarter of Section 17, T1N, R30E, in Roosevelt County, New Mexico, but the exact location is unknown. The location of this potential AOC will be further investigated during the RFI with the use of aerial photographs and other available sources during the record and literature search portion of the investigation. During World War II, the Army used this area as a cantonment dump/sanitary-landfill site. A cantonment is a temporary housing area for troops. The types and quantities of waste disposed at this site are unknown. Cantonment wastes could consist of any number or combination of wastes, such as domestic waste, motor pool waste, scrap ordnance, UXO, munitions, batteries, oils, fuels, or other items. A site conceptual model for this area has not been created at this time due to a general lack of information on the site, but will be included in the RFI report following field investigation activities.

3.5.2 Waste Characteristics

Given the limited information available concerning the history of this site, the types and characteristics of the waste disposed there is unknown. Potential contaminants of concern could include everything from metals to explosives to VOCs and SVOCs.

The potential of this site as a source of soil and groundwater contamination is unknown but could be significant depending upon the types of wastes present and the potential for migration processes such as infiltration, leaching, cosolvency effects, and soil vapor migration.

3.6 HELICOPTER PAD DISPOSAL/BURN SITE (UNNUMBERED POTENTIAL AOC)

3.6.1 Disposal Area Characteristics

The Helicopter Pad Disposal/Burn site is located north of the MAFR helicopter pad in the northeast quarter of the southwest quarter of Section 22, T1N, R30E, in Roosevelt County, New Mexico. This site was used in the past for burning and/or disposal of wastes. The types and volumes of material disposed at the site are unknown, but are believed to be small. The site is relatively small; the area to be investigated is estimated to be approximately one-quarter acre in size. Figure 3-6 is a site conceptual model of the Disposal/Burn Site. The site is located fairly close to the MAFR control complex. The proximity of the site to the range control complex suggests that the wastes disposed here may be a combination of domestic and/or range industrial waste. This site was eventually closed, backfilled with soil, and graded with a bulldozer. Grasses now thinly cover the pit.

3.6.2 Waste Characteristics

Because the types and quantities of waste disposed here are unknown, an accurate waste characterization cannot be made at this time. The site is expected to contain garbage, residue from burning, possibly spent fuels or motor oils, and metals. Explosive compounds are not anticipated to have been disposed there but may exist. Waste characterization will be addressed in the RFI field program by sampling soils and groundwater for chemical analysis.

The potential of this site as a source of soil and groundwater contamination is unknown. Migration processes, including leaching and infiltration enhanced by cosolvency effects and soil vapor migration, are possible.

3.7 DOMESTIC WASTE BURIAL SITE (EAST OF FIRE STATION) (UNNUMBERED POTENTIAL AOC)

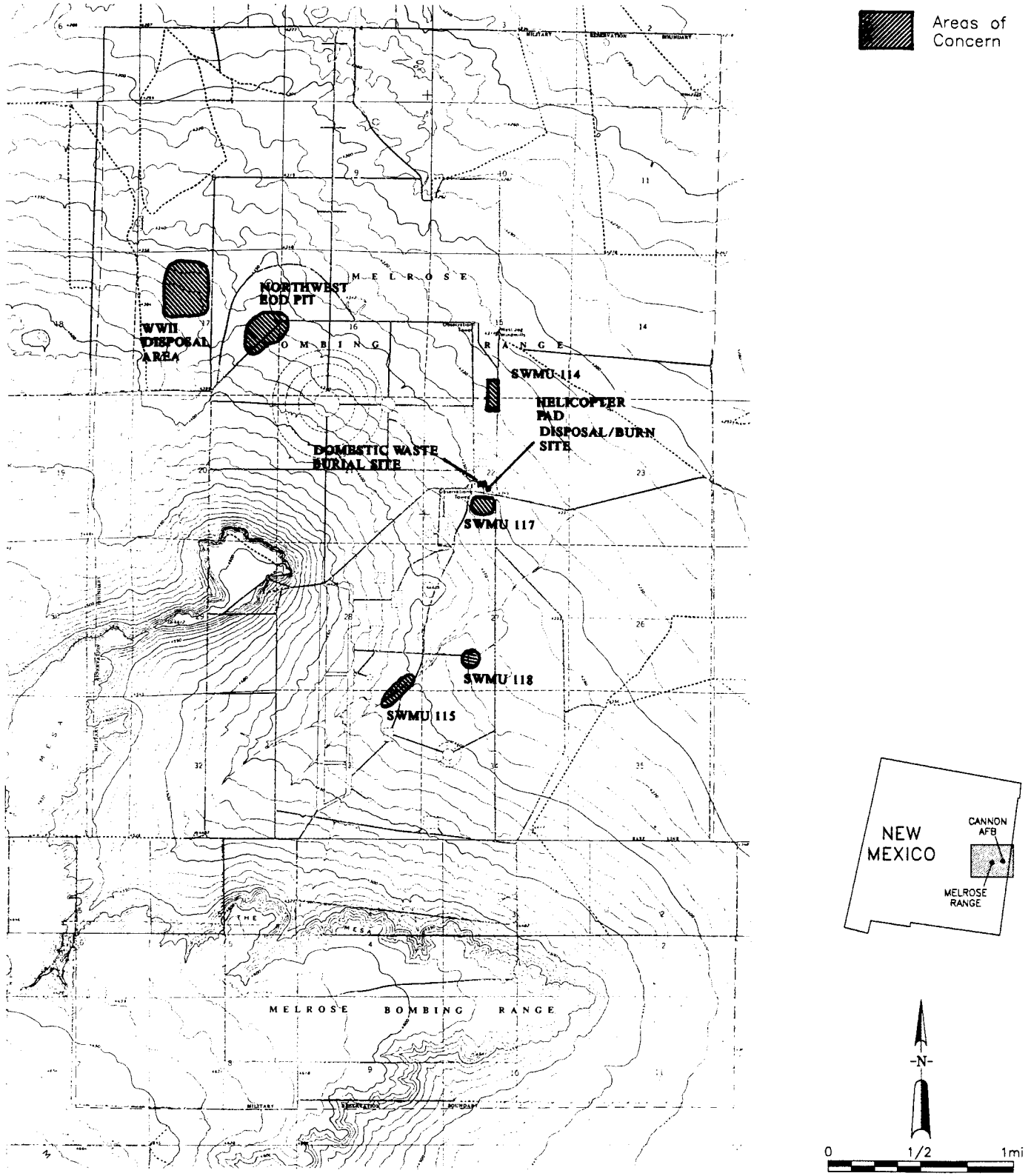
3.7.1 Disposal Area Characteristics

The Domestic Waste Burial site is located to the east of the MAFR fire station in the northeast quarter of the southwest quarter of Section 22, 1N, 30E, of Roosevelt County, New Mexico. This site was used in the past for burning and/or disposal of wastes. The types and volumes of material disposed at the site are unknown. The site is relatively small; the area to be investigated is estimated to be approximately one-half acre in size. This site is closed, and a thin layer of grasses now covers the site. Figure 3-7 is a site conceptual model of the Domestic Waste Burial Site.

3.7.2 Waste Characteristics

Because the types and quantities of waste disposed here are unknown, an accurate waste characterization cannot be made at this time. The site is expected to contain domestic waste, but, given the typically variable nature of domestic waste, it could contain such items such as garbage, potential for residue from burning, possibly spent fuels or motor oils, batteries, paints, pesticides, metals, or other similar items. Explosive compounds are not anticipated to have been disposed there but may exist. Waste characterization will be addressed in the RFI field program by sampling soils and groundwater for chemical analysis.

The migration of contaminants from this site is unknown. The potentially heterogeneous nature of domestic wastes and migration processes such as leaching and infiltration indicate a possibility that this site is a source for soil and groundwater contamination.



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U.S. Army Corps of Engineers, Omaha District
Cannon Air Force Base
Melrose Range

Prepared by:

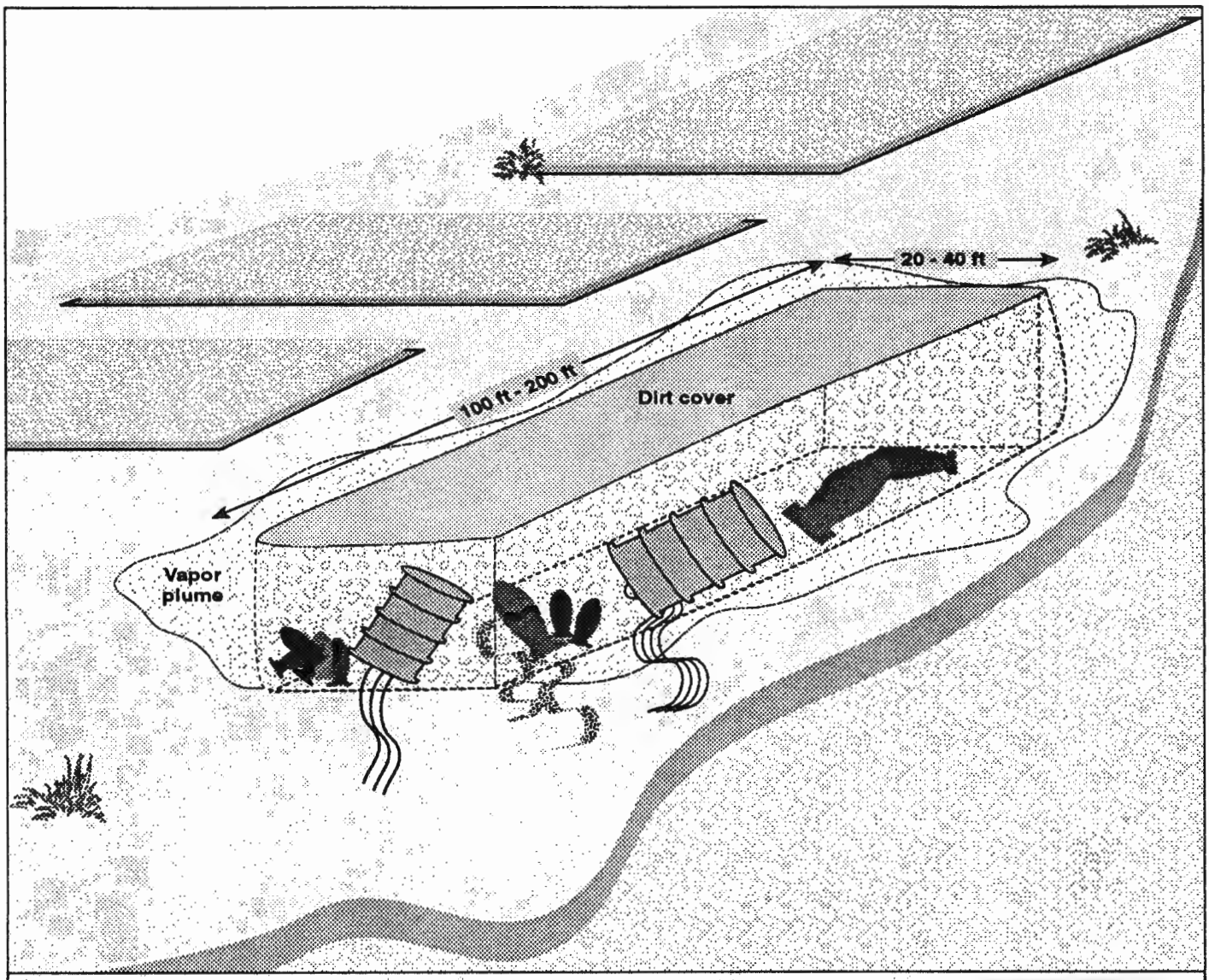
Ebasco Services Incorporated

Figure 3-1

Site Location Map

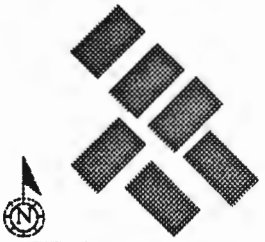
Draft Melrose RFI Workplan

April 1995



Status	Contents
• 1952 - present • 8 buried trenches (1 active, 1 deactivated, 6 backfilled and closed) • 10,000 - 15,000 pounds monthly	• Scrap metal • UXO • Drummed liquids (Fuel, paints, solvents, etc.) • Burned UXOs • Potentially any expended ordnance or CAFB industrial waste

Idealized Plan View



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Cannon Air Force Base
Melrose Range

Prepared by:

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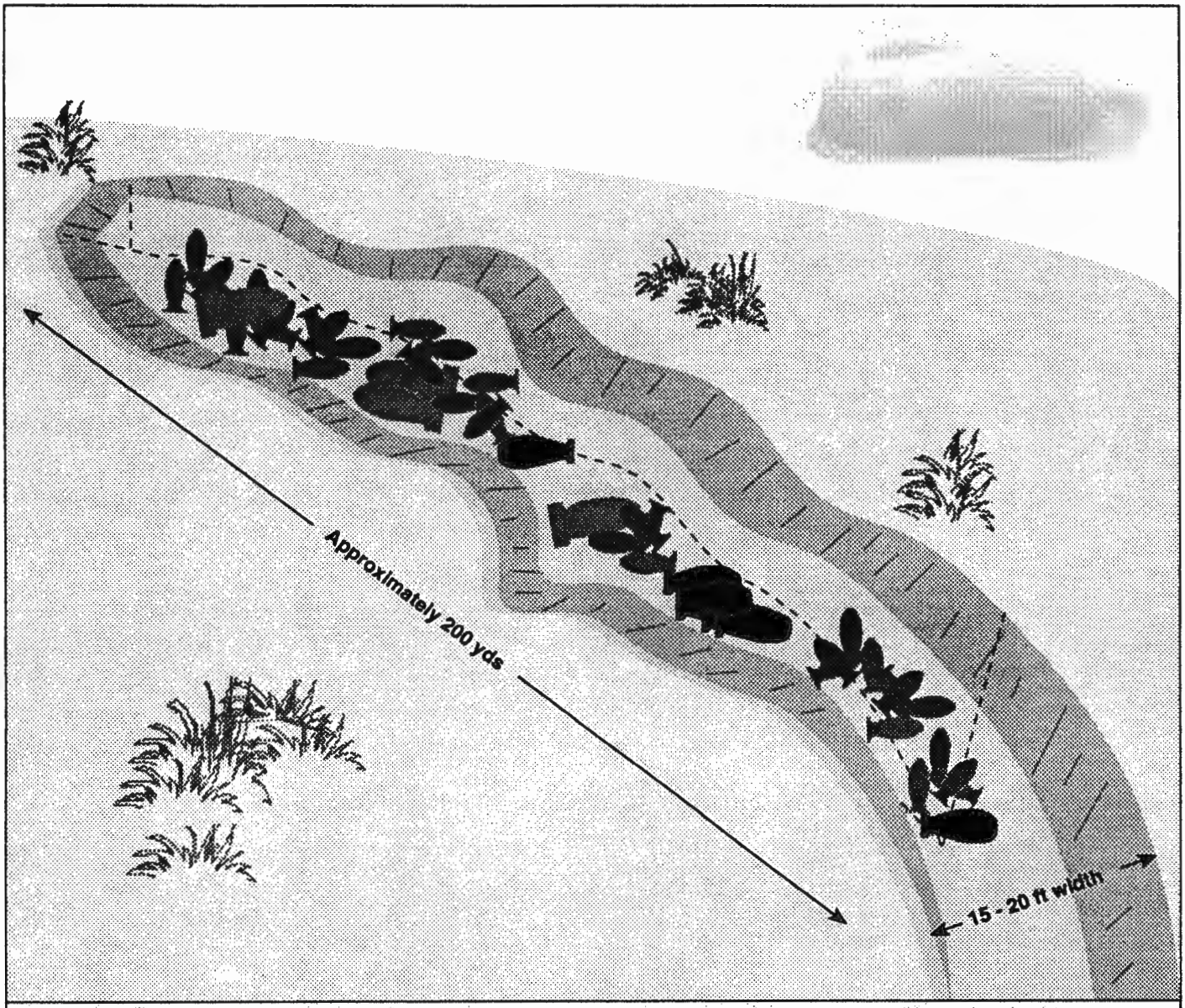
Figure 3-2

SWMU 114
Site Conceptual Model

Draft Melrose RFI Workplan

April 1995



Status

- "Unknown" start-up date; closed for "a long time"
- UXO burial (2,000 pound and 750 pound bombs)
- Depth in arroyo highly variable, approximately 15 - 20 ft
- Grown-over with vegetation
- Run-off down remainder of natural arroyo into Range reservoir

Contents

- Live munitions, UXOs
- Scrap metal

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Melrose Range

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Figure 3-3

SWMU 115
Site Conceptual Model

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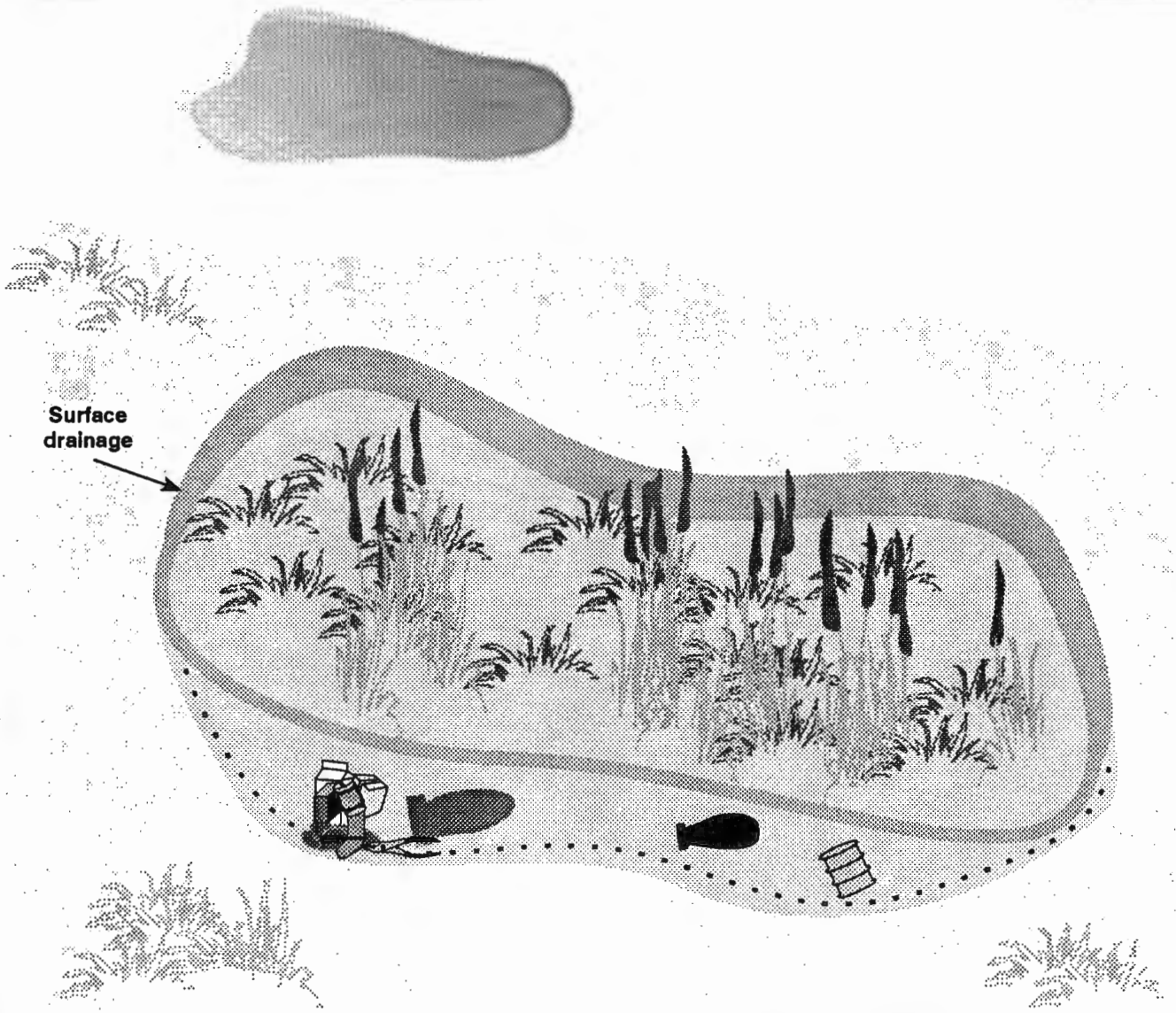
April 1995



Status

- Boggy, low-lying area
- Surrounding vegetation golden color; bog vegetation darker
- 1/2 - 1-1/2 acres

Contents

- Drums (?)
- Garbage, general refuse
- Possiby UXOs (Unconfirmed)

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Figure 3-4

SWMU 117
Site Conceptual Model

Draft Melrose RFI Workplan

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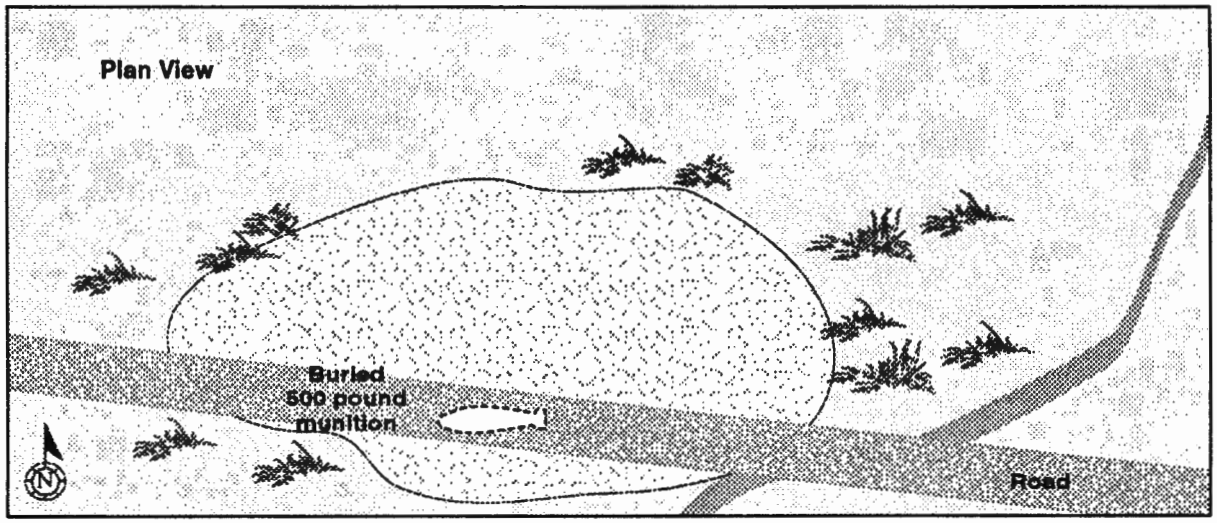

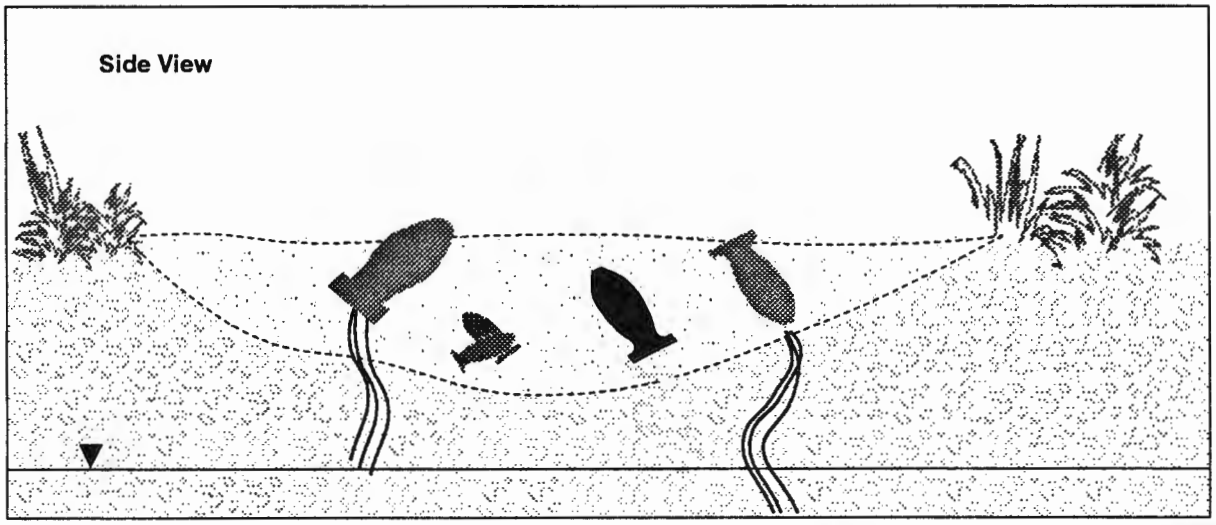

Contents

- 1952 - 1960
- Exploded and unexploded ordnance
- Proximity fuses
- Ordnance exposed at surface

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Figure 3-5

Northwest Munitions Disposal Site
Conceptual Model

Draft Melrose RFI Workplan

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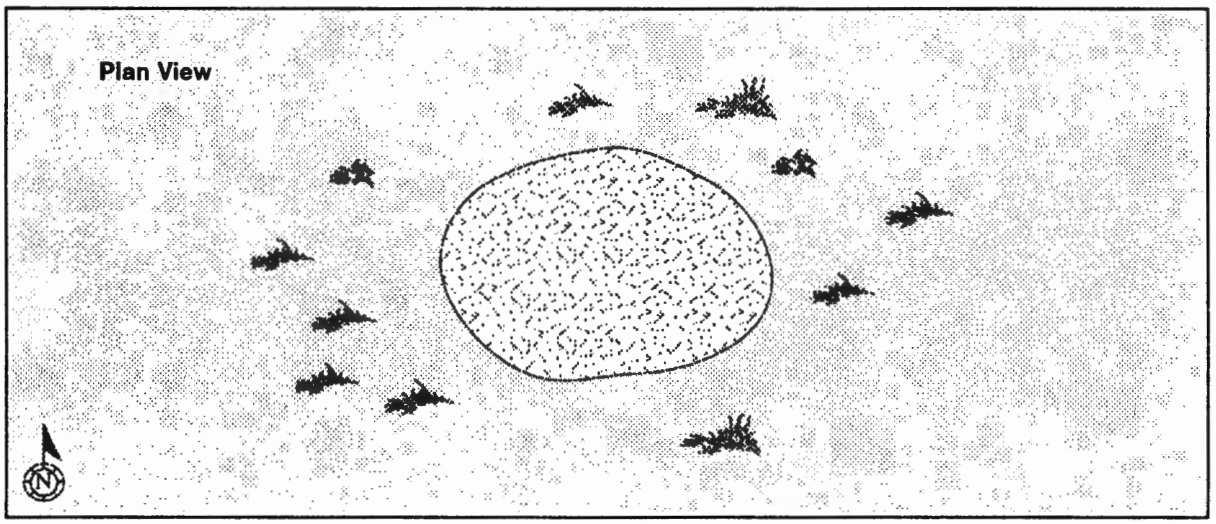

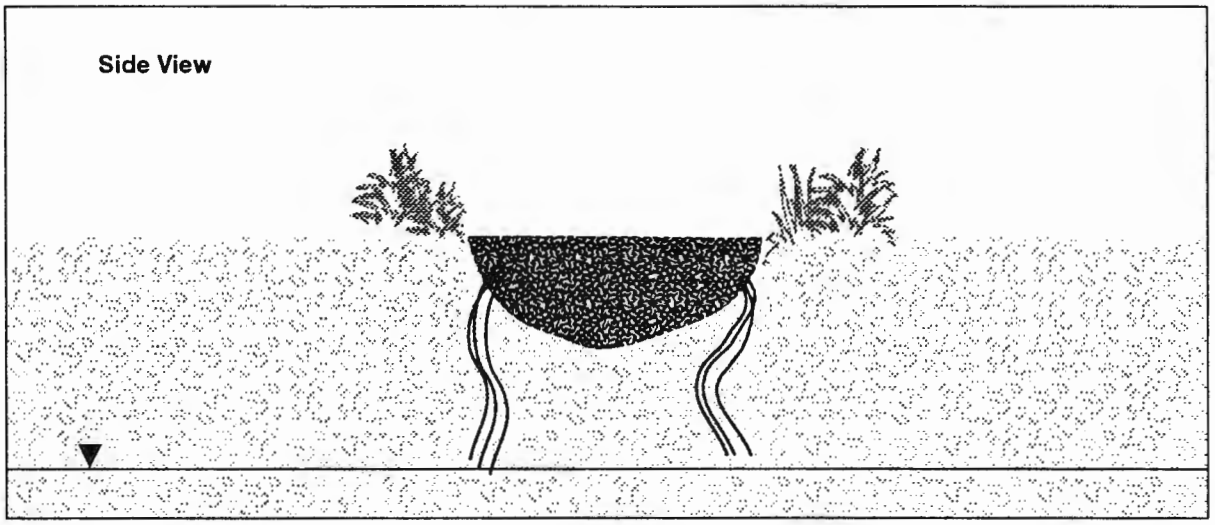

Contents

- Used for burning / disposal of wastes
- Contents unknown
- Approximately 1/4 acre in size
- Depth of site unknown

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Melrose Range

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Figure 3-6

Helicopter Pad Disposal / Burn Site Conceptual Model

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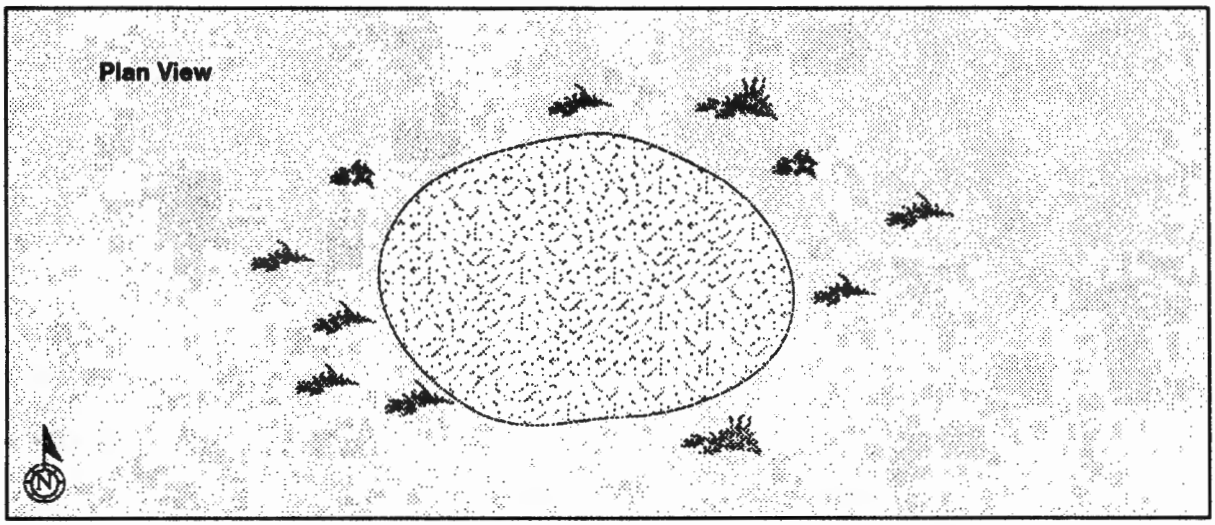

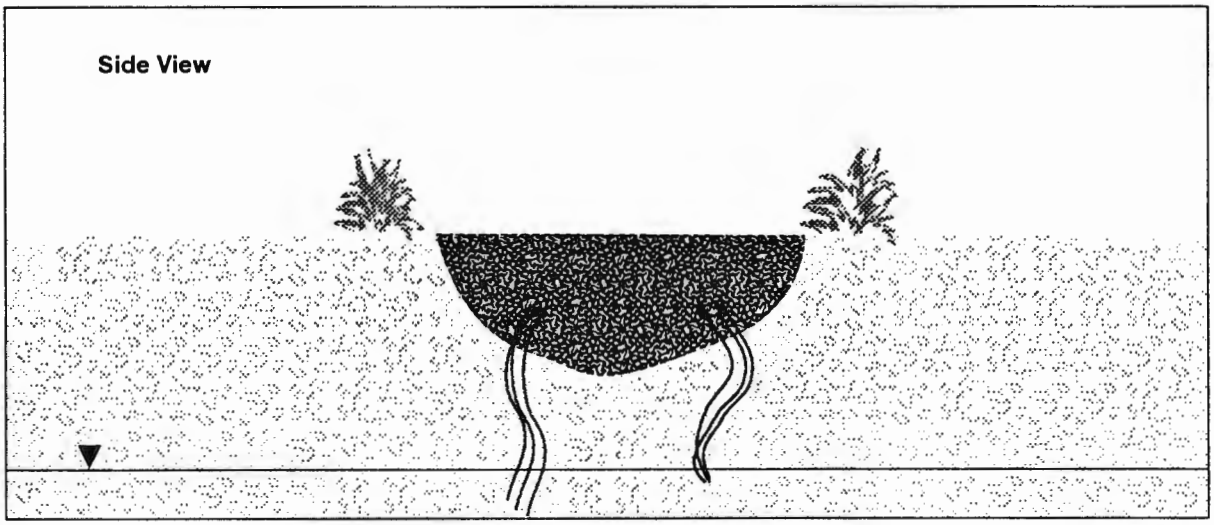

Contents

- Used for burning / disposal of wastes
- Contents unknown
- Approximately 1/2 acre in size
- Depth of site unknown

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Melrose Range

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Figure 3-7

Domestic Waste Burial Site Conceptual Model

Draft Melrose RFI Workplan

April 1995

ATTACHMENT 1
WELL COMPLETION DIAGRAM FOR
MONITORING WELL 1MW-1

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

Depth interval below land surface (feet)	Lithologic description
31 – 35	
35 – 42	31' - 42' Sand with silt and minor silty clay clumps and also pebbles with cobbles: sand very fine to medium grained: pebbles 25%, 15 to 60 mm, subangular to subrounded; cobble 100 mm (terminated by coring), subangular; pebbles and cobble limestone; light brown (5 YR 5/6), clumps moderately/firmly compacted; strong reaction with HCl.
42 – 44	42' - 44' Clayey silt with sand: sand very fine grained, arkosic; light brown (5 YR 5/6), contains root holes and Mn flakes moderately compacted, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl.
44 – 47	44' - 47' Silty sand grading downward to silty sand with pebbles, sand very fine to fine-grained with <1% coarser whole pebbles, pebbles <2%, subangular to rounded, mostly <8 mm with few to 12 mm, scattered, except at basal contact; sand-quartz, pebbles-quartz, chert, limonite; reddish brown, moderately compacted, minor root holes, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl; abrupt basal contact includes 30-mm limestone ($CaCO_3$) blob with regular horizontal and irregular near horizontal laminae, also dendritic.
47	TOP OF ROCK
47 – 54.5	47' - 54.5' Silty clay and clayey silt, moderate-reddish-brown (10 YR 4/5); moderately/strongly compacted, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl, upper portion contains $CaCO_3$-rich blobs, also major clayey blobs, greenish gray (5 GY 6/1), with moderate/strong reaction with HCl in lower portion of interval.
54.5 – 57	54.5' - 57' Silty sand; sand very fine grained, well sorted, moderate reddish brown (10 YR 4/5), moderately laminated <1 mm moderately compacted, strongly cemented, no reaction to moderate/strong reaction with HCl where calcareous; gradual basal contact.
57	TOP OF SOUND ROCK
57 – 61	57' - 61' Sandstone with siltstone in lower central portion; sand very fine grained, clayey in lower portion, well sorted, micaceous in upper portion; moderate brown (5 YR 4/4), poorly to well laminated <1 mm to 3 mm; moderately hard, readily scratches with knife, no reaction with HCl.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

Depth interval below land surface (feet)	Lithologic description
61 - 70.5	Sandstone, very fine to fine-grained, upper and lower 1' pale-greenish-yellow (10 YR 8/2), otherwise grayish-brown (5 YR 3/2), massive to laminated, moderately cemented, scratches with knife, no reaction with HCl.
70	Mudstone/shale, poorly defined 0.1-0.2' zone, irregular, moderate-brown (5 YR 4/4).
70.5 - 71	Siltstone, shaley; micaceous, moderate brown (5 YR 4/4), poor fissility, no reaction with HCl.
71 - 77	Sandstone, very fine to fine-grained; arkose; grayish brown (5 YR 3/2), massive to laminated; poorly cemented, scratches with fingernail when wetted; no reaction with HCl, blebby basal contact.
77 - 77.5	Shale, silty and sandy; sand very fine grained, arkosic, moderate brown (5 YR 4/4), poor fissility, irregular near-horizontal fracture in upper portion and 15 degrees (from horizontal) planar slicken-sided surface are Fe stained; no reaction with HCl.
77.5 - 82	Sandstone; very fine to fine or medium grained in lower central portion; grayish brown (5 YR 3/2); massive to laminated, weakly cemented, scratches with fingernail when wetted; no reaction with HCl.
82 - 85.2	Mudstone/shale; moderate brown (5 YR 4/4); irregular, near-horizontal weak fissility; weak reaction with HCl; basal contact is abrupt 50 degrees near-planar slicken-side with Fe stains.
85.2 - 85.5	Mudstone with volcanic ash (?), contains 10 to 20% silt and very fine to fine-grained sandstone, including glassy material; greenish gray (5 GY 6/1); poorly cemented, easily scratched when wetted; weak reaction with HCl; basal contact is abrupt and irregular.
85.5 - 95	Mudstone and shale; greenish gray (5 GY 6/1); poor to moderately developed fissility, dissolves in water, few scattered slicken-sides and minor near-vertical hairline fractures are Fe stained; weak reaction with HCl.

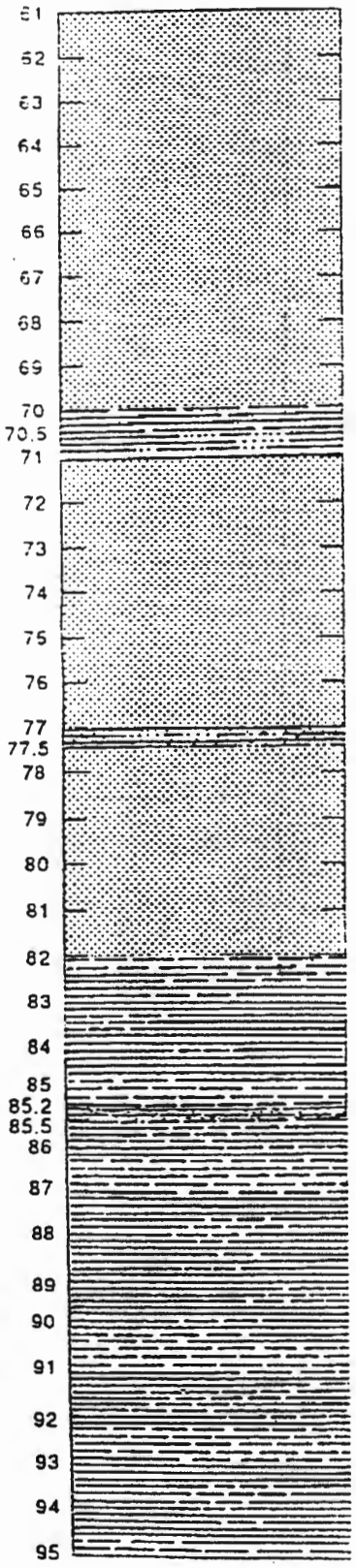


Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Base, NM--Continued

Depth interval below land surface (feet)	Lithologic description
95 - 105	95' - 105' Sandstone, very fine to fine- or medium-grained; greenish gray (5 GY 6/1); 97- to 100'-zone recovered crumbly (reported to be water bearing), small pieces easily crushed when wetted, no to weak reaction with HCl.
105 - 107	105' - 107' Mudstone, greenish-gray (5 GY 6/1).
107 - 119	107' - 119' Mudstone, very silty, and siltstone, moderate-brown (5 YR 4/4), soft, easily scratched with knife, very weak reaction with HCl.
119 - 120.2	119' - 120.2' Sandstone, very fine to fine-grained; grayish green (5 GY 6/1) to grayish brown (5 YR 3/2); massive, moderately hard, scratches with knife.
120.2 - 125	120.2' - 125' (Cuttings) Shale, silty; moderate brown (5 YR 4/4) and greenish gray (5 GY 6/1); no reaction with HCl.

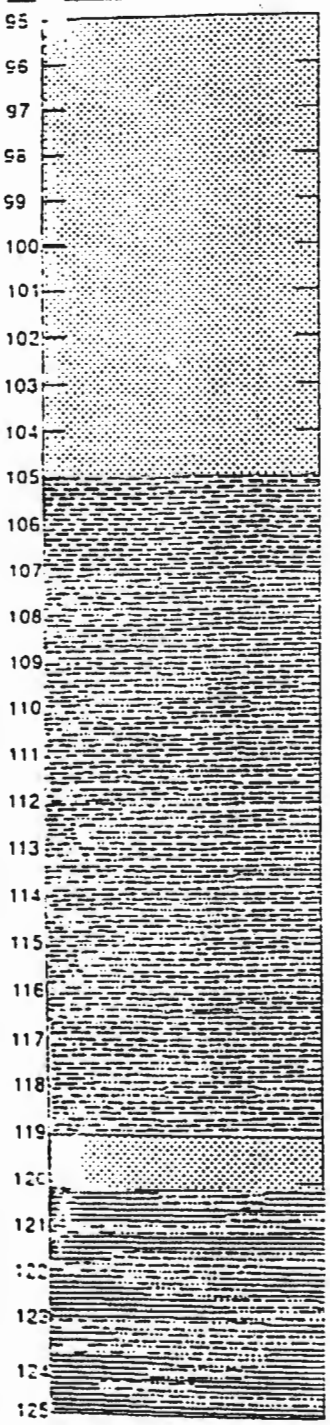


Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

Depth interval below land surface (feet)	Lithologic description
125–155	125' - 150' (Cuttings) Shale, silty; moderate brown (5 YR 4/4) and greenish gray (5 GY 6/1); no reaction with HCl.
	150' - 155' (Cuttings) Mudstone/shale; brownish-gray (5 YR 4/1), cuttings difficult to break with fingernail when dry, dissolves when wetted, no reaction with HCl.

Figure 2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Concluded

Depth interval below land surface (feet)	Lithologic description
155' - 165'	(Cuttings) Shale and silty shale: greenish gray (5 GY 6/1), cuttings difficult to break with fingernail when dry, dissolves when wetted, no reaction with HCl.
165' - 180'	(Cuttings) Sandstone with siltstone and shale, very fine to fine-grained, greenish-gray (5 GY 4/1), small pieces easily crushed with fingers when wetted (except for well-indurated shale); no reaction with HCl.

Table 2.2.2.1.--Lithologic log of core from hole OB/OD-01 Melrose Air Force Range, NM

Depth interval below land surface (feet)	Lithologic description
0' - 2'	Recovery 11". Very compacted silt (cemented). Munsell color chart: silt is grayish orange pink (5 YR 7/2). A few thin layers of calcification. Root tubes throughout this interval.
2' - 4'	Recovery 22". Very similar to above interval. Still grayish orange pink (5 YR 7/2). The layers or more of a banding of the calcification has slightly increased, but not yet turned to caliche. No sand or gravel.
4' - 6'	Recovery 20". Interval is still cemented silt with some very fine sand. Slight color change, light brown (5 YR 6/4). Thin bands of caliche. Also a few small bands of a darker fine sandy silt, moderate brown (5 YR 4/4). Still root tubes throughout.
6' - 8'	Recovery 23". Light-brown (5 YR 6/4) compacted silt with some very fine sand, small amount of bands of caliche. No moderate-brown bands. Still root tubes.
8' - 10'	Recovery 22". Still has light-brown (5 YR 6/4) compacted silt with some very fine sand However, there are more caliche layers. The silt and caliche seem to be pressed together in layers, breaking apart in layers. Root tubes.
10' - 12'	Recovery 20". Interval is basically the same as the previous sample. A slight change in color, light brown (5 YR 5/6). Slight increase in quantity of very fine sands. There are also a few pieces of small dark gray-black gravel, 1-2 mm. Root tubes.
12' - 14'	Recovery 23". Same as above; decrease in the compacted layers, more loosely packed. More fine sand. Caliche is now more of a calcification with more nodules rather than layers.
14' - 16'	Recovery 23". Has become more cemented silt. Most of this interval (14.7'-16') has a color change, grayish orange pink (5 YR 7/2). Less fine sand and more banding of the calcification. Almost no small gravel. Root tubes.
16' - 18'	Recovery 19". Same as above (14.7'-16').
18' - 20'	Recovery 24". Layered cemented silt. No small gravel. Very small percentage of fine sand. Color varies. Area with more calcification is grayish orange pink (5 YR 7/2); less calcification is light brown (5 YR 6/4). Still root tubes.

Table 2.2.2.2.--Lithologic log of core from hole OB/OD-02 Melrose Air Force Range, NM

Depth interval below land surface (feet)	Lithologic description
0 - 2'	Recovery 22". Very compacted silt. Light brown in color (5 YR 5/6) (Munsell color chart). Diameter of acetate sample tube is 28 mm. Numerous layers of caliche material, as large as the full diameter of tube. Numerous nodules of caliche throughout interval. Small amount of limestone gravel, as large as 5 mm--angular in shape. Root zones throughout core.
2' - 4'	Recovery 22". Basically same as above. Compacted dry silt. Slight change in color, light brown (5 YR 6/4). No hard caliche layers but several irregularly banded or spotted lighter colored--probably some calcification. Root tubes throughout interval. Traces of small, gray or darker, subangular to angular gravel.
4' - 8'	Most of material is compacted light-brown silt similar to above, but now has a large amount of poorly sorted gravel (quartz, feldspar, limestone). Gravel is generally subrounded to subangular (many angular fractured pieces). Sizes range up to diameter of sampling tube (28 mm) and probably much larger. Large amount of caliche and other lesser degrees of calcification.
8' - 12'	Similar to previous interval only now lighter in color, grayish-orange-pink (5 YR 7/2). Much less gravel than previous interval. Overall more compacted and calcified than before (several very "tight" zones).
12' - 15'	Tightly compacted light-brown silt with many light-colored calcified zones; slightly more gravel than previous interval (gravel is generally smaller, down to sand size). No white bands of caliche.
15' - 20'	Compacted brown silt, light-brown (5 YR 5/6), slightly darker than before. A lot of fine sand with some coarse sand to fine gravel. Several caliche nodules, but no large caliche layers. Noticed a dime-sized piece of shrapnel in sample. No root tubes.
20' - 22'	Upper 1.3' of this interval is still compacted light-brown silt with fine sand. The lower 0.7' is a mixture of light-brown silt with coarse dark-gray and black sand with small limestone gravel as large as large as 5 mm. Also a hard caliche layer 0.1' thick at 21.8'.

Table 2.2.2.3.--Lithologic log of core from hole OB/OD-03 Melrose Air Force Range, NM

Depth interval below land surface (feet)	Lithologic description
0 – 1	0' - 1' Moderate-brown (5 YR 4/4) silt, lightly compacted with some fine sand and trace of small gravel (limestone and quartz), subrounded to subangular. Plant roots throughout.
1 – 2	1' - 2' Light-brown (5 YR 6/4) moderately compacted silt, about 10% randomly "speckled" with white nodules or small bands of caliche. Some fine sand, no gravel. Root zones throughout.
2 – 4	2' - 4' Moderate orange-pink (5 YR 8/4) silt with some fine- to very fine-grained sand. About 30% is white banded but very few separate nodules. Root tubes throughout. No gravel.
4 – 7	4' - 7' Light-brown (5 YR 6/4) silt with some very fine- to fine-grained sand. Moderately compacted with small amount of white nodules (calcification) and irregular light-colored bands. Small number of small limestone nodules. Root tubes throughout (no gravel).
7 – 9	7' - 9' Light-brown silt and very fine sand similar to previous interval, only a half-shade darker in color, probably due to decrease overall in calcification. Still a few white calcite nodules. Traces of very hard sandstone. Root tubes throughout. No gravel.
9 – 12	9' - 12' Light-brown silt and fine-grained sand as above (somewhere between 5 YR 6/4 and 5 YR 8/4). Slight increase in small calcite nodules and lighter irregularly shaped zones. Slight trace of small gravel, mostly limestone, some quartz (quartz is well rounded.) Root tubes.
12 – 14	12' - 14' Light-brown (5 YR 6/4) silt and very fine-grained sand similar to previous intervals. Slightly more compaction than before. Only trace of small calcite nodules and lighter colored irregularly shaped zones. No gravel, small amount of pale-brown (5 YR 5/2) clay at about 13 feet. Root tubes throughout.
14 – 16	14' - 16' Light-brown silt and very fine-grained sand, similar to previous interval, only has small color variations (lighter/darker) throughout interval. Small amount of white calcite nodules. Trace of gravel (mostly subrounded to subangular limestone fragments - generally very small). Root tubes throughout.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM

Depth interval below land surface (feet)	Lithologic description
0 - 5'	No samples retained.
5' - 6'	(Cuttings) Sandy silt with clay and caliche nodules; sand very fine to medium grained; light brown (5 YR 5/6); strong reaction with HCl; caliche nodules 60%, ≤ 20 mm.
6' - 7'	(Cuttings) Silty sand with caliche and minor pebbles; sand very fine to fine-grained, pebbles <5%, <10 mm, subangular; pebbles limestone, sandstone, quartz; light brown (5 YR 5/6), strong reaction with HCl; caliche occurs as matrix and nodules < 10 mm.
7' - 8'	(Cuttings) Silty sand with caliche and minor pebbles; sand very fine to fine grained; pebbles <5%, <10 mm, subangular; pebbles limestone, sandstone, quartz; light brown (5 YR 5/6), strong reaction with HCl; caliche occurs as matrix and nodules <10 mm.
8' - 9'	(Cuttings) Sandy silt with clay; sand very fine to fine grained; moderate brown (10 YR 4/6), strong reaction with HCl.
9' - 10'	(Cuttings) Sandy silt with clay; sand very fine to fine grained; light brown (5 YR 5/6), strong reaction with HCl.
10' - 11'	(Cuttings) Silty sand with clay; sand very fine to fine grained; with 5% medium grained; moderate reddish brown (10 YR 4/6); strong reaction with HCl.
11' - 18'	Clayey silt with sand; sand very fine to fine grained to medium grained; in lower portion, arkosic; light brown (5 YR 5/6); moderately compacted; weakly cemented with $CaCO_3$, strong reaction with HCl; fairly abrupt basal contact.
18' - 24'	Silty clay, similar to previous interval. Contains 0.5- to 1-mm-diameter root holes and 1 mm flakes of irridescent bluish-black Mn-oxide? (weakly magnetic).
24' - 31'	Sand with silt and clay; sand very fine to fine grained in upper portion; very fine to medium grained in lower portion, sand-quartz; moderate yellowish brown (10 YR 5/4), moderately compacted, weakly cemented with $CaCO_3$, strong reaction with HCl; contains root holes and Mn flakes in upper portion; basal contact consists of a 40-mm (?) silty limestone lens; hard, difficult to break with hammer.

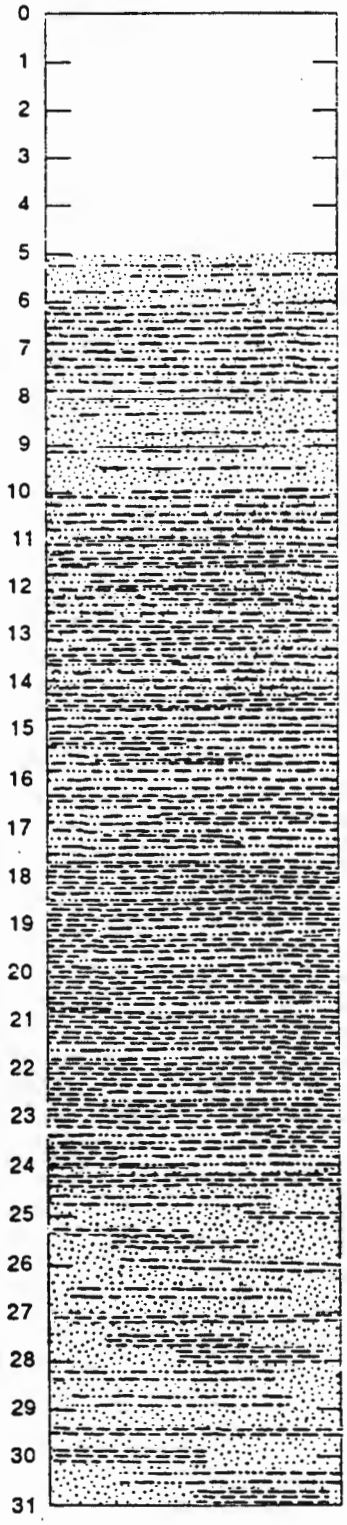


Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

Depth interval below land surface (feet)	Lithologic description
31 – 42	Sand with silt and minor silty clay clumps and also pebbles with cobbles; sand very fine to medium grained; pebbles 25%, 15 to 60 mm, subangular to subrounded; cobble 100 mm (terminated by coring), subangular; pebbles and cobble limestone; light brown (5 YR 5/6), clumps moderately/firmly compacted; strong reaction with HCl.
42 – 44	Clayey silt with sand; sand very fine grained, arkosic; light brown (5 YR 5/6), contains root holes and Mn flakes moderately compacted, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl.
44 – 47	Silty sand grading downward to silty sand with pebbles, sand very fine to fine-grained with <1% coarser whole pebbles, pebbles <2% subangular to rounded, mostly <8 mm with few to 12 mm, scattered, except at basal contact; sand-quartz, pebbles-quartz, chert, limonite; reddish brown, moderately compacted, minor root holes, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl; abrupt basal contact includes 30-mm limestone ($CaCO_3$) blob with regular horizontal and irregular near horizontal laminae, also dendritic.
	TOP OF ROCK
47 – 54.5	Silty clay and clayey silt, moderate-reddish-brown (10 YR 4/5); moderately/strongly compacted, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl, upper portion contains $CaCO_3$-rich blobs, also major clayey blobs, greenish gray (5 GY 6/1), with moderate/strong reaction with HCl in lower portion of interval.
54.5 – 57	Silty sand; sand very fine grained, well sorted, moderate reddish brown (10 YR 4/5), moderately laminated <1 mm moderately compacted, strongly cemented, no reaction to moderate/strong reaction with HCl where calcareous; gradual basal contact.
	TOP OF SOUND ROCK
57 – 61	Sandstone with siltstone in lower central portion; sand very fine grained, clayey in lower portion, well sorted, micaceous in upper portion; moderate brown (5 YR 4/4), poorly to well laminated <1 mm to 3 mm; moderately hard, readily scratches with knife, no reaction with HCl.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

Depth interval below land surface (feet)	Lithologic description
61 - 70.5'	Sandstone, very fine to fine-grained, upper and lower 1' pale-greenish-yellow (10 YR 8/2), otherwise grayish-brown (5 YR 3/2), massive to laminated, moderately cemented, scratches with knife, no reaction with HCl.
70'	Mudstone/shale, poorly defined 0.1-0.2' zone, irregular, moderate-brown (5 YR 4/4).
70.5' - 71'	Siltstone, shaley micaceous, moderate brown (5 YR 4/4), poor fissility, no reaction with HCl.
71' - 77'	Sandstone, very fine to fine-grained; arkose; grayish brown (5 YR 3/2), massive to laminated; poorly cemented, scratches with fingernail when wetted; no reaction with HCl, blebby basal contact.
77' - 77.5'	Shale, silty and sandy; sand very fine grained, arkosic, moderate brown (5 YR 4/4), poor fissility, irregular near-horizontal fracture in upper portion and 15 degrees (from horizontal) planar slicken-sided surface are Fe stained; no reaction with HCl.
77.5' - 82'	Sandstone; very fine to fine or medium grained in lower central portion; grayish brown (5 YR 3/2); massive to laminated, weakly cemented, scratches with fingernail when wetted; no reaction with HCl.
82' - 85.2'	Mudstone/shale; moderate brown (5 YR 4/4); irregular, near-horizontal weak fissility; weak reaction with HCl; basal contact is abrupt 50 degrees near-planar slicken-side with Fe stains.
85.2' - 85.5'	Mudstone with volcanic ash (?), contains 10 to 20% silt and very fine to fine-grained sandstone, including glassy material; greenish gray (5 GY 6/1); poorly cemented, easily scratched when wetted; weak reaction with HCl; basal contact is abrupt and irregular.
85.5' - 95'	Mudstone and shale; greenish gray (5 GY 6/1); poor to moderately developed fissility, dissolves in water, few scattered slicken-sides and minor near-vertical hairline fractures are Fe stained; weak reaction with HCl.

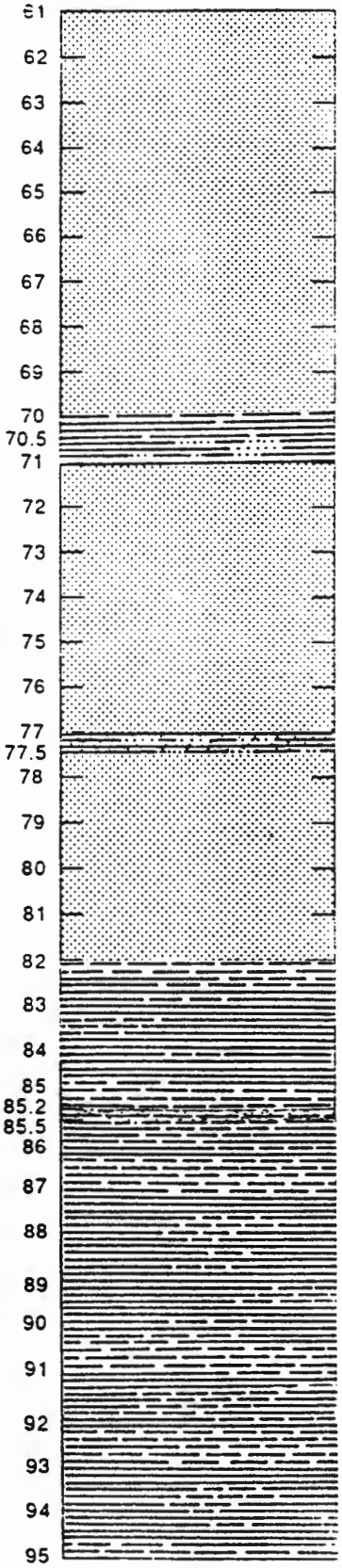


Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Base, NM--Continued

Depth interval below land surface (feet)	Lithologic description
95 - 105	95' - 105' Sandstone, very fine to fine- or medium-grained; greenish gray (5 GY 6/1); 97- to 100'-zone recovered crumbly (reported to be water bearing), small pieces easily crushed when wetted, no to weak reaction with HCl.
105 - 107	105' - 107' Mudstone, greenish-gray (5 GY 6/1).
107 - 119	107' - 119' Mudstone, very silty, and siltstone, moderate-brown (5 YR 4/4), soft, easily scratched with knife, very weak reaction with HCl.
119 - 120.2	119' - 120.2' Sandstone, very fine to fine-grained: grayish green (5 GY 6/1) to grayish brown (5 YR 3/2); massive, moderately hard, scratches with knife.
120.2 - 125	120.2' - 125' (Cuttings) Shale, silty; moderate brown (5 YR 4/4) and greenish gray (5 GY 6/1); no reaction with HCl.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

Depth interval below land surface (feet)	Lithologic description
125–155	
125' - 150'	(Cuttings) Shale, silty; moderate brown (5 YR 4/4) and greenish gray (5 GY 6/1); no reaction with HCl.
150' - 155'	(Cuttings) Mudstone/shale; brownish-gray (5 YR 4/1), cuttings difficult to break with fingernail when dry, dissolves when wetted, no reaction with HCl.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Concluded

Depth interval below land surface (feet)	Lithologic description
155	
156	
157	
158	
159	
160	
161	155' - 165' (Cuttings) Shale and silty shale: greenish gray (5 GY 6/1), cuttings difficult to break with fingernail when dry, dissolves when wetted. no reaction with HCl.
162	
163	
164	
165	
166	
167	
168	
169	
170	
171	
172	165' - 180' (Cuttings) Sandstone with siltstone and shale, very fine to fine-grained, greenish-gray (5 GY 4/1), small pieces easily crushed with fingers when wetted (except for well-indurated shale); no reaction with HCl.
173	
174	
175	
176	
177	
178	
179	
180	

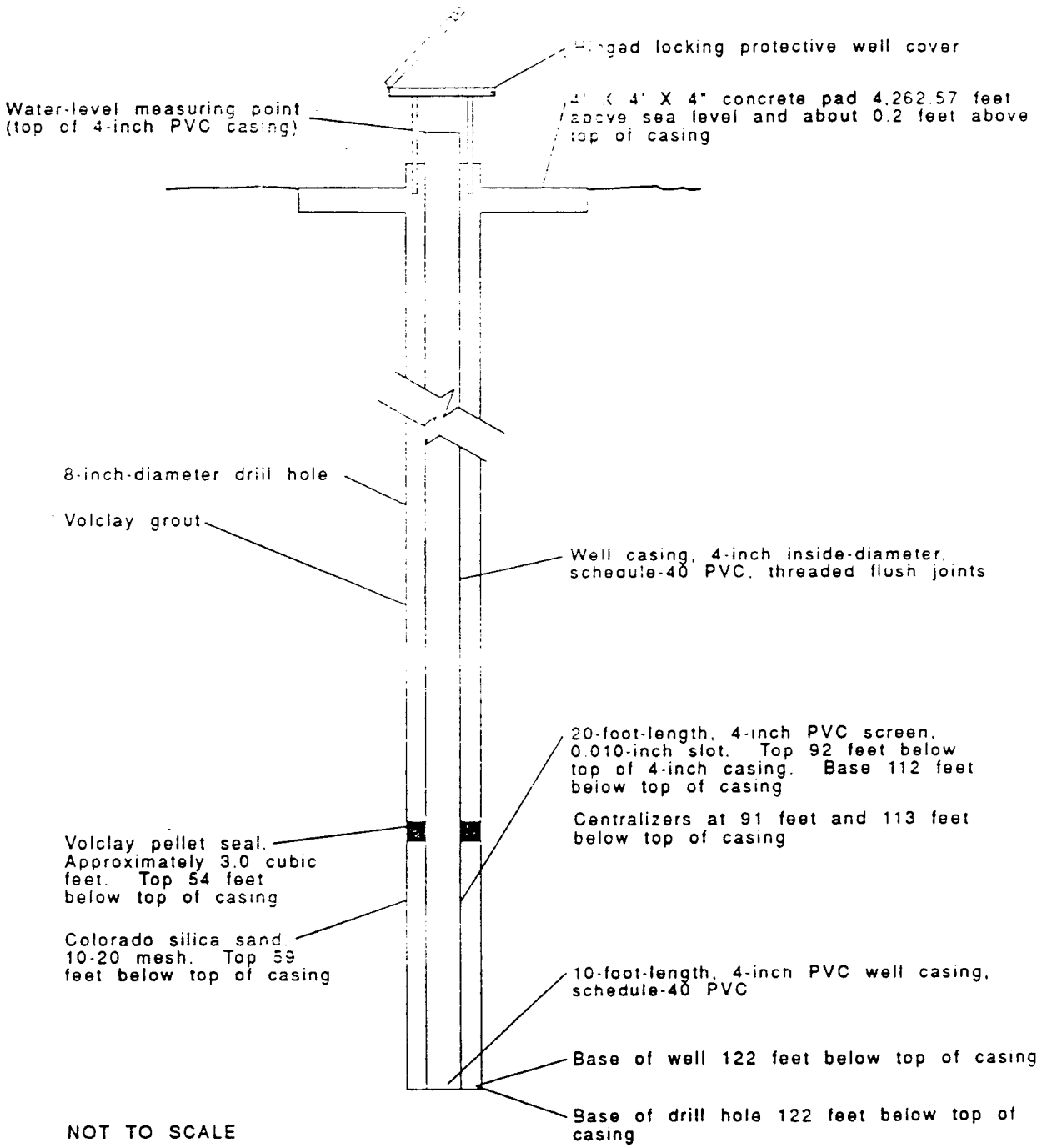


Figure 2.2.2.1.--Well-completion diagram for monitoring well 1MW-1. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started 06-03-93. Completed 06-07-93. Well drilled using mud-rotary method and Wyoming sodium bentonite drilling fluid.

4.0 CONTAMINANT CHARACTERIZATION

The investigations to be conducted under this Final Work Plan involve the execution of a series of tasks to collect analytical data on soil and groundwater at the three SWMUs and four potential AOCs at MAFR for contaminant characterization. Data obtained will provide the basic information needed to assess degree of contamination in environmental media at each site, including surface soil, subsurface soil, sediment, surface water, groundwater, subsurface soil gas, and air. Contaminant characterization will be directed toward defining the extent, origin, direction, and rate of movement of potential contaminant plumes. The results of the contaminant characterization will establish the need for potential remedial action alternatives, more rigorous contaminant fate analysis, risk assessment, additional field investigative activities (a Phase II RFI investigation), or no further actions.

4.1 SOIL CONTAMINATION

Potential soil contamination at MAFR will be addressed during the field investigation through sampling and analysis of selected soil samples. Table 4-1 outlines the number and types of sampling activities to be conducted at each site at MAFR.

Soil sampling will consist of surface soil and sediment sampling (0 to 6 inches below ground surface [bgs] for all analyses except VOCs; 6 to 12 inches bgs for VOCs) and subsurface soil sampling (> 6 inches bgs). Analysis of soil and sediment samples will consist of chemical analyses for organic and inorganic analytes as well as analyses for selected geotechnical parameters. Chemical analyses of soil and sediment samples will be used to ascertain the nature and extent of chemical contamination in soil, whereas geotechnical sampling and analysis will be performed to establish the chemical and physical properties of site soil and sediment for input to fate and transport calculations, risk assessment, and remedial design, if appropriate.

4.1.1 Surface Soil and Sediment

Potential contamination of surface soil and sediment at MAFR will be evaluated by the acquisition and chemical analysis of selected soil and sediment samples. The objective of chemical analysis is to determine the presence of potential contamination and identify the types and quantities of contaminants, both organic and inorganic, present in these media.

The presence of contamination in surface soil and sediments may be the result of a number of migration processes, such as the vertical diffusion of VOCs in soil gas, by direct contact between surface soil or sediment with near-surface contaminant sources, or by migration of the contaminants from the source to nearby soils or sediments by wind dispersion or surface runoff processes. Analysis of surface soil and sediment contamination will be used to assess the potential and future migration of contaminants via these contaminant migration pathways. Results from laboratory analysis of contaminants will be plotted on maps and the concentrations of contaminants contoured.

Surface soil samples will be collected from target locations at each site, whereas sediment samples will only be collected at locations having appreciable surface runoff and associated sediments. Sediment sampling will therefore only be conducted at SWMU #115, where the potential for downstream surface water transport of contaminants in arroyo sediments exists. Surface soil samples will be collected from the top 6 inches of soil at each targeted soil boring location as outlined in the FSP. Sediment samples will be collected from the top 6 inches of sediment from representative locations along the arroyo, downstream from SWMU #115. Both surface and sediment samples will be collected by hand using a stainless steel trowel or hand auger. Where VOC analyses are required, the 6 to 12 inch interval bgs will be sampled. Overall, a total of 39 surface soil including background sampling and contingency and 4 sediment samples will be collected for analysis and contamination characterization during the RFI at MAFR. Surface soil and sediment sampling procedures are outlined in detail in SOP No. 6. More specific information

regarding surface soil and sediment sampling is presented in the QAPP and FSP. Surface soil sampling will be conducted at each SWMU and AOC as listed in Table 4-1.

4.1.2 Subsurface Soil

Potential contamination of subsurface soil at MAFR will be evaluated through systematic sampling, description, and analysis of subsurface soil samples collected from soil borings in addition to the results of passive soil gas sampling outlined in Section 4.3. Soil borings will be drilled at all of the sites at MAFR. Subsurface soil sampling will generally be accomplished using a standard split-spoon sampler or California split-barrel sampler. Samples will be collected at standard depths beginning at 3 to 5 feet and at 8 to 10 feet. Below 10 feet, samples will be collected every 10 feet to the water table (i.e., 18 to 20 feet, 28 to 30 feet, etc.). In addition to sampling at these specified depth intervals, samples will be collected from intervals showing evidence of contamination, such as elevated PID readings and staining. Subsurface soil samples will also be collected for geotechnical analysis of chemical and physical parameters. In addition, 24 contingency samples may be collected. Lithologic logging of subsurface soil samples will be conducted in part to characterize soil and to assess soil properties that may influence contaminant migration or fate. These descriptions will also be part of the contamination assessment.

Subsurface soil samples will also be subjected to headspace screening using a photoionization detector or organic vapor analyzer prior to lithologic logging and sample collection. The results of the headspace screen will be recorded on the Hazardous and Toxic Waste (HTW) Drilling log and incorporated into the contamination assessment. The results of the headspace screening and laboratory chemical analysis will be used to assess the nature and extent of subsurface contamination.

4.2 GROUNDWATER CONTAMINATION

The field investigation will evaluate potential groundwater and surface water contamination by sample collection and analysis.

4.2.1 Surface Water

Potential surface water contamination will be evaluated by sampling and analyzing surface water bodies at, and downstream of, SWMU #115. This includes an ephemeral stream that seasonally exists in the arroyo streambed downgradient from SWMU #115 and the small range reservoir, located about a mile downstream of SWMU #115. A maximum of four surface water samples (not including quality assurance/quality control [QA/QC] samples) may be collected from stream water within the arroyo downgradient of SWMU #115. This sampling is dependent upon the presence of surface water at the time of the investigations. If surface water is not present in the arroyo drainage, a surface water sample will be collected from the small reservoir downstream from SWMU #115 instead of a surface water sample from the arroyo.

Surface water samples will be subjected to chemical analyses and general water quality parameters. Chemical analyses for surface water samples will consist of target analyte list (TAL) metals and explosives. General water quality parameters will include pH, specific conductivity, turbidity, and temperature. Surface water sampling will be conducted according to the procedures described in SOP No. 10 (Appendix A1 of the QAPP).

4.2.2 Groundwater

Potential groundwater contamination at MAFR will be evaluated by installing monitoring wells and obtaining groundwater samples for chemical analysis. As shown on Table 4.1, a total of 14 monitoring wells will be installed, developed, and sampled for VOCs, SVOCs, total recoverable petroleum hydrocarbons (TRPH), pesticides/PCBs, total metals, explosives, anions, nitrates/nitrites, herbicides, and dioxins/furans. A detailed outline of groundwater analyses is in the DCQAP.

Instead of installing monitoring wells, NW Munitions Disposal Site and SWMU #115 groundwater will be sampled in four soil borings to be drilled near each of these two sites using a sampler similar to a Hydropunch™ or an equivalent groundwater sampling technique. A groundwater sample will be collected from the existing Target Range water well, a production well located northeast of SWMU #114. Monitoring wells will not be installed at SWMU #115 and the NW Munitions Site because they are located in or near active areas of the target range and the wells would likely be destroyed by activities at the range. A total of 8 groundwater samples, not including QA/QC samples, will be collected during Hydropunch™-type operations for total metal, explosives, anions, and nitrate/nitrite analyses and general water quality parameters. In addition, two contingency borings with monitoring wells may be installed and sampled. Monitoring well installation, development, and sampling procedures are detailed in SOPs No. 7, No. 8, and No. 9, respectively. More specific information regarding the groundwater investigations to be conducted at each site is presented in Section 2.0 of the FSP.

4.3 SUBSURFACE SOIL GAS CONTAMINATION

Selected sites at MAFR have been chosen for passive soil gas sampling based on site and/or waste disposal history. Passive soil gas sampling involves the placement of soil gas collectors at the surface of a site for a period of 72 hours. The collectors adsorb VOCs emanating through surface soil from the subsurface. The collectors are then sent to an off-site laboratory for full VOC analysis by gas chromatography/mass spectroscopy, providing excellent analytical data on the types and concentrations of volatile compounds. The flux (or rate) of contaminant movement from site soil to the atmosphere is calculated by dividing the adsorbed contaminant mass by the collection period.

Passive soil gas sampling will be used as a screening tool at MAFR to determine the lateral extent of soil contamination as well as to identify hot spots and contaminants of concern in soil. Each

of the sites receiving a soil gas survey is listed in Table 4-1. Approximately 320 soil gas points will be used for contaminant characterization.

4.4 AIR CONTAMINATION

Potential air contamination at MAFR will be evaluated using the EPA Industrial Source Complex air dispersion model. Input to the model will consist of data collected during the field investigation in combination with meteorological data obtained from the nearest weather station to MAFR. Ideally, weather data used in the evaluation will entail a full year of measurements. Weather data will consist of wind speed, wind direction, mixing height, and other relevant meteorological factors.

Field data to be used in the air contamination assessment will include data obtained from the RFI soil gas investigation, surface soil sampling, and sediment sampling. Data supplied from the soil gas survey will provide information on VOCs, including the types present and the emission (flux) rate to the atmosphere. Data from soil and sediment sampling will provide chemical and geotechnical data for the assessment. Chemical data from surface soil samples will provide analyses for target compound list organics, pesticides/PCBs, total recoverable petroleum hydrocarbons, TAL metals, and explosives. Geotechnical data from surface soil samples will include particle size distribution and organic carbon content. Data from sediment sampling will include chemical analyses for explosive compounds and TAL metals. Additional field data used in the model will include area measurement of each SWMU and potential AOC, proximity and distance of potential downwind receptors, and site characteristics such as vegetation characteristics.

Such input will be used to estimate potential fugitive dust releases and volatilization emission rates. Once total suspendible dust generation levels and emission rates are calculated, the mass and flux of hazardous compounds will be modeled for the range.

4.5 BACKGROUND SOIL SAMPLING

Background soil sampling will be conducted to establish a baseline to which metal concentrations at targeted sites can be compared for inorganic contaminant characterization. Ten soil borings will be drilled and samples collected at the surface, 8- to 10-ft bgs, and 18- to 20-ft bgs. These samples will be used to establish a range of ambient metal concentrations representative of conditions at MAFR.

Sample locations will be chosen based on a combination of Range-specific factors including wind direction, historical land use, surface water drainage, soil type, and subsurface lithology. Samples will be collected upwind and upgradient from known, suspected, or potential contaminant source areas, including roads, burn/disposal sites, parking lots, disturbed ground, discolored soil, and similar features. Preliminary locations for the background soil samples are presented in Figure 4-1. However, these locations are tentative and may change based on site conditions and results of the RFI activities conducted at MAFR. The specific details of the background study will be developed and presented in an addendum to these workplans following completion of the site investigations described herein.

Background soil samples will be analyzed for TAL metals. Initially, the results of laboratory analytical background data will be graphically evaluated using box and whisker plots, normal probability plots, and cumulative frequency histograms. In addition, the background data set will be tested for statistical outliers (Levene's test) and distributions (Kolmogorov-Smirnov, Shapiro-Wilk, or Normal probability plots) prior to further statistical analyses. Background data will be compared to site data by two methods. In the first method, the background and site data populations will be compared using at least one of the following statistical tests:

- Parametric one-way analysis of variance (ANOVA)

- Cochran's Approximation to the Behrens-Fisher (CABF) Student's t-test
- Nonparametric Wilcoxon Rank-Sum test

The use of each of these population comparison tests is dependent data distributions, percent of nondetections, and homogeneous variances for the background and site data sets.

In the second method, a background value will be calculated for each analyte, which will then be compared to site-specific data in order to evaluate the potential for site-related contamination. Based on a comprehensive evaluation of the background data set, background values will be calculated as the 95 percent upper tolerance limit (UTL), assuming a 95 percent confidence on the data set. References and guidance cited for the use of statistics in evaluating background and site-specific data include:

- Statistical Methods for Environmental Pollution Monitoring (Gilbert, 1987)
- Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance (EPA, 1989b)
- Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (EPA, 1992b)

4.6 COLLECTION OF ADDITIONAL NONSAMPLING DATA

In order to conduct efficient field investigations of the SWMUs and potential AOC covered by this Draft Work Plan, additional background information is required for several of these sites. The following activities will be conducted to collect the necessary additional information:

- Documents/Records Review—Existing reports, facility operating records, maps, and other published and/or unpublished sources of information will be obtained and reviewed to develop data on site histories and activities that can aid in constructing and/or refining conceptual models for each site and in focusing field investigations both spatially and analytically to the target information required.

- Interviews—Current and retired military and civilian personnel and subcontractors with knowledge of the operational histories and activities at MAFR will be identified, contacted, and interviewed to develop additional site-specific data, with particular emphasis on target information such as periods of operation of the targeted sites, the types of materials and substances disposed, and the disposal practices to be investigated at each area.

- Aerial Photo Analysis—Available air photos, including stereoscopic coverage, for the period prior to and including operations at the sites to be investigated under this project will be acquired and analyzed to identify the areal extent of any activities visible at the sites and any other visible locations where disposal activities may have been conducted. If possible, at least one set of photos for each of the decades since operation began at MAFR (i.e., 1940s, 1950s, 1960s, 1970s, 1980s, and 1990s) will be obtained and examined. A copy of each set of photos obtained will be provided to the USACE Technical Manager.

4.7 MANAGEMENT OF INVESTIGATION DERIVED WASTES

Investigation-derived wastes (IDW) generated during this field investigation will include soil cuttings from the boreholes, well development and purge water, decontamination water, solutions, and other fluids from the decontamination and rinsing of drilling and sampling equipment, used personal protective equipment (PPE) and disposable sampling materials, and other debris resulting from sample collection activities. IDW will be managed in accordance with the approach presented in the Investigation-Derived Waste Management Plan (IDWMP), which is included as Appendix B1 of Part B of Volume II of these work plans.

The maximum volume of soil cuttings expected from the 22 boreholes (background sampling locations excluded) is about 1,500 cubic feet. This volume equates to about four 15 cubic yard capacity roll-off boxes. Soil cuttings from each borehole drilled to collect soil and groundwater samples will be temporarily stockpiled on and covered with plastic sheeting in a bermed area adjacent to each borehole location. Dependent on the results of the borehole soil sample analyses, soil cuttings will either be spread on the ground at the bore site, or consolidated into roll-off boxes for subsequent disposal, consistent with the IDWMP.

Monitoring well development and purging prior to sampling are expected to generate about 4,400 gallons, or 80 55-gallon drums, of IDW water. Other waste volumes are estimated at 20 55-gallon drums of decontamination water, and 12 drums for all disposed PPE and sampling materials. Well development and purge water, and decontamination water will be containerized separately for disposal based on analytical and programmatic results. Well development and purge water will be drummed at each well location and, dependent on the analytical data from the monitoring-well groundwater samples, either spread out to evaporate on the ground at the site, or consolidated for subsequent disposal. All decontamination waters, solutions, and fluids will be consolidated and drummed at each investigation unit (SWMU or AOC), and sampled for characterization. Dependent on the results of those analyses, decontamination fluids will either be spread out to evaporate on the ground at the site, or consolidated for subsequent disposal.

Waste management procedures consistent with standard regulatory requirements are assumed. The IDWMP (Appendix B1 of the Field Sampling Plan) includes specific information on the regulations governing the handling, disposal, and documentation of investigation derived waste.

Table 4-1 Summary of Field Sampling Activities for Contaminant Characterization

Site	Surface Soil[1]	Subsurface Soil[1]	Sediment	Ground-water	Surface Water	Soil Gas Samples	Geophysical Survey	EOD Clearance	Location Surveying
SWMU #114	4	44	0	5[2]	0	80	Yes	Yes	Yes
SWMU #115	4	44	4	4[3]	4	0	Yes	Yes	Yes
SWMU #117	4	44	0	4	0	70	Yes	Yes	Yes
NW Munitions Disposal Site	4	44	0	4[3]	0	0	Yes	Yes	Yes
WWII Cantonment Disposal Site	4	44	0	4	0	100	Yes	Yes	Yes
Helicopter Pad Disposal/Burn Site	1	11	0	1	0	30	Yes	Yes	Yes
Domestic Waste Burial Site	1	11	0	1	0	40	Yes	Yes	Yes
Background Soil Sampling Locations[4]	10	20	0	0	0	0	Yes	TBD	Yes
Contingency[5]	7	24	0	2	0	0	Yes	TBD	Yes
Total	39	286	4	25	4	320	8 sites	7 sites	8 sites

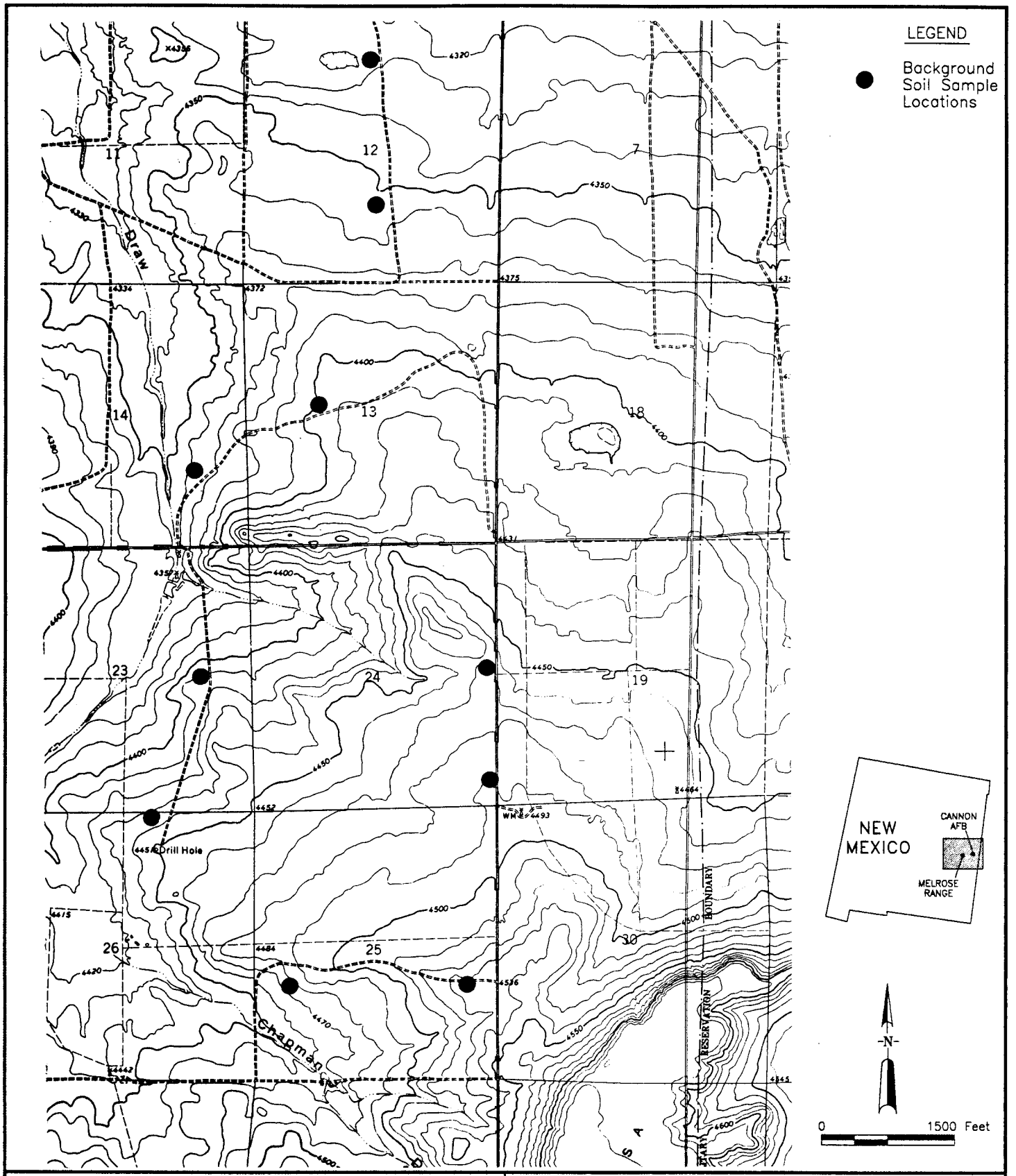
1 Soil samples, except background soil samples, will be collected at the surface, at five-foot intervals to 10 feet below ground surface (bgs) (3 to 5 feet, 8 to 10 feet) and at ten-foot intervals from 10 feet bgs to the top of the water table (18 to 20 feet, 28 to 30 feet, 38 to 40 feet, 48 to 50 feet, 58 to 60 feet, 68 to 70 feet, 78 to 80 feet, 88 to 90 feet, and 98 to 100 feet).

2 Four groundwater samples will be collected from monitoring wells installed at the SWMU, and a fifth sample will be collected from the Melrose AFR production well.

3 Groundwater sampling will be conducted using a Hydropunch™-type sampler. No groundwater wells are planned, due to location within or near active target range area.

4 At background locations, soil samples will be collected at the surface, at 8 to 10 feet bgs, and at 18 to 20 feet bgs and analyzed for TAL metals.

5 Two contingency bores, including monitoring well installation, and 5 other surface soil locations may be sampled.



Prepared for:

U.S. Army Corps of Engineers, Omaha District
Cannon Air Force Base
Melrose Range

Prepared by:

Ebasco Services Incorporated

Figure 4-1

Background Soil Sample Locations

Final Melrose RFI Workplan August 1995

5.0 POTENTIAL RECEPTOR IDENTIFICATION

Currently, contaminant conditions at the sites targeted for investigation under this Draft Work Plan are unknown. In the event contamination is identified at the targeted sites, it will be necessary to conduct an assessment of the human health and environmental risks posed by such contamination. If a risk assessment is indicated, a complete site conceptual model will be drawn depicting the likely pathways of exposure for the potential human and non-human receptors. Presently, it is anticipated that such an assessment would be conducted as a screening level, using the approach outlined in the Rational National Standards Initiative Project Summary (USACE 1994).

6.0 DATA COLLECTION QUALITY ASSURANCE PLAN

Under the outline provided by USACE for the organization of this Draft Work Plan, the Data DCQAP is presented as a separate volume (Volume II). The DCQAP consists of two parts; the QAPP comprises Part A, and the FSP constitutes Part B. The SOPs, governing all technical aspects of the activities to be conducted during this RFI, comprise Appendix A1 of the QAPP. The DMP is Appendix A2 of the QAPP, and the PMP is Appendix A3 of the QAPP. Attached to the FSP as Appendix B1 is the IDWMP.

The DCQAP has been prepared to document all monitoring procedures, including sampling, field measurements, and sample analysis performed during the course of the investigations to ensure that the information, data, and resulting decisions are technically sound, statistically valid, and properly documented.

In order to streamline the preparation and presentation of this Draft Work Plan, the DCQAP is not duplicated here.

7.0 DATA MANAGEMENT PLAN

Under the outline provided by USACE for the organization of this Draft Work Plan, the DMP is presented as Appendix A2 of the QAPP, which is Part A of the DCQAP (Volume II of the Draft Work Plan). The DMP provides the guidance and procedures necessary to document and track investigation data and results. The DMP identifies and establishes the data documentation materials and procedures, the project file requirements, and project-related progress reporting procedures and documents. The data documentation materials and procedures—referred to as the data record—follow the Installation Restoration Program Information Management System guidance (IRPIMS Data Loading Handbook 1994).

In order to streamline the preparation of this Draft Work Plan, the DMP is not duplicated here.

8.0 SITE SAFETY AND HEALTH PLAN

The SSHP is presented as Volume III of the Draft Work Plan. The SSHP includes descriptions of the facility conditions and available resources under which the field activities will be conducted and the known hazards and evaluated risks, both on and off site, associated with potential contaminant exposures related to each activity to be performed and specifies procedures to be followed and levels of protection to be worn by personnel in the work area to ensure the work is conducted safely and successfully.

In order to streamline the preparation of this Draft Work Plan, the SSHP is not duplicated here.

9.0 COMMUNITY RELATIONS PLAN

A basewide CRP for CAFB is being prepared under a separate project and will be attached as an appendix to the Work Plan when finalized. The CRP describes procedures for disseminating information to the public regarding the activities and results of this investigation. A draft copy of the CRP is attached as Appendix A to this Work Plan.

In order to streamline the preparation of this Draft Work Plan, the CRP is not duplicated here.

10.0 PROJECT MANAGEMENT PLAN

The Project Management Plan (PMP) presents the overall approach to manage all the activities comprising the RFI and any other investigations to be conducted under this Draft Work Plan. Included in the PMP is the project organization structure, the project schedule, and the qualifications of the key project personnel. The project budget will be included in the final version of the PMP.

In order to streamline the preparation of this Draft Work Plan, the PMP can be found in Appendix A3 of the QAPP.

11.0 SCHEDULE AND DELIVERABLES

Figure 11-1 presents the schedule for initiating, conducting, and completing the investigations and other associated tasks described in this Final Work Plan. This schedule has been devised on the assumptions that the authorizing approval and funding for the work described in the work plan will not be delayed and that facility access, resource availability, and coordination with other ongoing facility operations will not significantly restrict the initiation or completion of the scheduled activities beyond the scheduled time frames. The schedule also does not account for significant delays due to the presence of UXO, requiring CAFB/MAFR EOD team clearance, or the unavailability of Cannon/Melrose EOD clearance teams. The schedule further does not account for any force majeure that delays or prevents the completion of any scheduled activity.

The schedule takes into account that invasive investigations at two sites (SWMU #115 and the NW Munitions Disposal Site) located in or near the active training operations areas at MAFR must be accomplished during the second half of September, while other operations are suspended and the base conducts EOD clearance. Other field activities are scheduled around this period. Work at these sites that can be conducted in the morning before training runs begin has been factored into the schedule. In order to take advantage of this window of opportunity and minimize the risk of schedule conflicts with MAFR's operational mission, additional drilling rigs and field crews will be mobilized during this period.

Deliverables required under the RFI described in this Final Work Plan include progress reports and product report submittals as described in Section 3.5—Reporting Documents of the Scope of Services, RCRA Facility Investigation, Melrose Bombing Range, Melrose, New Mexico, Delivery Order #9 (Contract No. DACW45-94-D-0003).

The product reports include Final, and Final versions of Work Plans and RFI Reports, a Letter Report on the monitoring well inspections to be conducted on CAFB (addressed under separate

cover and not included in this Final Work Plan), Final Quality Control Summary Report, and Field Well Construction Logs (sent within 10 days after well completion) as described in Section 3.5.5—Submittals and Schedules of the Delivery Order #9 Scope of Services. The progress reports described in Section 3.5.2 of the Delivery Order #9 Scope of Services include Daily Quality Control Reports, weekly activities summary reports, and Monthly TERC Reports, including a Monthly Status Report, a Monthly Cost Report, and a Monthly Progress Report. Other required submittals include Meeting Minutes and Confirmation Notices.

The Document Submittal Register (Table 11-1) shows the number of copies of specific deliverables and the list of individuals to whom submittals are to be distributed.

Submittals will be formatted according to the requirements presented in the Delivery Order #9 Scope of Services, Section 3.4.2—Work Plan Submittal Requirements/Approvals, and Section 3.5.5.1.1—General Submittal Requirements. The Final report will be submitted using a comb or similar type of binder. Comments on the Final will be submitted to EBASCO 2 weeks following submittal of the report. After comments on the Final have been received and incorporated, a Final document will be prepared for submittal to the parties and regulatory agencies; however, no documents will be sent to the regulatory agencies. The error-free Final documents will be submitted to the parties 2 weeks after receipt of the comments. Final documents will be submitted in a 3-ring binder, as with the Final documents. The Final report will be submitted 3 weeks after receipt of comments and will be submitted as new cover pages and corrected replacement pages only, which will be inserted into the Final document. All Final comments and responses will be included in the Final document as an appendix.

A cover letter will accompany each document submittal and indicate the project, project phase, document phase, the date comments are due, to whom comments are to be submitted, the date and location of the review conference, etc., as appropriate. The contents of these cover letters will

be coordinated with the USACE-Technical Manager (USACE-TM) prior to submittal. The cover letter will not be bound into the document.

Table 11-1. Document Submittal Register

	Recipient A	Recipient B	Recipient C	Recipient D	Recipient E
Letter Report on Cannon AFB Monitoring Well Inspections	2	2	1	-	-
Work Plans and RFI Reports					
Pre-Draft	5	3	2	1	-
Draft	5	8	2	1	1
Final	5	8	2	1	1
Monthly Progress Reports	1	1	1	1	-
Daily Control Summary Reports	2*	1**	-	1	-
Quality Control Summary Reports: Final	4	3	1	1	1
Field Well Construction Logs (Sent within 10 days after well completion) [B]	2	1	-	1	-

* Two copies sent by priority mail at the end of each week.
* Copy each day, hand carried to Cannon CES/CEV Office.

[B] For all wells in the field effort, send 1 unbound original and one copy of the field well construction logs to the USACE-TM.

A: U. S. Army Corps of Engineers
Omaha District
Attn: CEMRO-ED-EC (Mr. Doug Mellema)
215 North 17th Street
Omaha, NE 68102-4978
Tel. (402) 221-7184
Fax. (402) 221-7796 or 7793

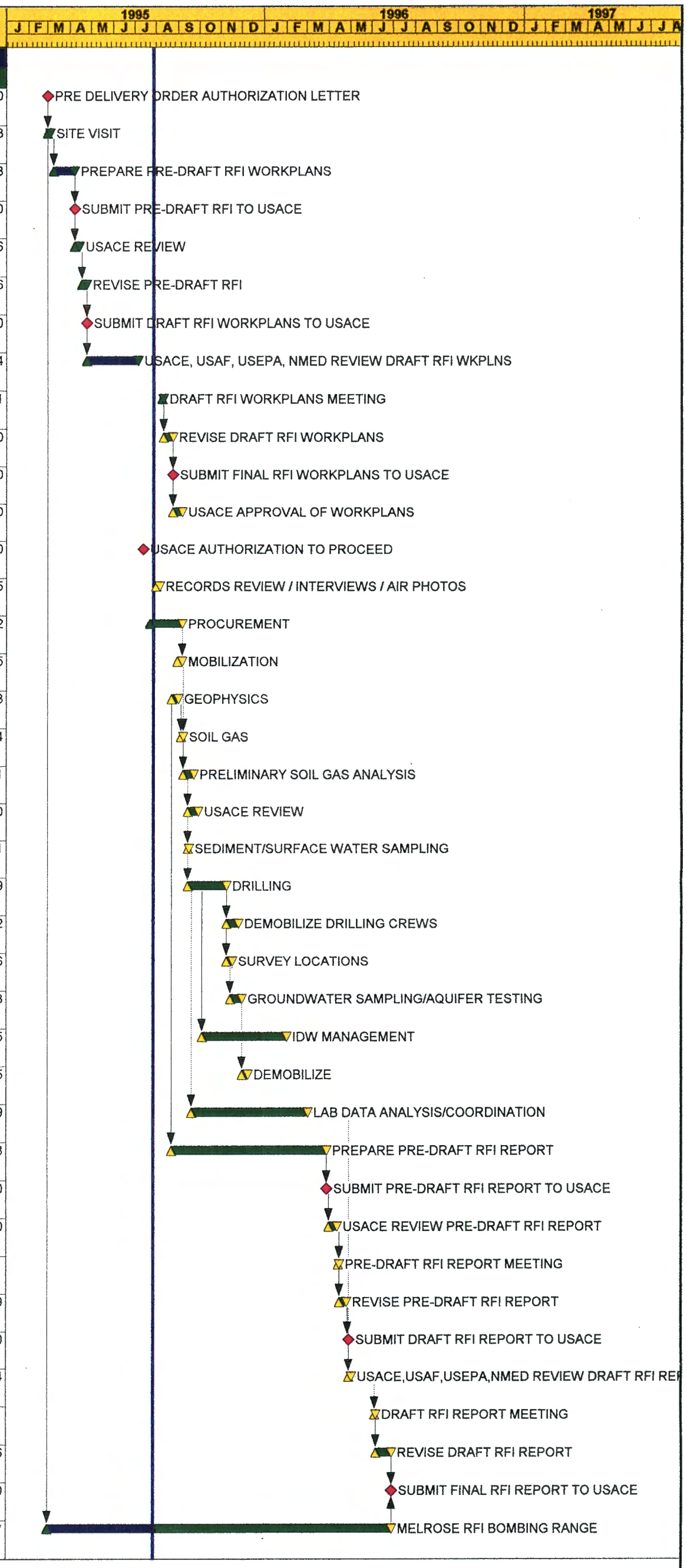
B: Cannon Air Force Base
Attn: 27 CES/CEV (Mr. John Constantine)
111 Engineers Way
Cannon Air Force Base, NM 88103
Tel. (505) 784-4348
Fax. (505) 784-2208

C: ACC CES/ESVW
Attn: Ms. Margaret Calvert
129 Andrews Street Suite 102
Langley AFB, VA. 23665-2769

D: U. S. Army Corps of Engineers
Cannon AFB Resident Office
Attn: Steve Mahan
Cannon AFB, NM 88103
Tel. (505) 784-4194
Fax. (505) 784-2663

E. U. S. Army Corps of Engineers
Missouri River Division Lab
Attn: CEMRD-EP-LC
420 South 18th Street
Omaha, NE 68102
Tel. (402) 444-4318

Activity ID	Activity Description	OD
CANNON D.O. 9		
WAD 1 - MELROSE RFI BOMBING RANGE		
0901100	PRE DELIVERY ORDER AUTHORIZATION LETTER	0
0901110	SITE VISIT	3
0901120	PREPARE PRE-DRAFT RFI WORKPLANS	28
0901125	SUBMIT PRE-DRAFT RFI TO USACE	0
0901130	USACE REVIEW	6
0901140	REVISE PRE-DRAFT RFI	6
0901150	SUBMIT DRAFT RFI WORKPLANS TO USACE	0
0901160	USACE, USAF, USEPA, NMED REVIEW DRAFT RFI WKPLNS	14
0901165	DRAFT RFI WORKPLANS MEETING	1
0901170	REVISE DRAFT RFI WORKPLANS	10
0901180	SUBMIT FINAL RFI WORKPLANS TO USACE	0
0901210	USACE APPROVAL OF WORKPLANS	10
0901220	USACE AUTHORIZATION TO PROCEED	0
0901240	RECORDS REVIEW / INTERVIEWS / AIR PHOTOS	5
0901250	PROCUREMENT	32
0901260	MOBILIZATION	5
0901270	GEOPHYSICS	8
0901290	SOIL GAS	4
0901310	PRELIMINARY SOIL GAS ANALYSIS	11
0901320	USACE REVIEW	10
0901330	SEDIMENT/SURFACE WATER SAMPLING	1
0901340	DRILLING	39
0901365	DEMOBILIZE DRILLING CREWS	12
0901370	SURVEY LOCATIONS	6
0901390	GROUNDWATER SAMPLING/AQUIFER TESTING	13
0901410	IDW MANAGEMENT	85
0901420	DEMOBILIZE	5
0901425	LAB DATA ANALYSIS/COORDINATION	119
0901430	PREPARE PRE-DRAFT RFI REPORT	158
0901435	SUBMIT PRE-DRAFT RFI REPORT TO USACE	0
0901440	USACE REVIEW PRE-DRAFT RFI REPORT	10
0901445	PRE-DRAFT RFI REPORT MEETING	1
0901450	REVISE PRE-DRAFT RFI REPORT	9
0901455	SUBMIT DRAFT RFI REPORT TO USACE	0
0901460	USACE,USAF,USEPA,NMED REVIEW DRAFT RFI REPORT	4
0901465	DRAFT RFI REPORT MEETING	1
0901470	REVISE DRAFT RFI REPORT	16
0901475	SUBMIT FINAL RFI REPORT TO USACE	0
0901HA	MELROSE RFI BOMBING RANGE	346*



Project Start	01MAR94	Early Bar	
Project Finish	01JUL97	Progress Bar	
Data Date	29JUL95		
Plot Date	18AUG95		

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5155

Sheet 1 of 1

EBASCO SERVICES INCORPORATED

MELROSE AIR FORCE RANGE RFI SW TERC

FIGURE 11-1 PROJECT SCHEDULE

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FINAL

COMMUNITY RELATIONS PLAN

CANNON AIR FORCE BASE, NEW MEXICO

Prepared for
U.S. Department of the Army
Corps of Engineers, Omaha District
Omaha, Nebraska

August 1995

C3M11MM

TABLE OF CONTENTS

Section		Page
1.0	OVERVIEW OF THE COMMUNITY RELATIONS PLAN	1-1
1.1	INTRODUCTION	1-1
1.2	BACKGROUND AND DEVELOPMENT OF THE COMMUNITY RELATIONS PLAN	1-1
1.3	REGULATORY HISTORY AT CANNON AFB	1-3
1.4	ORGANIZATION OF THE COMMUNITY RELATIONS PLAN	1-4
2.0	SITE DESCRIPTION	2-1
2.1	LOCATION OF CANNON AFB	2-1
2.2	HISTORY OF CANNON AFB	2-2
2.3	HAZARDOUS MATERIALS/WASTE MANAGEMENT PRACTICES	2-2
2.4	DESCRIPTION OF CANNON AFB'S SOLID WASTE MANAGEMENT UNITS	2-3
3.0	COMMUNITY PROFILE	3-1
3.1	CLOVIS, NEW MEXICO	3-1
3.2	PORTALES, NEW MEXICO	3-2
3.3	PUBLIC CONCERNS AND PERCEPTIONS	3-3
4.0	PUBLIC INVOLVEMENT REQUIREMENTS UNDER THE IRP AND RCRA	4-1
4.1	DERP/IRP PUBLIC INVOLVEMENT REQUIREMENTS	4-1
4.2	CURRENT RCRA PUBLIC INVOLVEMENT REQUIREMENTS	4-3
4.3	PROPOSED RCRA PUBLIC INVOLVEMENT REQUIREMENTS	4-4
5.0	PUBLIC INVOLVEMENT ACTIVITIES AT CANNON AFB	5-1
5.1	CURRENT ACTIVITIES	5-1
5.2	FUTURE ACTIVITIES	5-3

LIST OF TABLES

TABLE 1 SITE SUMMARY TABLE SWMUs, AOC, AND IRP SITES
TABLE 2 PUBLIC INVOLVEMENT ACTIVITIES

LIST OF FIGURES

FIGURE 1 CAFB AND SATELLITE LOCATIONS
FIGURE 2 SWMU LOCATIONS - CAFB
FIGURE 3 SWMU LOCATIONS - MAFR

LIST OF APPENDIXES

APPENDIX A QUESTIONNAIRE FOR COMMUNITY INTERVIEWS
APPENDIX B PUBLIC MEETING LOCATIONS
APPENDIX C CANNON AFB PUBLIC AFFAIRS OFFICE MEDIA DISTRIBUTION LIST
APPENDIX D LIST OF ACRONYMS
APPENDIX E GLOSSARY

1.0
OVERVIEW OF THE COMMUNITY RELATIONS PLAN

1.1 INTRODUCTION

This Community Relations Plan (CRP) outlines the public involvement activities to be implemented during Installation Restoration Program (IRP) activities at Cannon Air Force Base (CAFB) and Melrose Air Force Range (MAFR), New Mexico. References to CAFB throughout this plan include satellite facilities such as MAFR. These IRP activities are being conducted in accordance with the requirements of:

- The Defense Environmental Restoration Program (DERP)
- The Resource Conservation and Recovery Act (RCRA) of 1976 as amended by the Hazardous and Solid Waste Amendments of 1984
- The Federal Facilities Compliance Act of 1992

A variety of community involvement activities are required under the DERP, the IRP, and RCRA. This CRP was developed to document and coordinate those activities. It incorporates the public involvement requirements found in the following documents:

- The Air Force Installation Restoration Program Management Guidance
- The Air Combat Command's Installation Restoration Program Remedial Project Manager's Guide
- The Air Combat Command's Guidance on Restoration Advisory Boards
- Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities (Proposed Rule)
- RCRA Expanded Public Participation (Proposed Rule)

1.2 BACKGROUND AND DEVELOPMENT OF THE COMMUNITY RELATIONS PLAN

The purpose of a CRP is to provide a "roadmap" for consistent public involvement in the ongoing IRP activities at CAFB. The CRP focusses on providing IRP information on a

regular basis, with additional emphasis at key decision-making milestones in the IRP. Activities identified in this CRP will be carried out by the CAFB Environmental Restoration Office (27 CE/CEVR) and Public Affairs Office (PAO) (27 FW/PA). While CEVR is the focal point for restoration project management, PA is the focal point for implementing and updating this CRP.

In preparation for the development of this CRP, the CAFB PAO solicited participants for a series of interviews in Clovis and Portales, New Mexico. Letters were mailed to prospective interviewees, along with a fact sheet describing CAFB's IRP and its public involvement opportunities. Articles highlighting the CRP and seeking participants for the interviews were also placed in local newspapers. Finally, an open house for walk-in interviews was held at the Clovis-Curry County Chamber of Commerce.

A questionnaire was developed for the interviews and was provided to prospective interviewees. Respondents were asked questions about their perception of CAFB and its environmental programs, their knowledge of and access to environmental information about CAFB, their desire for additional environmental information about CAFB, and their willingness to participate in future public involvement activities sponsored by the CAFB Environmental Restoration Office. A copy of the questionnaire is provided in Appendix A.

The PAO completed 22 interviews during the week of February 6, 1995. The interviewees were selected to represent a cross section of the two communities (Clovis and Portales), including:

- Elected officials
- Civic leaders
- Businesses and utilities
- Schools and libraries
- Local residents
- Senior citizens
- Minority groups
- Adjacent landowners

More information regarding the public's perception of CAFB and its environmental programs is provided in Section 3.3 of this CRP. The public involvement activities selected for this CRP are based on input received during the interviews. They are described in Section 5, Public Involvement Activities at Cannon AFB.

1.3 REGULATORY HISTORY AT CANNON AFB

DERP is the statutory authority for the Department of Defense (DoD) to carry out environmental restoration activities at military installations. The statutory citation for DERP is 10 U.S.C. §2701 et.seq. DERP's program goals and activities include the identification, investigation, and remediation of contamination associated with past hazardous waste generation or disposal sites. While DERP is a DoD program, DERP activities are to be carried out consistent with Section 120, Federal Facilities, of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (also known as "Superfund"), and in consultation with the U.S. Environmental Protection Agency (EPA).

The IRP is the U. S. Air Force's program for implementing DERP. Similarly, the IRP goals also include the identification, investigation, and remediation of past hazardous waste sites. These sites could include landfills or hardfills, maintenance shops, spill sites, storage tanks, and oil/water separators.

CAFB is an operating RCRA facility and, as such, is under the regulatory authority of the RCRA branch of the EPA Region VI. CAFB is also regulated by the New Mexico Environment Department (NMED). Under a RCRA Part B operating permit issued by EPA Region VI on November 14, 1989, CAFB is required to take "Corrective Actions". Under a RCRA Subpart X permit issued in December, CAFB is required to take actions for MAFR. Steps in the RCRA Corrective Action program include:

- RCRA Facility Assessments (RFAs)
- RCRA Facility Investigations (RFIs)
- Corrective Measures Studies (CMSs)
- Corrective Measures Implementation (CMI)

CAFB is fulfilling its RCRA Corrective Action obligations through the IRP. Required public involvement milestones required under RCRA are described in more detail in Section 4, Public Involvement Requirements Under the IRP and RCRA.

1.4 ORGANIZATION OF THE COMMUNITY RELATIONS PLAN

A description of CAFB, its operational history, and its regulatory history are provided in Section 2 of this CRP. Section 3 describes the communities of Clovis and Portales and presents an overview of the community concerns and perceptions identified during the community interviews. The public involvement requirements under the IRP and RCRA are discussed in Section 4. Specific public involvement activities developed for CAFB are presented in Section 5.

2.1 LOCATION OF CANNON AFB

CAFB occupies approximately 4,000 acres south of U.S. Highway 60/84 in Curry County, New Mexico (Figure 1). It is situated six miles west of the city of Clovis, near the New Mexico-Texas border. Chavez Manor Housing Area, which provides housing for CAFB personnel, is located on 239 acres of CAFB property north of 60/84. The area surrounding CAFB is used mainly for farming and ranching. In addition, CAFB maintains the following satellite facilities (Figure 1):

- MAFR (87,925 acres of CAFB-owned, public domain, and restricted easement land), approximately 25 miles west of CAFB. Used since 1952 as a bombing and air-to-ground gunnery range, the range consists of a composite day-and-night simulated special and conventional weapon delivery range and day-only tactical range. Live ordnance use was discontinued in 1969.

- Clovis Housing Area (40 acres). This area includes 200 units, a community center, and maintenance facility in Clovis.

- Portales Housing Area (30 acres). This includes approximately 150 units in Portales.

- NEXRAD radar site (0.5 acres), near Field, New Mexico.

- Roswell Site (12 acres), at the Roswell, New Mexico, Industrial Air Center. The site contains four facilities and five unimproved acres to be used as support facilities.

- GWEN Site (10 acres), Hereford, Texas. This site is used for the Ground Wave Emergency Network (GWEN) transmitter.

2.2 HISTORY OF CANNON AFB

The area now known as CAFB was originally used for farming. However, in 1929, Portair Field, a civilian passenger terminal for early commercial transcontinental flights, was established at the site. The DoD eventually took over Portair Field in 1942 and created Clovis Army Air Base, which became a training facility for B-17, B-24, and B-29 air crews during World War II. The base was renamed Clovis Army Airfield in 1945.

Flight activities decreased in mid-1946, when the base was placed on a reduced operational status. Clovis Army Airfield eventually closed in 1947, only to be reactivated in 1951 and reassigned to the Tactical Air Command (TAC). The installation was renamed CAFB in 1957 in honor of the late General John K. Cannon, a former commander of the TAC.

Between 1952 and 1957, the 50th and 388th Fighter-Bomber Wings were activated and replaced by the 312th and 474th Fighter-Bomber Wings. The 832nd Air Division was activated in 1957 to oversee the activities of these wings, which were redesignated Tactical Fighter Wings (TFW). Two years later, the 312th TFW was deactivated and replaced by the 27th TFW. When the 832nd Air Division was deactivated in 1975, the 27th TFW became the principle Air Force unit at CAFB, and was redesignated a Rapid Deployment Joint Task Force Member.

CAFB was reassigned to the Air Combat Command (ACC) on June 1, 1992. A variety of aircraft have been stationed at CAFB through the years. The mission of CAFB is to maintain a combat-ready force capable of day, night, and all-weather operations and to provide replacement training of combat aircrews for tactical organizations worldwide.

2.3 HAZARDOUS MATERIALS/WASTE MANAGEMENT PRACTICES

Like any industrial area, CAFB has numerous activities that use hazardous materials or generate hazardous wastes, as defined by RCRA. Those activities include:

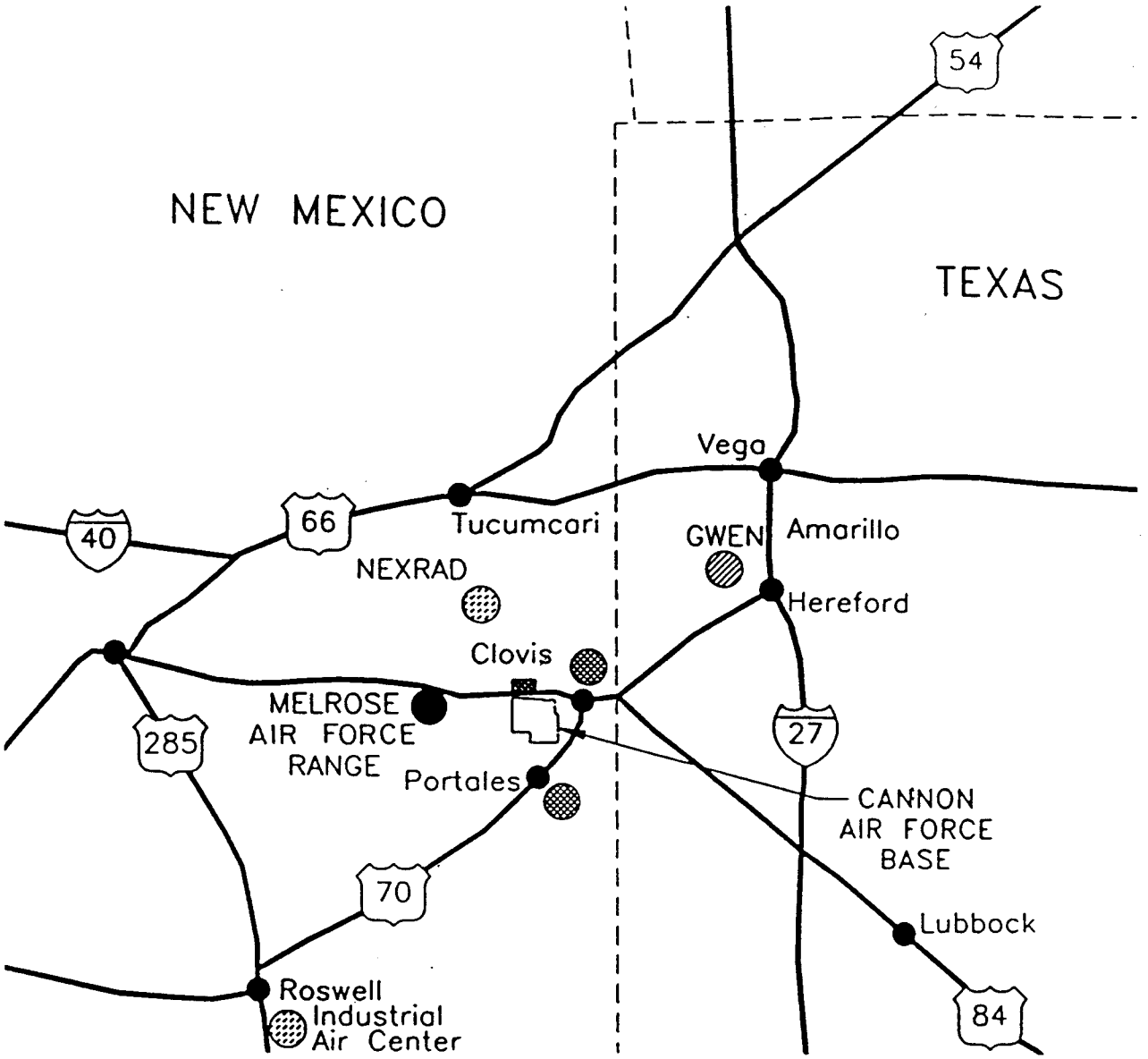
- Aircraft and vehicle maintenance
- Petroleum, oil, and lubricants dispensing and storage
- Landscape management/groundskeeping

- Sewage treatment plants
- Training for fire-fighting crews
- Ordnance training

The wastes generated in association with operations at CAFB include: aircraft fuel, waste oils and lubricants, waste batteries, pesticides, herbicides, waste ordnance, acids, waste solvents, waste paints and thinners, sludges, construction rubble, and polychlorinated biphenyl (PCB)-contaminated oil from capacitors or transformers. Aircrew training operations have resulted in spent training munitions at MAFR.

2.4 DESCRIPTION OF CANNON AFB'S SOLID WASTE MANAGEMENT UNITS

Under RCRA, sites where hazardous wastes were generated, stored, spilled, or disposed of are designated as Solid Waste Management Units (SWMUs). EPA Region VI has identified 74 SWMUs and 3 areas of concern (AOCs) in CAFB's RCRA Part B Permit. The RCRA Subpart X Permit identifies 3 SWMUs at MAFR. The permits require that CAFB investigate the SWMUs, remediate them when necessary, and identify/investigate new discoveries and AOCs. Table 1 lists the 74 SWMUs and 3 AOCs, their description, the material disposed there, the dates of discovery and operation, and their current status. Note that the 74 CAFB SWMUs are not numbered sequentially; therefore, there are numbers assigned to SWMUs that exceed the number 74. Figure 2 shows the location of the SWMUs and AOCs on CAFB. Figure 3 shows the location of MAFR SWMUs.



LEGEND

FACILITY TYPE

- Bombing Range
- Housing Area
- Radar Site
- GWEN Site

FACILITY NAME

- Melrose Air Force Range
- Clovis Housing Area
  Portales Housing Areas
  Chaves Manor
- GWEN Site Hereford TX.
- NEXRAD – Field NM.
  Roswell Industrial Air Center

N

DRN. BY: SCR	DATE: 04/12/95	CANNON AFB SATELLITE FACILITIES CANNON AIR FORCE BASE NEW MEXICO	PROJECT No.	FIG. No.
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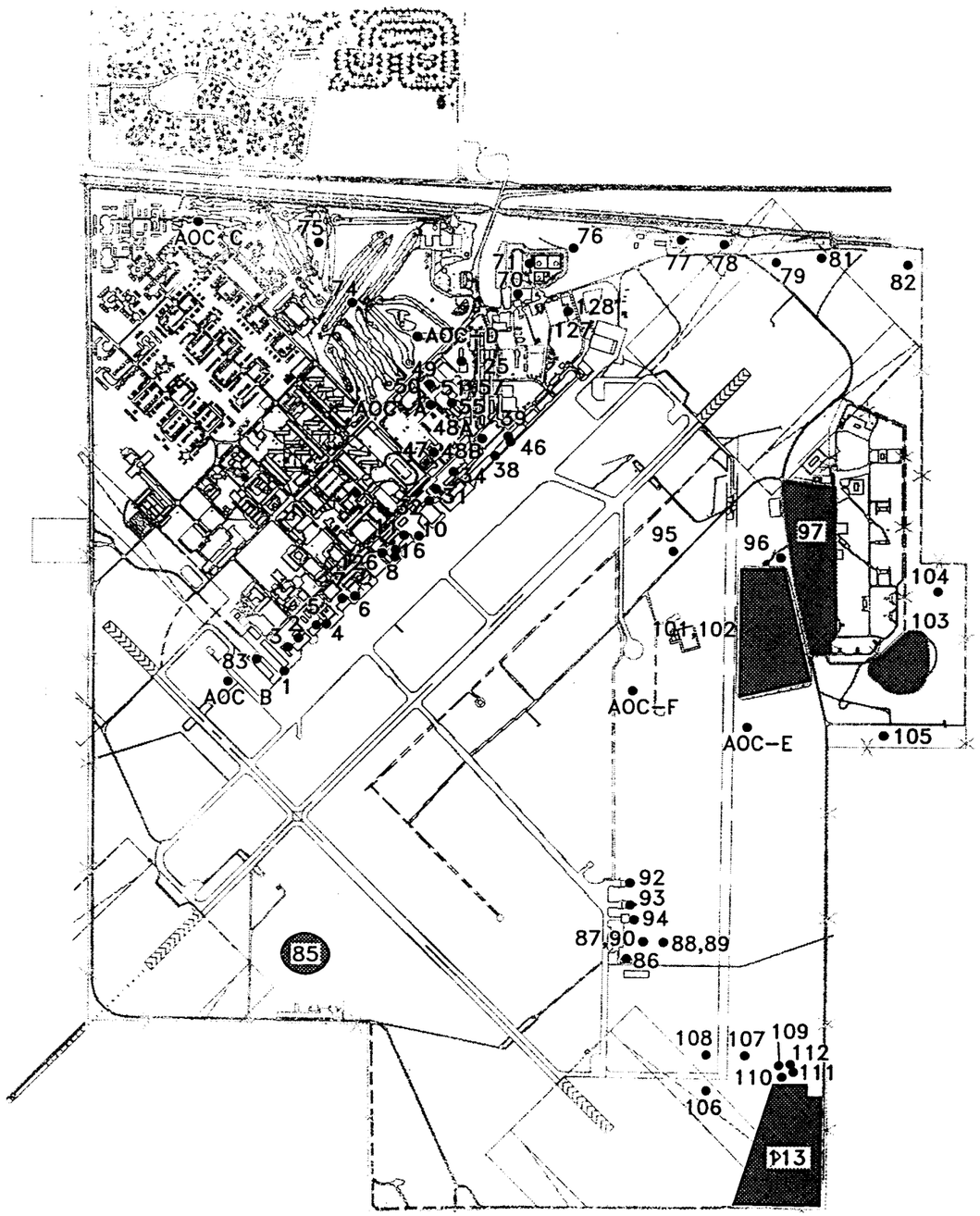
REPORT PHASE: COMMUNITY RELATIONS PLAN



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SCALE IN FEET

LEGEND

3 ● SOILD WASTE MANAGEMENT UNIT (SWMU) LOCATION AND NUMBER

SWMU No.	DESIGNATED AREA
1	OIL/WATER SEPARATOR No. 119
2	ST-28 RECOVERED DIESEL TANK No. 108
3	OIL/WATER SEPARATOR No. 108
4	ST-29 RECOVERED DIESEL TANK No 121
5	OIL/WATER SEPARATOR No. 121
6	POL TANK No. 129
7	OIL/WATER SEPARATOR No. 129
8	OIL/WATER SEPARATOR No. 165
10	POL TANK No. 170
11	OIL/WATER SEPARATOR No. 170
16	OIL/WATER SEPARATOR No. 680
31	AGE MAINTENANCE SHOP PAD
34	SD-15 AGE DRAINAGE DITCH
38	OIL/WATER SEPARATOR No. 194
39	OIL/WATER SEPARATOR No. 195
46	OIL/WATER SEPARATOR No. 196
47	OIL/WATER SEPARATOR No. 494
48A	OIL/WATER SEPARATOR No. 165
48B	ABOVEGROUND STORAGE TANK
49	ST-26 INACTIVE POL STORAGE TANK No. 4028A
50	ST-26 INACTIVE POL STORAGE TANK No. 4028B
51	OIL/WATER SEPARATOR No. 375
55	OIL/WATER SEPARATOR No. 186 ACCUMULATION POINT
57	OIL/WATER SEPARATOR No. 379
70	OIL/WATER SEPARATOR No. 326
71	RECOVERED JP-4 FUEL TANK No. 390
74	LF-1 LANDFILL No. 1
75	SD-13 SANITARY SEWAGE LIFT STATION OVERFLOW PIT
76	WP-14 SLUDGE WEATHERING PIT
77	CIVIL ENGINEERING CONTAINER STORAGE AREA
78	FT-6 FIRE DEPARTMENT TRAINING AREA No. 1
79	UNDERGROUND TANK
81	DP-16 SOLVENT DISPOSAL SITE
82	LF-2 LANDFILL No. 2
83	ST-27 SUMP
85	SD-12 STORMWATER COLLECTION POINT
86	SD-11 ENGINE TEST CELL
87	SD-11 FORMER OVERFLOW PIT
88	SD-11 FORMER LEACHING FIELD
89	SD-11 EVAPORATION POND
90	SD-11 OIL/WATER SEPARATOR No. 5114
92	OIL/WATER SEPARATOR No. 5120
93	OIL/WATER SEPARATOR No. 5121
94	OIL/WATER SEPARATOR No. 5144
95	SD-20 NE STORMWATER DRAINAGE AREA
96	SD-17 OLD ENTOMOLOGY RINSE AREA
97	LF-25 CONCRETE RUBBLE PILE
101	SD-21 WASTEWATER TREATMENT SYSTEM-LAGOONS
102	SD-21 WASTEWATER TREATMENT SYSTEM - EFFLUENT DISCHARGE
103	WASTEWATER PLAYA LAKE
104	LF-4 LANDFILL No. 4
105	LF-3 LANDFILL No. 3
106	FT-7 FIRE DEPARTMENT TRAINING AREA No. 2
107	FT-8 FIRE DEPARTMENT TRAINING AREA No. 3
108	EXPLOSIVE ORDINANCE DISPOSAL (EOD) TRAINING AREA
109	FT-9 FIRE DEPARTMENT TRAINING AREA No. 4
110	UNDERGROUND WASTE OIL TANK No. 2336
111	UNLINED PIT
112	OIL/WATER SEPARATOR No. 2336
113	LF-5 LANDFILL No. 5
124	ST-30 INACTIVE UNDERGROUND TANK
125	ST-30 INACTIVE UNDERGROUND TANK
126	ST-30 INACTIVE UNDERGROUND TANK
127	OIL/WATER SEPARATOR No. 4095 #1 AND LEACH FIELD
128	OIL/WATER SEPARATOR No. 4095 #2 AND LEACH FIELD
AOC A	SS-19 MOGAS SPILL
AOC B	SS-18 JP-4 FUEL SPILL
AOC C	OT-10 BLOWN CAPACITORS SITE OT-23 MELROSE BOMBING RANGE OT-24 CONCHAS LAKE RECREATION ANNEX DP-33 DISPOSAL PIT
AOC-D	DISPOSAL PIT (ON GOLF COURSE)
AOC-E	RUBBLE PILE
AOC-F	BORE SITE MOUND

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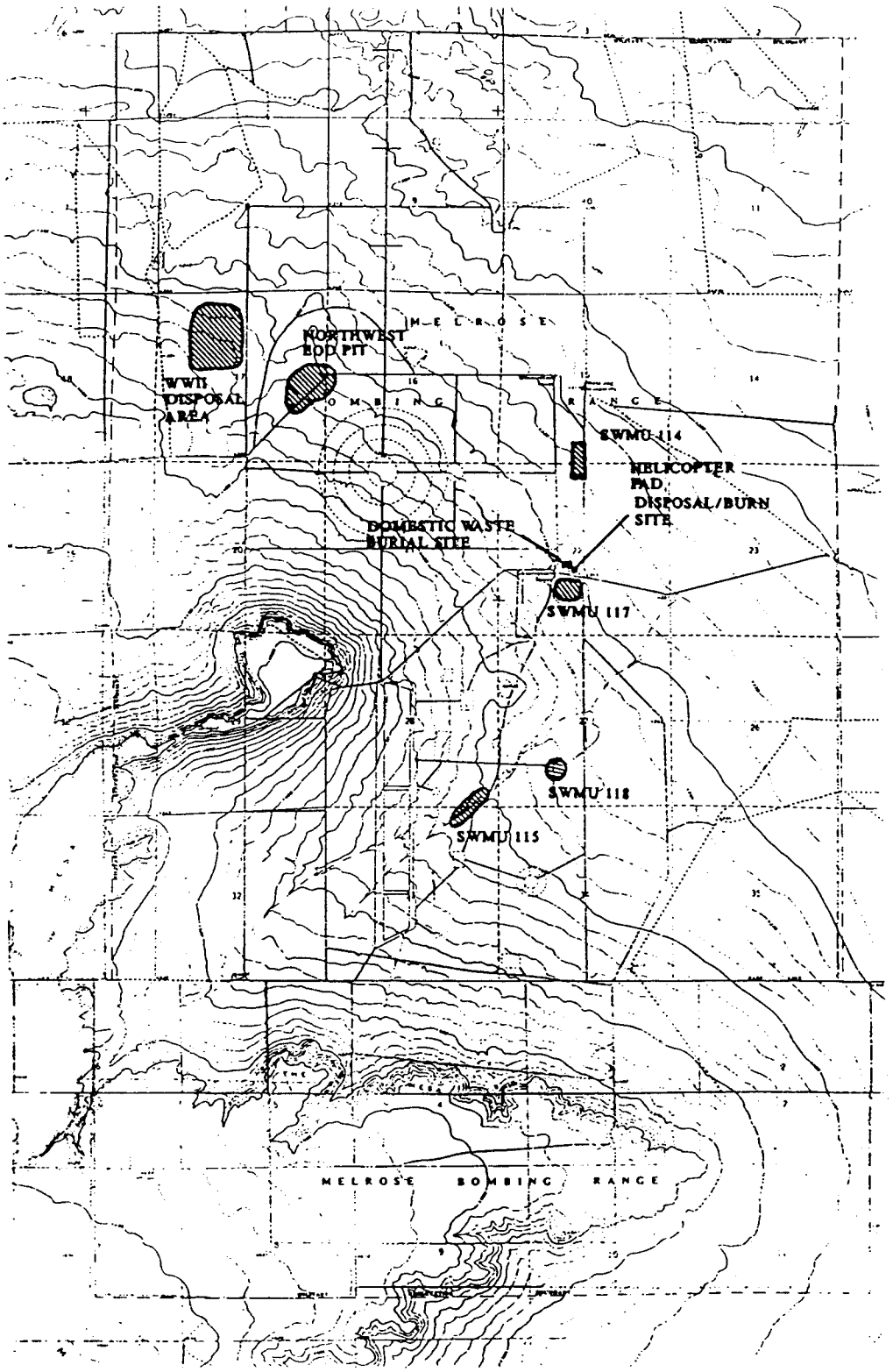
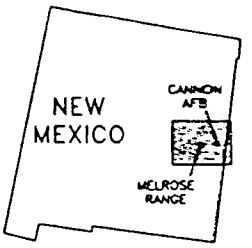
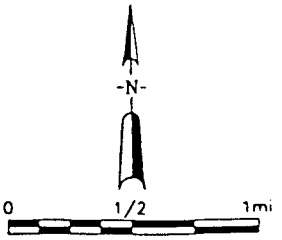
DRN. BY: JWB	DATE: 04/10/95	SITE PLAN AND LOCATION OF INVESTIGATED SWMU SITES CANNON AIR FORCE BASE CLOVIS, NEW MEXICO	PROJECT NO. C3M11MM
CHK'D. BY:	REVISION: 0		FIG. NO. 2



LEGEND

Areas of Concern





SOURCE: DRAFT MELROSE RFI WORKPLAN

DRN. BY: SCR	DATE: APRIL, 1995	SITE LOCATION MAP MELROSE AIR FORCE RANGE CANNON AIR FORCE BASE NEW MEXICO	PROJECT No.	FIG No.
CHK'D. BY:	REVISIONS: 0		C3M11MM	3

TABLE 1
SITE SUMMARY TABLE
SWMUs, AOC, AND IRP SITES

SWMU No.	IRP Site I.D.	Site Type	Description	Material Disposed of	Date of Discovery	Date of Operation	Status
1	-	SWMU	OWS No. 119	Recovers washdown from aircraft maintenance operations	1987	1963 to present	REP95
2	ST-28	SWMU/IRP	Recovered Diesel Tank No. 108	2,000-gal. heating oil UST at Building 108 (demolished 1989)	1989	1943 to 1990 Removed 1989	NFA
3	-	SWMU	OWS No. 108	Recovered oil and grease from washdown generated by aircraft maintenance operations	1987	1943 to 1989 Removed 1989	NFA(1)
4	ST-29	SWMU/IRP	Recovered Diesel Tank No. 121	2,000-gal. heating oil UST at Building 121 (demolished 1989)	1991	1943 to 1989 Removed 1989	NFA
5	-	SWMU	OWS No. 121	Recovered oil and grease from washdown generated by aircraft maintenance operations	1987	1943 to 1989 Removed 1989	NFA(1)
6	-	SWMU	POL Tank No. 129	2,000-gal. heating oil UST at Building 129	1987	1943 to 1992 Removed 1992	NFA
7	-	SWMU	OWS No. 129	Recovers diesel fuel, solvents, oil, and grease from aircraft washdown operations	1987	1943 to present	REM95
8	-	SWMU	OWS No. 165	Recovers fuel, solvents, oil, and grease in runoff from the aircraft washrack	1987	1963 to present	REM95
9	-	SWMU	Aircraft Washrack Drain System	Recovers solvents, fuel, oil, and grease	1987	1966 to present	REP95
10	-	SWMU	POL Tank No. 170	2,000-gal. heating oil UST at Building 170	1987	1943 to present Removed 1992	NFA
11	-	SWMU	OWS No. 170	Recovers fuel, solvents, oil, and grease from aircraft washdown operations	1987	Unknown to 1989	REM95
16	-	SWMU	OWS No. 680	Recovers fuel, solvents, oil, and grease from aircraft washdown operations	1987	1965 to 1991 Removed 1991	NFA(1)
31	-	SWMU	AGE Maintenance Shop Pad	Fuel, oil, and grease	1983	1971 to present	NFA(2)
32	-	SWMU	OWS No. 186 (#1)	Recovers fuel, oil and grease from AGE washrack	1987	1971 to present	REM95
33	-	SWMU	OWS No. 186 (#2)	Recovers fuel, oil and grease from AGE shop floor drains	1987	1971 to present	REM95

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SWMUs, AOC, AND IRP SITES

SWMU No.	IRP Site I.D.	Site Type	Description	Material Disposed of	Date of Discovery	Date of Operation	Status
34	SD-15	SWMU	AGE Drainage Ditch	Receives fuel, solvents, oil, and grease from flightline and road runoff	1987	Late 1960s to present	NFA
38	-	SWMU	OWS No. 194	Recovers oil and grease from washdown operations	1987	1971 to present	REP95
39	-	SWMU	OWS No. 195	Recovers oil and grease from washdown operations	1987	1971 to present	REP95
46	-	SWMU	OWS No. 196	Recovers oil and grease from washdown operations	1987	1969 to present	REM95
47	-	SWMU	OWS No. 494	Recovers oil and grease from washdown operations	1987	1982 to present	REM95
48a	ST-26	SWMU/IRP	Underground Waste Oil Tank	Waste oils, solvents, paint thinners, fuels	1987	1941 to 1985 Removed 1988	NFA(1)
48b	ST-26	SWMU/IRP	Aboveground Overflow Capacity Tank	Waste oils, solvents, paint thinners, fuels	1992	1965 to 1985 Removed 1992	NFA(1)
49	-	SWMU/IRP	Inactive POL Storage Tank No. 4028a				Does not exist on CAFB
50	-	SWMU/IRP	Inactive POL Storage Tank No. 4028b				Does not exist on CAFB
51	-	SWMU	OWS No. 375	Recovers oil and grease from vehicle maintenance operations	1987	1968 to present	REP95
55	-	SWMU	Lead Acid Battery Accumulation Point	Storage area for waste lead acid batteries	1987	1965 to present	NFA(2)
57	-	SWMU	OWS No. 379	Recovers oil and grease from vehicle maintenance operations	1987	1965 to present	REP95
61	-	SWMU	OWS No. 5077a	Actually a sandtrap receiving wash water with oil and grease from a motor vehicle washrack	1987	1957 to present	REM95
62	-	SWMU	OWS No. 5077b	Actually a sandtrap in washrack floor drain upstream of SWMU No. 61	1987	1957 to present	REM95
63	-	SWMU	OWS No. 5077c	Actually a sandtrap in washrack floor drain upstream of SWMU No. 61	1987	1957 to present	REM95

TABLE 1
SITE SUMMARY TABLE
SWMUs, AOC, AND IRP SITES

SWMU No.	IRP Site I.D.	Site Type	Description	Material Disposed of	Date of Discovery	Date of Operation	Status
70	-	SWMU	OWS No. 326 and Leach Field	Recovers fuel, oil, and grease from vehicle maintenance operations	1987	1960 to present	REM
71	-	-	Recovered JP-4 Tank No. 390	JP-4 fuel UST	1987	Unknown to 1991 Removed 1991	NFA
72	-	SWMU	OWS No. 390	2,000-gal. underground JP-4 recovery tank until replaced with oil/water separator in 1991	1987	Unknown to 1991 (Tank) 1991 to present (OWS)	NFA
74	LF-01	SWMU/IRP	Landfill No. 1	Domestic solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, and empty cans/drums	1983	1942 to 1946	Phase I RFI on Burn Pits in FY 1995
75	SD-13	SWMU/IRP	Sanitary Sewage Lift Station Overflow Pit	Emergency sewage storage pit. In February 1983, an estimated 100,000 to 150,000 gal. of raw sewage was stored in the pit for one week	1983	Unknown to present (no remnants due to new golf course construction)	NFA
76	WP-14	SWMU/IRP	Sludge Weathering Pit	Sludge from JP-4 bulk storage fuel tanks	1983	1960 to 1980	NFA
77	-	SWMU	Civil Engineering Container Storage Area, Facility No. 4038	Waste oils and solvents, fuels, PCBs, pesticides	1987	1943 to present	NFA(2)
78	FT-06	SWMU/IRP	Fire Department Training Area No. 1	Waste oils and solvents, recovered fuels	1983	1959 to 1968	NFA
79	-	SWMU	Underground Tank	Recovered JP-4 (no reference of this tank can be located)	1987	1959 to 1968	NFA
81	DP-16	SWMU/IRP	Solvent Disposal Site	Trichloroethylene	1983	Unknown	NFA
82	LF-02	SWMU/IRP	Landfill No. 2	Domestic and industrial waste, waste oils and solvents, paint strippers and thinners, pesticide containers, and empty cans/drums	1983	1946 to 1947 1951 to 1959	NFA
83	ST-27	SWMU/IRP	Sump	Washdown from flight apron	1987	Unknown to 1993 Removed 1993	NFA(1)
85	SD-12	SWMU/IRP	Storm Water Collection Point	Receives storm water runoff from flight line	1983	1943 to present	NFA

TABLE 1
SITE SUMMARY TABLE
SWMUs, AOC, AND IRP SITES

SWMU No.	IRP Site I.D.	Site Type	Description	Material Disposed of	Date of Discovery	Date of Operation	Status
86	SD-11	SWMU/IRP	Engine Test Cell	Fuel, oil, grease, and solvents from aircraft engine cleaning operations (Building 5114)	1983	1965 to 1988	Phase III RFI in FY 1995
87	SD-11	SWMU/IRP	Former Overflow Pit	Overflow from Engine Test Cell, SWMU No. 86	1983	1982 to 1985	Phase III RFI in FY 1995
88	SD-11	SWMU/IRP	Former Leaching Field	Washdown wastewater from OWS SWMU No. 90 (attached to Engine Test Cell, SWMU No. 86)	1983	1965 to 1985	Phase III RFI in FY 1995
89	SD-11	SWMU/IRP	Evaporation Pond	Engine Test Cell wastewater/fuel	1983	1985 to present	Phase III RFI in FY 1995
90	SD-11	SWMU/IRP	OWS No. 5114	Engine Test Cell, SWMU No. 86, wastewater/fuel	1983	1965 to 1988	Phase III RFI in FY 1995
91	-	SWMU	Recovered Fuel Tank No. 5114	Did not receive waste; functioned as a JP-4 bulk storage facility	1987	1967 to 1988 Removed 1988	NFA
92	-	SWMU	OWS No. 5120	Recovered fuel, oil, and grease from aircraft maintenance operations	1987	1957 to 1988	REM95
93	-	SWMU	OWS No. 5121	Recovered fuel, oil, and grease from aircraft maintenance operations	1987	1957 to 1988 Removed 1988	NFA(2)
94	-	SWMU	OWS No. 5144	Recovered oil and grease from vehicle washrack	1987	1960 to 1988	REM95
95	SD-20	SWMU/IRP	NE Storm Water Drainage Area	Storm water runoff from flight line and effluent from flight line oil/water separators	1987	1943 to present	Phase II complete, waiting for EPA decision
96	SD-17	SWMU/IRP	Old Entomology Rinse Area	Pesticides	1983	1968(?) to 1983	Phase II complete, waiting for determination of inclusion on NPDES permit
97	LF-25	SWMU/IRP	Concrete Rubble Pile	Building demolition material, asphalt rubble	1987	Mid-1950s to early 1960s	FE(2)
98	-	SWMU	Sanitary Sewerage Line	Sanitary and industrial wastewater	1987	1943 to present	NFA

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SWMUs, AOC, AND IRP SITES

SWMU No.	IRP Site I.D.	Site Type	Description	Material Disposed of	Date of Discovery	Date of Operation	Status
101	SD-21	SWMU/IRP	Wastewater Treatment System - Lagoons	Sanitary and industrial wastewater	1987	1966 to present	Groundwater monitoring
102	SD-21	SWMU/IRP	Wastewater Treatment System - Effluent Discharge	Sanitary and industrial wastewater (sewage lagoons' outfall)	1987	1966 to present	Groundwater monitoring
103	-	SWMU	Wastewater Playa Lake	Sanitary and industrial wastewater (sewage lagoons' outfall)	1987	1943 to present	NFA[2]
104	LF-04	SWMU/IRP	Landfill No. 4	Domestic and industrial waste, waste oils and solvents, paint strippers and thinners, pesticide containers, empty cans/drums	1983	1967 to 1968	Monitoring of downgradient well
105	LF-03	SWMU/IRP	Landfill No. 3	Domestic and industrial waste, waste oils and solvents, paint strippers and thinners, pesticide containers, empty cans/drums	1983	1959 to 1967	Monitoring of downgradient well
106	FT-07	SWMU/IRP	Fire Department Training Area No. 2	Waste fuels, oils, and solvents burned	1983	1968 to 1974	NFA
107	FT-08	SWMU/IRP	Fire Department Training Area No. 3	Waste fuels, oils, and solvents burned	1983	1968 to 1974	NFA
108	-	SWMU	Explosive Ordnance Disposal Activities Area	Munitions training site (5-lb. explosive limit)	1987	Early 1970s to present	NFA[1]
109	FT-09	SWMU/IRP	Fire Department Training Area No. 4	Waste fuels, oils, and solvents burned	1983	1974 to present	NFA
110	-	SWMU	Underground Waste Oil Tank No. 2336	JP-4 fuels storage for training (at SWMU No. 109)	1987	1975 to 1988 Removed 1988	Phase II RFI in CY 1995
111	-	SWMU	Unlined Pit	Collection point for unburned fuel, water, and fire-retardant foam runoff from SWMU No. 109	1987	1975 to 1985	NFA
112	-	SWMU	OWS No. 2336	Unburned fuel runoff from SWMU No. 109	1987	1985 to present	NFA

TABLE 1
SITE SUMMARY TABLE
SWMUs, AOC, AND IRP SITES

SWMU No.	IRP Site I.D.	Site Type	Description	Material Disposed of	Date of Discovery	Date of Operation	Status
113	LF-05	SWMU/IRP	Landfill No. 5	Domestic and industrial waste, waste oils and solvents, paint strippers and thinners, pesticide containers, and empty cans/drums	1983	1968 to 1988	Phase I RFI under NMED lead scheduled for 1995 to 1997
124	ST-30	SWMU/IRP	Inactive Underground Tank 1	Location and purpose unknown	1987	Unknown	NFA
125	ST-31	SWMU/IRP	Inactive Underground Tank 2	Location and purpose unknown	1987	Unknown	NFA
126	ST-32	SWMU/IRP	Inactive Underground Tank 3	Heating oil UST	1987	Unknown	NFA
127	-	SWMU	OWS Near Tank 4095 (#1) and Leach Field	Sandtrap for POL washrack washdown water contaminated with JP-4, grease, and oils	1987	1977 to present	NFA[2]
128	-	SWMU	OWS Near Tank 4095 (#2) and Leach Field	Does not exist on Cannon AFB	1983		NFA
AOC A	SS-19	SWMU/IRP	MOGAS Spill	Approximately 2,000 to 3,000 gal. of leaded gasoline	1983	Occurred in early 1960s	NFA
AOC B	SS-18	SWMU/IRP	JP-4 Fuel Spill	Approximately 400 gal. of JP-4	1983	Occurred in 1980	NFA
AOC C	OT-10	SWMU/IRP	Blown Capacitors Site	Approximately 6 gal. of oil thought to contain PCBs	1983	1978	NFA
AOC D	-	SWMU/IRP	Nonfriable Asbestos Burial Pit	Asbestos siding material	1993	Unknown	Investigate in 1996
AOC 36	-	IRP	Disposal Pit	Possibly fluids from aircraft engine maintenance shop	?	Early 1950s	NFA request sent to EPA in 1994
-	DP-33	IRP	Disposal Pit	55-gal. drums discovered; 60 to 100 drums	1992	Late 1940s to early 1950s	Interim Removal Action in 1994, NFA expected
AOC E	-	SWMU/IRP	Rubble Pile	Airfield pavement	1995	Late 1930s(?)	Investigate in 1996
AOC F	-	SWMU/IRP	Bore Site Mound	Small caliber munitions	1995	1957-1971	Investigate in 1996

TABLE 1
SITE SUMMARY TABLE
SWMUs, AOC, AND IRP SITES

SWMU No.	IRP Site I.D.	Site Type	Description	Material Disposed of	Date of Discovery	Date of Operation	Status
Melrose AFR							
114	-	SWMU/IRP	Expended Ordnance Burial Site	Scrap metal, unexploded ordnance, and possibly unusable paints, solvents, and fuels	1987	1952 to late 1960s	Phase I RFI in 1995
115	-	SWMU/IRP	Explosives Contaminated Burial Site	Unexploded ordnance, training munitions, and metal targets	1987	1952 to 1989	Phase I RFI in 1995
117	-	SWMU/IRP	Domestic Waste Pile	Domestic Waste	1987	1952 to 1980s	Phase I RFI in 1995

AGE = Aerospace Ground Equipment
AOC = Area of Concern
FE = Further evaluation
IRP = Installation Restoration Program
MOGAS = Motor gasoline
NFA = No Further Action at this time
NMED = New Mexico Environment Department
OWS = Oil/Water Separator
PCBs = Polychlorinated biphenyls
POL = Petroleum, oils, and lubricants
RCRA = Resource Conservation and Recovery Act
REM = Pilot bio-venting study is being executed. The OWS will be reviewed following completion of the study.
REM95 = To be removed and inspected in 1995
REP95 = To be removed, inspected, and replaced in 1995
SWMU = Solid waste management unit
UST = Underground storage tank

(1) Per draft Phase II RFI Report, Appendix II SWMUs
(2) Per draft Phase II RFI Report, Appendix III SWMUs

Source: Management Action Plan for Cannon AFB, New Mexico

3.0
COMMUNITY PROFILE

The "Community" at CAFB includes the cities of Clovis and Portales, as well as the on-base residents at CAFB. It also includes landowners adjacent to CAFB and small towns located near MAFR.

3.1 CLOVIS, NEW MEXICO

Clovis is located in a rich agricultural area, approximately 6 miles east of CAFB. This city of 32,000 is the hub of the state's eastern plains and is called the "Cattle Capital of the Southwest".

Clovis, established by the Atchison, Topeka, and Santa Fe Railway in 1907, was originally a railway town called Riley Switch. In the same year, homesteaders were allowed to settle on the land, and transcontinental rail traffic began. Following this, the town's population and economy grew steadily. While the railroad was Clovis' main industry for many years, cattle raising became a significant activity with the opening of the stockyards in 1935 and the establishment of numerous feed lots. Some of the largest feedlots in the southwest are located in Clovis.

In 1947, the DoD closed the former Clovis Army Airfield. It was reactivated under a new name, CAFB, in 1951, boosting the community's economy. Also in the early 1950s came the development of deep-well irrigation farming, which spurred the agricultural boom that continues today.

Clovis consistently ranks second in the state in agricultural production. Nearly half the wheat, corn, peanuts, and barley grown in New Mexico comes from this area. Other crops include sorghum, sugar beets, and cotton.

Clovis is governed by a city manager and eight city commissioners. It has five banks and two savings and loan associations, with assets totalling $560 million. The 69 churches in Clovis represent 25 denominations. Clovis also has 22 schools and a community college.

Clovis has 8 parks totalling 240 acres. Local sports include motorcross motorcycle racing, recreational motorcycling, stock car racing, softball, soccer, football, basketball, golf, bowling, target shooting, horseback riding, and rodeos. Visiting animals in the city zoo is also a popular recreational activity.

The Committee of Fifty is a group of Clovis men and women in business dedicated to maintaining warm relations between the community and CAFB through legislative liaison in Washington D.C. and Santa Fe. This group was founded after the Clovis Army Airfield closure in 1947. The Committee of Fifty has been instrumental in helping CAFB obtain much-needed land. The special relationship between CAFB and the committee also includes involvement in social functions and recreational activities.

The relationship between CAFB and the Clovis community is very supportive. People in town are warm, friendly, and helpful when dealing with CAFB personnel. During the community interviews, many citizens described the relationship as "being part of a family."

3.2 PORTALES, NEW MEXICO

Portales is located approximately 15 miles south of CAFB and has a population of more than 12,000 people. Originally known as "Los Portales," meaning porches, it was named for a cowboy campsite where spring waters bubbled from caves resembling porches across a pueblo style house.

While Portales dates back to the 1880s, archaeological findings indicate humans have inhabited the area for more than 11,000 years, dating to the Paleo-Indian mastodon hunters. Artifacts and skeletal remains from archaeological digs are displayed at the Blackwater Draw Early Man Museum, just a few miles north of Portales, on U.S. Highway 70.

Portales' unique history is preserved in four other museums, all on the Eastern New Mexico University campus in Portales. The university is the third largest in New Mexico and is a major element in Portales life. The main campus, which employs more than 500 people, is in Portales; a branch campus is located in Roswell. The 400-acre, $23-million campus provides a variety of educational programs to the more than 4,000 students enrolled in the university each year. Students come from every county in New Mexico, 40 states, and many

foreign countries. The university offers 95 major areas of study. Many personnel from CAFB are full- or part-time students there.

The peanut and cattle industries are primary factors in Portales' economy. Peanuts are raised on much of the flat cropland surrounding the city, which has four peanut processing plants. Groundwater is used to irrigate thousands of acres of peanuts, cotton, wheat, corn, milo, hay, and potatoes. Portales also has the largest dairy industry in New Mexico. Other industries include ethanol distilling, soft drink canning, grain storage, and shipping and trucking services.

Portales' four city parks have picnic areas with tables and play equipment, tennis courts, and a swimming pool. The Oasis State Park, located between Portales and CAFB, has camping facilities and a small fishing lake.

The Portales Military Affairs Committee is a group of business men and women who act as intermediaries between CAFB and Portales. The committee is involved in various projects concerning CAFB, which keeps the lines of communication open. Relations between the people of Portales and CAFB are supportive and friendly.

3.3 MELROSE, NEW MEXICO

Melrose is located approximately 17 miles west of CAFB off of Highway 60-84 and has a population of more than 600 people. In the early 1900s, Melrose was originally called Brownhorn after one of the first settlers to the area.

Melrose is primarily an agricultural community, raising wheat and cattle. The town has a bank, two convenience stores, a nursing home, a New Mexico State Highway maintenance yard, and elementary and secondary school, and a grain elevator. Recreational outlets include a public swimming pool, city park, and a softball field. Many families own horses and ride throughout the outer town areas.

The community's main annual event is Old Timers Day. This a time when Melrose families get together and large family reunions take place. Melrose is a family-oriented community.

The town's people are highly religious, and are active in five churches of different denominations.

3.4 PUBLIC CONCERNS AND PERCEPTIONS

The CAFB PAO conducted 22 community interviews with residents of Clovis and Portales during the week of February 6, 1995. The interviews were developed to solicit community members' perceptions and concerns about CAFB and its environmental programs, their knowledge of and access to environmental information about CAFB, their informational needs, and how they would like to be involved in future public involvement activities. A copy of the interview questionnaire is provided in Appendix A.

Interviewees were asked how the community typically perceives the presence of CAFB. Everyone interviewed considers CAFB a vital community member and partner, and stated the community views CAFB positively and tries to work closely with it. Many of the interviewees said CAFB impacts education, real estate, and banking, and is interwoven into every facet of the community. Two of the people interviewed said CAFB brings cultural enrichment and diversity, as well as youth to the older agricultural community.

Many people also stressed the importance of CAFB to the economy of the area, with one interviewee saying Clovis relies quite heavily on CAFB and its large economic impact. Another respondent said, "Clovis and CAFB are really one community."

The majority of interviewees were not aware of or did not have concerns about environmental programs at CAFB. Several of these people said they knew CAFB was working with the state and has made positive, conscientious efforts to take care of any problems CAFB may have. Most of the respondents who were aware of environmental programs did not know specifically what the programs were.

One interviewee was aware of the most recent air space easements, final approval of the old sanitary landfill, and MAFR. That individual did not have concerns about those issues and thought the state and CAFB do a good job of meeting regulatory requirements. Another interviewee was aware of programs at MAFR, but did not hear of environmental problems at CAFB.

One individual was familiar with CAFB's environmental programs from involvement with various projects and programs. That person's involvement included working with the Air Force on construction of a water pipeline from the Ute Reservoir, reviewing various Environmental Impact Statements, and reviewing groundwater depletion projections and aquifer depletion studies. The interviewee thought CAFB's programs were generally very well managed, but was concerned about groundwater depletion, groundwater protection, wellhead protection, and compliance with the solid waste act.

There were few concerns identified during community interviews about environmental programs at CAFB, and none of the interviewees expressed concerns related to the IRP. The main concern interviewees did have was with groundwater quality and quantity. A few interviewees knew CAFB has its own wells for water supply and were concerned about the amount of groundwater being pumped. Two people stated the need for CAFB, as well as other groundwater users, to study their use of and impact on the groundwater supply of eastern New Mexico.

Other concerns expressed by interviewees were that CAFB plan well and take care of environmental problems as they go along, continue to be very proactive to maintain the ecosystem on CAFB, meet regulations, and that Clovis be able to monitor environmental activities. A few interviewees also mentioned that there have been some noise complaints. One interviewee was concerned about the quality of CAFB wastewater he was using to irrigate his feed crops.

The community members aware of CAFB's environmental programs became aware mainly through involvement in activities as members of the Committee of Fifty, honorary squadron commanders, Clovis/Curry County Chamber of Commerce, or as city or county officials. Many also read articles in the Clovis and Portales newspapers and the CAFB newspaper, the Mach Meter, or had conversations with people aware of CAFB environmental programs.

The interviewees were split on the need for more information about CAFB's environmental programs. Most of the people who were aware of CAFB programs said they were well informed, or knew how to get information, and did not need more. Others said they did not need additional information as long as CAFB was in compliance, because they trusted CAFB, or because they were not concerned. The majority of interviewees who said they needed

additional information were not aware of environmental programs at the CAFB. Only two of the interviewees did not know of some way to obtain information about CAFB environmental programs, and one person said the average citizen does not know how to obtain information.

The interviewees were asked what agencies or government officials, if any, they had contacted regarding environmental programs at CAFB. All but one citizen said they had not contacted any agencies. One interviewee had contacted the New Mexico environmental office about other community issues, then talked about CAFB. Several interviewees had contacted CAFB personnel, including the PAO, the civil engineering squadron's environmental office, and the support group commander, and said the offices were responsive to their questions and concerns.

The interviewees identified a number of ways they would like to receive additional information about environmental activities. The majority indicated they would like to see the information in newspaper articles; the Clovis News Journal's weekly feature story on CAFB was mentioned as a place for articles to appear. Several others said they would like to see the information in newsletters and fact sheets. Most of the interviewees did not think it was necessary to get information on a scheduled basis, but as it was available. A few interviewees did say they would like a quarterly or semi-annual newsletter. Other communication vehicles identified included:

- Open houses
- CAFB visits
- A speakers bureau
- Radio talk shows, CAFB's cable television channel
- An index to CAFB's environmental reports in the public libraries

Many interviewees said public meetings have been poorly attended in the past, and they felt the public would prefer reading about CAFB's environmental activities. One person said public meetings were good when there were conclusions to present or when actions were being taken.

Interviewees were asked the best location, time, and day for public meetings when they were necessary. Everyone interviewed said it was best for meetings to be held off CAFB in the evening during the week. They suggested Monday, Tuesday, and Thursday evenings, with Thursday being the best; Wednesday evenings should be avoided because of religious activities. Several people identified early evening starting times between 5:30 p.m. and 7:00 p.m. Meeting sites identified were:

- Clovis Community College's Town Hall or classrooms
- Clovis Carver Public Library
- Marshall Junior High School in Clovis
- Eastern New Mexico University auditorium
- Portales Memorial Building
- Portales Public Schools board room
- Low income neighborhoods

More information on meeting sites is provided in Appendix B.

When asked how they would like to be involved in future activities related to the IRP, several people said they would be involved in whatever was good for CAFB and the community. Many of the interviewees were already participating in CAFB/community activities, but said they would do more if it was helpful. A few people were happy with the communication between CAFB and the community and were not interested in additional involvement.

4.0
PUBLIC INVOLVEMENT REQUIREMENTS UNDER THE IRP AND RCRA

4.1 DERP/IRP PUBLIC INVOLVEMENT REQUIREMENTS

Under DERP, federal facilities were required to create a Technical Review Committee (TRC) to participate in the selection of remedies for a facility. The TRC consists of representatives from the federal facility, EPA, and state regulatory agency, and local officials and a representative from the community. CAFB established a TRC, but it is now dormant.

The ACC has established several additional policies for implementing public involvement activities during the IRP at its bases. ACC has policies for establishing Administrative Records and Information Repositories, preparing CRPs for each base, and for converting the bases' TRCs to Restoration Advisory Boards (RABs). This CRP was prepared to fulfill ACC's policy. The background for development of this plan was described in Section 1.2.

Administrative Record

The Administrative Record is a file containing all of the information or documentation used to support the Selection of Remedy at a SWMU (described in Section 4.2). It generally contains copies of the RFI, CMS, public notices, public comments, EPA's responses to comments, and appropriate permits. The Administrative Record is a legal record that must be available for public review. Under RCRA, EPA would maintain an Administrative Record for any decisions the agency would make regarding the issuance or modification of a RCRA Part B Permit at a facility.

The Air Force developed a policy (U.S. Air Force Policy Letter, issued January 12, 1988) to establish and maintain an Administrative Record at each base to document its decisions throughout the IRP, rather than just during the RCRA permitting process. Each ACC base has established its Administrative Record within the environmental restoration offices of the bases' civil engineering squadrons. The bases' Administrative Records are available for public review during normal working hours. Parties wishing to review CAFB's Administrative Record should contact the PAO.

Information Repositories

Information Repositories are similar to Administrative Records, but they are established to provide information directly to the community. Fact sheets, technical summaries, site reports, the CRP, and other information that aids public understanding of the IRP process at a base can be part of the Information Repository. They are located "off-site" to facilitate public access. Typical locations for Information Repositories include libraries, city halls, public schools, or other public buildings. ACC has also developed a policy to establish and maintain Information Repositories at all of its bases.

Community Relations Plan

The CRP should be reviewed semiannually and updated when new site information and public concerns are revealed. To avoid unnecessary interviews, preparation of a new CRP, and revision of the CRP each time remedial action is taken at an IRP site, EPA has agreed to allow federal facilities to add appendices to the original CRP reflecting site updates. While only one CRP need be written, it must be updated as actions are taken.

Restoration Advisory Boards

In April 1992, EPA established the Federal Facilities Environmental Restoration Dialogue Committee to identify and evaluate issues related to environmental restoration activities at federal facilities. The committee included representatives from federal agencies, environmental groups, citizen groups, tribal organizations, and state and local governments. One of the issues the committee reviewed in 1992 was the existing opportunities for public involvement in environmental restoration. In February 1993, the committee issued its report that, among other things, recommended that those opportunities be expanded and site-specific advisory boards be established at federal facilities with sufficient community interest.

The DoD has recommended the establishment of RABs, which are very similar to the site-specific advisory boards. The EPA and DoD issued a joint "Restoration Advisory Board Implementation Guidelines" on September 27, 1994. In October 1994, ACC issued guidance to its bases which adopted the joint EPA-DoD guidance, and recommended that base TRCs be converted to RABs.

RABs are made up of representatives from the local community, state and federal regulatory agencies, and the base. Community members are chosen to represent the various "stakeholders" in the environmental restoration decision-making process at a base. Those stakeholders may include adjacent landowners, senior citizens, minority groups, local environmental groups, and other interested members of the community.

RABs provide expanded opportunities for ongoing community input and participation in IRP activities. They provide an important mechanism for two-way communication of IRP-related information between base representatives and members of the community. Since many RAB members are chosen to represent stakeholder groups, they will bring their groups' concerns to the base, and will also provide information from the base to their groups. While RAB members have direct input to the decision-making process, they are not a decision-making body.

At the time this CRP was prepared, CAFB was developing its RAB, with the first meeting planned for August 1995. Quarterly RAB meetings are planned and will be held if there is sufficient and sustained community interest.

4.2 CURRENT RCRA PUBLIC INVOLVEMENT REQUIREMENTS

Under the current RCRA regulations, most public involvement activities are focused on the permitting process for a facility. Those EPA regulations are found at 40 Code of Federal Regulations (CFR) Part 270. There are four steps in the RCRA permitting decision process; public involvement is required in Steps 3 and 4.

- *Step 1:* EPA receives the permit application or modification and begins to assemble a mailing list of interested individuals or organizations.

- *Step 2:* EPA completes its review of the permit application or modification and makes a preliminary decision to approve or deny the application/modification.

- *Step 3:* Once EPA makes its preliminary decision and prepares a draft permit, EPA must give a formal public notice that the draft permit is available for

public review and comment. They must publish the public notice in a major local newspaper, broadcast it over local radio stations, and send it to all persons on the mailing list. A 45-day public comment period on the draft permit follows the publication of the public notice. EPA must also hold a public hearing on the draft permit, if requested. If EPA holds a public hearing, it must provide a second public notice 30 days in advance of the hearing, giving the time and place of the hearing.

- *Step 4:* After the public comment period closes, EPA must review and evaluate all written and oral comments received before EPA can issue the final permit. When the final permit is issued, EPA must send a Notice of Decision, together with a written response to all comments, to all persons who submitted comments or requested notice of the final permit decision. EPA must also place its written response to comments in the Administrative Record established for the permitting process and maintained at EPA.

For CAFB, the four steps described above will occur after completing investigation and remediation (if necessary) of the 74 SWMUs and the 3 AOCs listed on the CAFB RCRA Part B Permit. At that time, CAFB will request a permit modification from EPA to acknowledge that the permit requirements (to investigate and, where necessary, remediate the sites) have been completed and the permit requirements should be removed from their permit. The permit modification will follow the regulations found in 40 CFR Part 270-Subpart D-Changes to Permit. A similar process will be followed for the MAFR RCRA Subpart X Permit.

4.3 PROPOSED RCRA PUBLIC INVOLVEMENT REQUIREMENTS

EPA has issued proposed rules to expand the existing corrective action requirements under RCRA (Federal Register, pages 30873 to 30884, published on July 27, 1990) and to expand public participation in the permitting process (Federal Register, pages 28680 to 28711, published on June 2, 1994). These two proposed rules would add several opportunities for public involvement in the investigation and remediation of RCRA-regulated sites, or SWMUs.

The proposed RCRA Corrective Action rules describe the following steps in the investigation and remediation process for SWMUs. CAFB is following the proposed regulations as part of its RCRA Permit requirements.

RCRA Facility Investigations

The RFI is a comprehensive evaluation of the SWMU to determine if operations at the SWMU caused contamination of the soil, surface water, or groundwater. If contamination is detected, the level of contamination is compared to established remediation action levels to determine whether the site must be remediated. Under the proposed RCRA Corrective Action rules, the following public involvement would occur:

- A summary of the final RFI report may be mailed to persons on the facility mailing list (maintained by the PAO)
- The facility may be required by EPA to establish an Administrative Record (see Section 4.1)
- EPA would issue a public notice on the availability of the Administrative Record (if established)
- The facility would notify all potentially affected parties in writing whenever a hazardous waste release exceeding action levels is discovered

Corrective Measures Studies

A CMS is an identification and evaluation of the different alternatives available for remediation of contamination at a SWMU. CMSs are completed at those SWMUs where the RFI determined that contamination exceeded the action level. The CMS culminates in the selection of a proposed alternative or remedy for the SWMU.

Selection of Remedy

EPA will review the CMS and prepare a Statement of Basis describing the proposed remedy for the SWMU. The following public involvement steps are part of the Selection of Remedy in the proposed RCRA Corrective Action rules:

- A fact sheet is prepared
- EPA would publish a public notice announcing the Statement of Basis and a 45-day public comment period
- EPA would hold a public hearing if they receive a written request stating a person's opposition to the proposed remedy
- EPA would review all comments received during the public comment period, and prepare a written response to comments
- EPA will issue its Notice of Decision regarding the selected remedy

Corrective Measures Implementation

After EPA issues its Notice of Decision, construction plans and specifications for the selected remedy are prepared. Under the proposed RCRA Corrective Action rules, a public notice would be published announcing that the construction plans and specifications are available for public review. The facility would be required to notify any potentially affected parties in writing if a hazardous waste release exceeding RCRA action levels occurred during the remediation of the SWMU.

Completion of Remedy

After the remediation of the SWMU is complete, EPA would issue a public notice and hold a 60-day public comment period under the proposed RCRA Corrective Action rules. An informal meeting would also be held, if requested. EPA would then follow the existing

permit modification rules (described in Section 4.1) to modify the facility's permit to delete the corrective action requirements (since the requirements would all be satisfied).

5.0
PUBLIC INVOLVEMENT ACTIVITIES AT CANNON AFB

5.1 CURRENT ACTIVITIES

CAFB has several public involvement activities already in place as part of its IRP. This CRP is part of those on-going activities, and serves as a focal point for those activities. Some of those activities will be modified as a result of input received during the community interviews. This section describes the existing public involvement activities. The expanded or modified activities, along with several new activities, are described in Section 5.2. The CAFB PAO is the focal point for these public involvement activities.

Administrative Record

CAFB's IRP Administrative Record resides in its environmental restoration office. The Administrative Record can be reviewed during normal working hours (8:00 a.m. through 5:00 p.m., Monday through Friday). The environmental restoration office is closed on federal holidays and weekends. Arrangements to review the Administrative Record can be made by calling the environmental restoration office at (505) 784-4348 or the PAO at (505) 784-4131. The environmental restoration office's address is:

27 CE/CEVR
111 Engineers Way
Cannon AFB, New Mexico 88103-3136

The PAO address is:

27th Fighter Wing/PA
100 S DL Ingram Blvd., Suite 102
Cannon AFB, New Mexico 88103-5216

Information Repository

An Information Repository has been established at the Clovis Carver Public Library. The library is located at 701 N. Main in Clovis; its phone number is (505) 769-7840. Current library hours are:

Monday through Thursday:	10:00 a.m. to 9:00 p.m.
Friday and Saturday:	10:00 a.m. to 5:00 p.m.
Sunday:	Closed

Restoration Advisory Board

CAFB is in the process of establishing its RAB. Many stakeholder groups were identified during the community interviews for this CRP. Fact sheets and a RAB membership application have been developed and CAFB is in the process of advertising the development of its RAB. Following the advertisement and solicitation for members, CAFB will seek volunteers to serve on a selection panel to select the members of the RAB. The full RAB should be in place and operational by the end of August 1995.

Speakers Bureau

CAFB's PAO maintains a list of CAFB personnel who participate on its speakers bureau. Speakers bureau members are available for on- and off-base presentations to public and private groups and civic organizations. Citizens and groups interested in obtaining a speaker can call the PAO at (505) 784-4131.

Mailing Lists

The CAFB Environmental Restoration Office has developed an extensive mailing list for RAB activities and distribution of materials to parties interested in CAFB environmental restoration activities. This list contains names of state and local elected officials, congressional representatives, chambers of commerce, community organizations, other citizens' groups, and various federal and Air Force organizations. Fact sheets and other public information documents will identify a CAFB contact for parties wanting more information. The mailing

list should be continually reviewed and updated to add those people requesting information and should reflect changes in elected offices. The list also includes a complete list of local radio stations, local, regional and national newspapers, and other daily and weekly publications for media release distribution. The mailing list is included as Appendix C.

5.2 FUTURE ACTIVITIES

Table 2 is a matrix of proposed public involvement activities at CAFB. The matrix was developed using both the current and proposed RCRA regulations, as described in Section 4 of this CRP. It also incorporates several suggestions received during the community interviews for the development of this CRP. They are discussed further in the following paragraphs.

News Releases

News releases will be distributed to the media identified on CAFB PA media release distribution lists as significant developments in the IRP process occur. Copies of all news releases will be maintained for public inspection in the Administrative Record and Information Repositories.

PA will provide IRP update information and environmental news releases to the Clovis News Journal, and will offer suggestions for their weekly feature articles on CAFB. PA will maintain a file of those that are printed to evaluate placement.

Fact Sheets

Based on comments CAFB's PAO received during community interviews, fact sheets will be prepared to provide information directly to the public. A fact sheet will be prepared and distributed to individuals on the environmental restoration office RAB mailing list (Appendix C) at the completion of each major milestone of IRP technical work or when there is other IRP information to report. This would include distributing information prior to the start of field investigations to give advance notice of what field activities or testing will be done, and providing information after field investigations are complete.

The fact sheets will provide results of investigations and a schedule of continuing IRP work, and opportunities for future community involvement. Copies of all fact sheets will be maintained for public inspection in the Administrative Record and Information Repositories. The PAO is the point of contact for questions about news releases and fact sheets.

Public Meetings

Most of the community members interviewed by the PAO said public meetings were poorly attended and were not an effective way to disseminate information. Therefore, public meetings will only be held as required for the IRP process. Required public meetings will be held off CAFB. Sites to be considered for public meetings include those identified in Section 3.3, Public Concerns and Perceptions, of this CRP. Melrose area residents should attend public meetings in either Clovis or Ft. Summer. A list of public meeting locations is included in Appendix B of this CRP.

TABLE 2

PUBLIC INVOLVEMENT ACTIVITIES

Activity	During RFI	After RFI	During CMS	After CMS	During CMI	Permit Modifications
News Releases and Newspaper Articles	X	X	X	X	X	
Informed Base Meetings		X		X		X
Fact Sheets	X	X	X	X	X	X
Public Notices				X	X	X
Public Comment Periods				X		X
Opportunity for Public Hearing				X		

RCRA: Resource Conservation and Recovery Act
RFI: RCRA Facility Investigation
CMI: Corrective Measures Implementation
CMS: Corrective Measures Study

APPENDIX A

QUESTIONNAIRE FOR COMMUNITY INTERVIEWS

CANNON AIR FORCE BASE
COMMUNITY INTERVIEWS

NAME:_____ **DATE:**_____

ORGANIZATION:_____ **LOCATION:**_____

1. How does the community typically perceive the presence of Cannon Air Force Base in the Area?

2. Are you aware of any environmental programs at Cannon Air Force Base?

3. When and how did you first become aware of the program?

4. What are your concerns regarding environmental programs at Cannon Air Force Base?

5. Do you need more information about Cannon Air Force Base's environmental programs?

6. Do you know how to obtain information about Cannon Air Force Base's environmental programs?

7. What agencies or government officials (if any) have you contacted regarding the environmental program at Cannon Air Force Base?

8. Do you think these officials have been responsive to your concerns?

9. If not, how can the information exchange be improved?

10. How would you like to receive additional information (i.e., fact sheets, newsletters, newspaper articles, public meetings)?

11. How frequently would you like to get that information?

12. How would you like to be involved in future activities?

13. What would you consider to be the best location, time, and day for public meetings?

14. What other individual or groups do you think we should contact for development of this Community Relations Plan?

15. Would you serve on a Restoration Advisory Board, an organization of people service in an advisory capacity for environmental restoration at Cannon Air Force Base?

APPENDIX B

PUBLIC MEETING LOCATIONS

PUBLIC MEETING LOCATIONS

CIVIC CENTER (EL TAOSENO)
120 Civic Plaza Drive
Taos, New Mexico
Phone: 758-4160

CLOVIS COMMUNITY COLLEGE
417 Schepps Blvd.
Clovis, New Mexico
Phone: 769-4002

-- Town Hall --
- Seats 285 people
- Reserve 2 weeks in advance

-- Small classroom --
- Seats average 35 people

-- Large classroom --
- Seats 60-75 people
- Reserve 2 weeks in advance

CLOVIS MUNICIPAL BUILDING
321 Conley Street
Clovis, New Mexico
Phone: 769-7828

-- Assembly Room --
- Seats 60 people
- Reserve 1 month in advance

CLOVIS-CARVER PUBLIC LIBRARY
701 N. Main Street
Clovis, New Mexico
Phone: 769-7840

-- Ingram Room --
- Seats 80 people
- Reserve 2 months in advance

COMMUNITY HALL
Ft. Sumner, New Mexico
Phone: 355-2401 (Ft. Sumner City Hall)

EASTERN NEW MEXICO UNIVERSITY AUDITORIUM
U.S. Highway 70
Portales, New Mexico
Phone: 562-1011

MARSHALL JUNIOR HIGH SCHOOL
100 Commerce Way
Clovis, New Mexico
Phone: 769-4410

NEW MEXICO HIGHLANDS UNIVERSITY
Corner of 8th and University
Las Vegas, New Mexico
Phone: 424-3590

PORTALES PUBLIC SCHOOLS ADMINISTRATIVE BOARD ROOM
501 S. Abilene Avenue
Portales, New Mexico
Phone: 356-6641

TOLES LEARNING RESEARCH CENTER
New Mexico Military Institute Auditorium
Roswell, New Mexico
Phone: 622-6250

APPENDIX C

CANNON AFB
ENVIRONMENTAL RESTORATION OFFICE
MAILING LIST

INTERNATIONAL MINERAL & GEM CORPORATION
AL PANERAL
PO BOX 71
CARLSBAD NM 88220

MEALS ON WHEELS
MILLIE BOYLE
103 W 19TH
PORTALES NM 88130

MINISTERIAL ALLIANCE
DR. MARK SCOTT
115 W 15TH ST.
PORTALES NM 88130

MENTAL HEALTH RESOURCES
ROBERT BELL
300 E 1ST ST
PORTALES NM 88130

MISS NEW MEXICO PAGEANT BOARD
FRANKIE ANDERSON
400 E BAJA DR.
HOBBS NM 88240

NEW MEXICO PEANUT COMMISSION
CLAUDE MCAFFEE
EAST STAR RT BOX 140
PORTALES NM 88130

ODD FELLOWS LODGE #17
1424 N. MAIN
PORTALES NM 88130

THE ONES CLOVIS-PORTALES
DOROTHY SCARBOROUGH
108 WESTERFIELD
CLOVIS NM 88101

OPTIMIST CLUB OF PORTALES
ED HITSON
PO BOX 247
PORTALES NM 88130

OVEREATERS ANONYMOUS-NOW
RITA SENA
700 ELGIN
PORTALES NM 88130

PEANUT VALLEY COOPERATION
SHERYL WOFFORD
S. AVE F
PORTALES NM 88130

PEO SISTERHOOD CHAPTER
SHERYL BORDEN
2108 W UNIVERSITY DR.
PORTALES NM 88130

PEP HOMEMAKERS CLUB
CLAUDENE TOWER
RT 2 BOX 212
PORTALES NM 88130

PEOPLE'S AWARENESS
BETTY JOHNSON
STAT 34-ENMU
PORTALES NM 88130

PORTALES OF REALTORS
PAT WALLACE
1809 S AVE D
PORTALES NM 88130

PORTALES COUNTRY CLUB
BOBBY CRANE
S FLOYD HWY
PORTALES NM 88130

PORTALES EDUCATIONAL ASSOCIATION
300 E 5TH ST
PORTALES NM 88130

PORTALES GEM & MINERAL SOCIETY
L.W. MCGUFFIN
841 E 2ND ST.
PORTALES NM 88130

PORTALES MASONIC LODGE
KENNY PRINCE
1105 E 2ND ST
PORTALES NM 88130

PORTALES WOMEN'S CLUB
SHERYL BORDEN
137 TEXAS DR.
PORTALES NM 88130

AMERICAN CANCER SOCIETY
PO BOX 901
PORTALES NM 88130

AMERICAN LEGION AU
PO BOX 901
PORTALES NM 88130

AMERICAN SOCIETY OF WOMAN ACCOUNTANTS
PHYLLIS DAVIDSON
417 SHEPPS BLVD
CLOVIS 88101

ARCH HOMEMAKERS
MRS. T L ARNOLD
E STAR RT BOX 87
PORTALES NM 88130

BAPTIST WOMEN'S MISSIONARY UNION
LURLINE OWEN
701 W 14TH
PORTALES NM 88130

BETA SIGMA PHI, CHI C
KIM FOSTER
920 W UNIVERSITY
PORTALES NM 88130

BETA SIGMA PHI, XI-LAMBDA CHAPTER
RT 2 BOX 64
PORTALES NM 88130

BETA SIGMA PHI PRECE
BECKY COGGINS
1208 E 3RD ST
PORTALES NM 88130

BETHEL HOMEMAKERS CLUB
JEAN MARSHALL
E FLOYD HWY
PORTALES NM 88130

BLUE KEY HONOR SOCI
STAT 34-ENMU
PORTALES NM 88130

CLOVIS-PORTALES ARTS COUNCIL
BETTE-JANE GOODWIN
IRIS ARBOR DR.
CLOVIS NM 88101

COMMUNITY SERVICES
DELORES PENROD
1100 COMMUNITY WAS
PORTALES NM 88130

DELTA KAPPA GAMMA
ROSEMARY PATRICK
1501 S MAIN
PORTALES NM 88130

EASTERN NEW MEXICO
ANTIQUE CAR CLUB
DARREL STROUD
E STAR RT BOX 183A
PORTALES NM 88130

EASTERN STAR CHAPTER
MARY JOYCE PATE
117 E 3RD ST
PORTALES NM 88130

EASTERN NEW MEXICO
PRESS WOMEN
MARSHA MCFADDEN
1620 CAMEO
CLOVIS NM 88101

FINE ARTS DEPARTMENT
STAT 16-ENMU
PORTALES NM 88130

FAMILY & CHILDREN'S
2009 W ASPEN
PORTALES NM 88130

FRATERNAL ORDER OF POLICE
SGT KATHLEEN SMITH
100 W. 1ST ST
PORTALES NM 88130

HIGH PLAINS RODEO AS
KEITH MOORE
1732 ARCINEIGA DR.
CLOVIS NM 88101

THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS
1930 S AVE G
PORTALES NM 88130

TRINTY EPISCOPAL
116 W 3RD ST
PORTALES NM 88130

IMMANUEL LUTHERAN
11TH & PRINCE ST
CLOVIS NM 88101

TRINITY LUTHERAN
1705 W. 21ST ST
CLOVIS NM 88101

FIRST UNITED METHODIST
2ND ST & AVE C
PORTALES NM 88130

CHURCH OF NAZARINE
823 W. UNIVERSITY
PORTALES NM 88130

FIRST PRESBYTERIAN
W. 1ST & AVE F
PORTALES NM 88130

SEVENTH DAY ADVENTIST
112 N. AVE F
PORTALES NM 88130

FAITH TEMPLE
615 W 4TH ST
PORTALES NM 88130

LIVING FAITH
21ST & S AVE D
PORTALES NM 88130

PORTALES CHRISTIAN FELLOWSHIP
400 N MAIN
PORTALES NM 88130

WORD OF LIFE
801 W 18TH ST
PORTALES NM 88130

AARP
DR. GEORGE LEMON
147 YUCCA DR
PORTALES NM 88130

AAUW
JAN FROST
STAT 52-ENMU
PORTALES NM 88130

A.E.O.P.
DEBRA BURROW
STAT 4-ENMU
PORTALES NM 88130

A.H.O.R.A.
MARTY CHAVEZ
STAT. 34-ENMU
PORTALES NM 88130

ALPHA PHO ETA
MARILYN HOWARD
200 TUCKER CIRCLE
PORTALES NM 88130

ALHA PHI OMEGA
LUCY COOK
STAT 34-ENMU
PORTALES NM 88130

ALTRUSA CLUB OF PORTALES
GAYNELLE THOMAS
122 YUCCA DR.
PORTALES NM 88130

AMERICAN LEGION
FLOREN THOMPSON
1715 S. AVE M
PORTALES NM 88130

FIRST ASSEMBLY OF GOD
601 S. AVE B
PORTALES NM 88130

GOSPEL LIGHTHOUSE
AVE Q & W FIR
PORTALES NM 88130

FAITH MISSIONARY BAPTISH
MIN A.D. BENNETT
PORTALES NM 88130

FIRST BAPTIST CHURCH-PORTALES
100 S. AVE C
PORTALES NM 88130

IGLESIA BAUTISTA BETHEL
200 N. INDIO
PORTALES NM 88130

NEW TESTAMENT BAPTIST
901 E. END ST
PORTALES NM 88130

UNIVERSITY BAPTIST
1012 W. 15TH ST.
PORTALES NM 88130

BRAZOS ST. CHURCH OF CHRIST
814 E. BRAZOS
PORTALES NM 88130

SOUTHSIDE CHURCH OF CHRIST
209 S AVE B & W 18TH ST
PORTALES NM 88130

THE CHURCH OF GOD PROPHECY
816 E. CANADIAN
PORTALES NM 88130

CALVARY BAPTIST
1101 W. 18TH ST.
PORTALES NM 88130

EMMANUEL BAPTIST
GLOBE & ELBE ST.
PORTALES NM 88130

FELLOWSHIP BAPTIST
820 W. 17TH ST.
PORTALES NM 88130

FIRST SPANISH BAPTIST
1301 N. MAIN
PORTALES NM 88130

LIBERTY BAPTIST
S. MAIN AT 20TH ST.
PORTALES NM 88130

PRIMATIVE BAPTIST
813 E. 1ST
PORTALES NM 88130

ST HELEN CATHOLIC
1600 S AVE 0
PORTALES NM 8130

CHURCH OF CHRIST
18TH ST. & S AVE G
PORTALES NM 88130

PORTALES CHURCH OF GOD
1425 E AMAZON
PORTALES NM 88130

WORD ALIVE C.O.G.I.C.
400 N MAIN
PORTALES NM 88130

AAUW- BETTY BURCH
3721 AUTUMNWOOD
CLOVIS NM 88101

AIR FORCE ASSOCIATION
3016 CHEYENNE
CLOVIS NM 88101

ALTRUSA CLUB - SUSAN ROGERS
1421 WILSHIRE
CLOVIS NM 88101

AL-ANON (ODAT GRP)
500 W 19TH STREET
CLOVIS NM 88101

AMERICNA ASSN OF RETIRED PERSONS
1408 WALLACE
CLOVIS NM 88101

AMERICAN CANCER SOCIETY
1404 N KENTUCKY
ROSWELL NM 88201

AMERICAN LEGION POST #17
3209 MANDEL CIRCLE
CLOVIS NM 8810

AMERICAN RED CROSS
P O BOX 1235
CLOVIS NM 88101

AMVETS POST 14
P O BOX 1464
CLOVIS NM 88101

ANIMAL WELFARE LEAGUE
407 N PRINCE
CLOVIS NM 88101

ANTIQUE DEALERS ASSOCIATION
RT 3 BOX 2884
CLOVIS NM 88101

ARC OF CURRY COUNTY
308 MANSON
CLOVIS NM 88101

ASTRONOMY CLUB
1004 W CHRISTOPHER
CLOVIS NM 88101

BAXTER-CURREN HALL SENIOR CENTER
908 HICKORY
CLOVIS NM 88101

BETA SIGMA PHI-BARBARA BERRY
CITY COUNCIL OF BSP
CLOVIS NM 88101

LAUREATE TAU CHAPTER-GENE PULLMA
1308 FAIRWAY TERRACE
CLOVIS NM 88101

PRECEPTOR PSI-BSP-PATTY BRADY
304 N MAIN
CLOVIS NM 88101

XI BETA SIGMA CHAPTER-DEBBIE BRACKE
2816 ROSS
CLOVIS NM 88101

BIG BROTHERS/BIG SISTERS
414 MITCHELL
CLOVIS NM 88101

BOARD OF REALTORS - KATHY CORN
2708 N PRINCE
CLOVIS NM 88101

BOW HUNTERS
P O BOX 1524
CLOVIS NM 88101

BOY SCOUTS OF AMERICA-JIM COWMAN
2705 PUTNAM
CLOVIS NM 88101

BPW CLUB-MAOMI FLOWERS
1721 SR 77
TEXICO NM

BRUCES HOME-MARIAN RUTTER
CLOVIS NM 88101

AFSA-SMSGT GERARD FOISIE
3725 AUTUMNWOOD
CLOVIS NM 88101

CHIEFS GROUP-CMSGT ED ROLLINS
4216 BRIANS WAY
CLOVIS NM 88101

FIRST SGT GROUP-MSGT DAVE BLAKE
320 FIREBALL DRIVE
CLOVIS NM 88101

NCOA-MSGT DALE HUFT
504 ROSEWOOD DRIVE
CLOVIS NM 88101

OFFICERS WIVES CLUB-SUE HICKS
600 SHAY MARIE
CLOVIS NM 88101

ENLISTED WIVES CLUB-KAREN EBY
2312 HAMMOND WAY
CLOVIS NM 88101

CAR DEALERS ASSOCIATION-CLETIS JONES
HWY 60/70/84
CLOVIS NM 88101

CEA-DAVID BRISENO
10 PASEO VILLAGE
CLOVIS NM 88101

CHRISTIAN ACTIVITIES BOARD - TAMMY WILLARD
2400 PRINCE
CLOVIS NM 88101

CLOVIS BEAUTIFUL
P O BOX 760
CLOVIS NM 88101

CLOVIS/CURRY COUNTY CHAMBER
215 MAIN STREET
CLOVIS NM 88101

COMMUNITY PLAYERS-GINA NEWMAN
P O BOX 1388
CLOVIS NM 88101

COMPUTER CLUB-KATHY MCGUIRE
404 SANDY LANE
CLOVIS NM 88101

CONCERNED CITIZENS OF CLOVIS
P O BOX 1749
CLOVIS NM 88101

COOTIES AUXILIARY
P O BOX 271
CLOVIS NM 88101

COUNCIL ON AGING
908 HICKORY
CLOVIS NM 88101

COUNTY MENTAL HEALTH-MARILYN VALERIO
1216 CAMEO
CLOVIS NM 88101

CRIME STOPPERS-ROBERT WINKENWEDER
P O BOX 2001
CLOVIS NM 88101

CRISIS CENTER-RUBY FOWLER
113 WICKS
CLOVIS NM 88101

MOUNTED PATROL-BILL ADAMS
205 SPRINGFIELD DRIVE
CLOVIS NM 88101

NATIONAL ASSOCIATION RETIRED FEDERAL
EMPLOYEES-JOE URBAN
420 E MANANA
CLOVIS NM 88101

NEW MEXICO COUNCIL OF THE BLIND
1700 MABRY DRIVE
CLOVIS NM 88101

OASIS CHILDRENS ADVOCATE CENTER
HANK BASKETT
304 E 5TH STREET
CLOVIS NM 88101

SUNRISE OPTIMIST CLUB-DALE PETTY
PO BOX 1371
CLOVIS NM 88101

PANHELLENIC ALUMNAE
CAROLYN EDWARDS
1913 COLONIAL PARKWAY
CLOVIS NM 88101

PINTORES ART LEAGUE-DALE BURGES
P O BOX 63
CLOVIS NM 88101

CREATIVITY UNLIMITED-GINA NEWMAN
P O BOX 1388
CLOVIS NM 88101

CRIPPLED CHILDRENS ASSOCIATION-GLOI
201 INNSDALE
CLOVIS NM 88101

CURRY COUNTY FAIR ASSOCIATION
LYLE HUTCHINS
RT 1 BOX 42
CLOVIS NM 88101

NAACP-SELMUS PRICE
P O BOX 453
CLOVIS NM 88101

NEW MEXICO COALITION
JOE B GARCIA
417 CAMEO
CLOVIS NM 88101

NEW MEXICO NURSES ASSOCIATION#4
MARIAN PASTERNACKI
308 MANSON
CLOVIS NM 88101

OPTIMIST CLUB OF CLOVIS-JEFF BAUM
109 MASON
CLOVIS NM 88101

OUTDOOR DRAMA ASSOCIATION
CAROLYN EDWARDS
1913 COLONIAL PARKWAY
CLOVIS NM 88101

PILOT CLUB-DOROTHY REID
232 SASSER
CLOVIS NM 88101

PLAINS REGIONAL MEDICAL CENTER AU
MARINA PASTERNACKI
308 MANSON
CLOVIS NM 88101

PROGRESSIVE WOMENS CLUB-THELMA POTTARD
113 LINCOLN
CLOVIS NM 88101

PLAY INC
1700 E 7TH STREET BOX 333
CLOVIS NM 88101

QUILTERS-JUDY MATTHEWS
2913 LISA
CLOVIS NM 88101

REBEKAH LODGE#21
EDNA FULGHAM
812 SYCAMORE
CLOVIS NM 88101

READ-CURRY COUNTY FOR LITERACY
CLOVIS CARVER PUBLIC LIBRARY
TERRI GLENDEN
701 N MAIN
CLOVIS NM 88101

REPUBLICAN PARTY-BRIAN LOCKHART
501 CHANTICLEER
CLOVIS NM 88101

REPUBICAN WOMEN
SUSAN MCDOWELL
1908 S PRINCE
CLOVIS NM 88101

RETIRED EDUCATORS
VIC STOUT
2713 ROSS
CLOVIS NM 88101

RETIRED OFFICERS ASSOCIATION
FOREST CARPER
P O BOX 1075
CLOVIS NM 88101

RETIRED PUBLIC EMPLOYEES
WINNIFRED CONNER
3509 CORLINGTON WAY
CLOVIS NM 88101

RETIRED SENIOR VOLUNTEER PROGRAM
LUCY BONNEY
2401 -D N MAIN
CLOVIS NM 88101

ROSE OF SHARON (EASTERN STAR)
DOROTHY BROWN
P O BOX 2056
CLOVIS NM 88101

SALVATION ARMY
CAPT & MRS KRIS SUAREZ
220 N PRINCE P O BOX 804
CLOVIS NM 88101

SCA(SOCIETY FOR CREATIVE ANACHRONI
JOHN CASADY
2401 S GLOBE
PORTALES NM 88130

SENIOR CITIZENS-RUBY GOFORTH
908 HICKORY
CLOVIS NM 88101

SERTOMA CLUB
SELMUS PRICE
P O BOX 1474
CLOVIS NM 88101

SHRINE CLUB-BILL VETTERLY
1508 HICKORY
CLOVIS NM 88101

SHRINERS CLOWN UNIT
I.W. (DUTCH) QUICKEL
303 AVE G
FARWELL TX

SHRINERS HOSPITAL CONTACT-WENDOL CHRISTIAN
706 4TH STREET
FARWELL TX

THE ONES (SINGLES)
TED OLNOS
104 REMUDA
CLOVIS NM 88101

SOFTBALL ASSOCIATION
GUY LEEDER
217 SYCAMORE
CLOVIS NM 88101

SOY Y VIENTO GARDEN CLUB
BECKY BAUGH
3625 PALMER COURT
CLOVIS NM 88101

SPECIAL OLYMPICS-ROXIE BURGESS
P O BOX 2061
CLOVIS NM 88101

MASONIC LODGE
3100 THORNTON
CLOVIS NM 88101

CIRCLE 8 SQUARES
MASONIC LODGE
3100 THORNTON
CLOVIS NM 88101

TAN TERRIFIC
LOIS HUNTER
1028 SANDIA
CLOVIS NM 88101

TOASTMASTERS INTERNATIONAL
2901 HOLMBERG
CLOVIS NM 88101

TELEPHONE PIONEERS OF AMERICA
ROADRUNNER CLUB-BUDDY PRINCE
RT 1 BOX S #69 LA HACIENDA
PORTALES NM 88103

UNITED BLOOD SERVICE-GINNY NEFF
1708 E 21ST STREET
CLOVIS NM 88101

UNITED WAY
301 PILE P O BOX 806
CLOVIS NM 88101

UNIVERSITY SYMPHONY LEAGUE-JEAN PULLMAN
1308 FAIRWAY TERRACE
CLOVIS NM 88101

DAUGHTERS OF THE NILE
1520 HICKORY
CLOVIS NM 88101

DEAF CLUB OF CLOVIS-JOHN BERTRAM
800 HINKLE
CLOVIS NM 88101

DELTA DELTA DELTA
1913 COLONIAL PARKWAY
CLOVIS NM 88101

DEMOCRATIC PARTY
WARREN FROST, ATTY
920 MAIN STREET
CLOVIS NM 88101

DUPLICATE BRIDGE
CAROLYN WILSON
305 DIAMONDHEAD
CLOVIS NM 88101

FATERNAL ORDER EAGLES AREA 3245
GERALD WILLETT
513 HEASLET
CLOVIS NM 88101

EASTERN NEW MEXICO PRESS
DAVE HOLLAND
501 COMMERCE WAY SUITE 2
CLOVIS NM 88101

EASTERN NEW MEXICO AMATEUR RADIO CLUB
LEE CREUZER (N8MHC)
3516-B ADENMORE COURT
CLOVIS NM 88101

EASTERN NM RANGE RUNNERS CLUB
1709 JANEWAY
CLOVIS NM 88101

CLOVIS-PORTALES LODGE #1244
JOHN GIVENS
P O BOX 191
CLOVIS NM 88101

ENCANTO GARDEN CLUB
ELSIE DEAN
1708 GLENARMS
CLOVIS NM 88101

EMERGENCY MEDICAL SERVICES
EMT & CPR TRAINING
2905 N PRINCE SUITE A BOX 1895
CLOVIS NM 88101

EPSILON SIGMA ALPHA
BETA PHI CHAPTER - PATSY LORENZ
901 KATHY DRIVE
CLOVIS NM 88101

EXECUTIVE ASSOCIATION-DR JAKE MOBERLY
200 MURRAY DRIVE
CLOVIS NM 88101

FARM BUREAU-JACK DONAHEY
RT 1
TEXICO NM 88135

4-H
CURRY COUNTY COURTHOUSE
CLOVIS NM 88101

FARMERS UNION-BILLY TATE
RT 2
CLOVIS NM 88101

FOOD BANK-NANCY TAYLOR
BOX 1476
CLOVIS NM 88101

FOSTER GRANDPARENTS PROGRAM
2401-D N MAIN
CLOVIS NM 88101

FRIENDS OF THE LIBRARY-TISH MCDANIEL
2901 NORRIS
CLOVIS NM 88101

FRIENDSHIP CENTER(SENIOR CITIZEN)
CHERYL PARISH
901 E 13TH STREET
CLOVIS NM 88101

FUN DANCERS (DARYLE &BOBBIE STEPHENS)
P O BOX 1798
CLOVIS NM 88101

FULL GOSPEL BUSINESS MEN
J.R. HOUSTON JR.
1024 MORE
CLOVIS NM 88101

GENEALOGICAL SOCIETY & HISTORY CENTER
E.C. SHAEFFER
1500 SAINT ANDREWS DRIVE
CLOVIS NM 88101

GEM & MINERAL SOCIETY
DON HOGG
P O BOX 1815
CLOVIS NM 88101

GIRLS ATHLETIC ASSOCIATION
MR ROB PITCOCK
3232 DUCKWORTH
CLOVIS NM 88101

GIRL SCOUTS OF AMERICA
DEBRA METTHEWS
P O BOX 1001/7TH & SYCAMORE
CLOVIS NM 88101

PORTALES/CLOVIS AREA FAMILY EDUCATORS
BARBARA K SENN
P O BOX 961
PORTALES NM 88130

HART YOUTH RANCH
P O BOX 315
MELROSE NM 88124

HIGH PLAINS DRIFTER
MR ERNIE GOODMAN
2315 AZTELL
CLOVIS NM 88101

HIGH PLAINS MUZZLELOADERS
MR DRUE HARVEY
1821 GIDDING
CLOVIS NM 88101

HISPANO BUSINESS COUNCIL
MR VINCENT GALLEGOS
P O BOX 1170
CLOVIS NM 88101

HISTORICAL FOUNDATION
MR HAROLD KILMER
313 PRAIRIEVIEW
CLOVIS NM 88101

HUMANE SOCIETY
VIRGINIA KOEHNLEIN
916 ROSEWOOD P O BOX 384
CLOVIS NM 88101

INDEPENDENT ORDER OF THE ODD FELLOWS
MELVIN GOAR
405 MAIN STREET
CLOVIS NM 88101

JAYCEES
MR WILL CANTRELL
2420 ASHFORD
CLOVIS NM 88101

KENNEL CLUB
MS LAURA MORRIS
#6 BRIBLE STREET RANCHVALE
CLOVIS NM 88101

MORNING KIWANIS
ALLEN ISBELL
P O BOX 433
CLOVIS NM 88101

KNIGHTS OF COLUMBUS
CLOVIS COUNCIL #4205
E 21ST STREET P O BOX 165
CLOVIS NM 88101

LIFE UNDERWRITERS
MS JUDY CUMMINGS
P O BOX 466
FRIONA TX 79035

NOON DAY LIONS CLUB
MR RALPH BALFANZ
1912 E 21ST STREET
CLOVIS NM 88101

LITERARY COUNCIL
MR JIM GAINER
417 SCHEPPS BLVD
CLOVIS NM 88101

LYCEUM THEATRE INC
411 N MAIN
CLOVIS NM 88101

MENTAL HEALTH RESOURCES
MR FRED COTA
919 RENCHER
CLOVIS NM 88101

MUSCULAR DYSTROPHY
MS PATSY CHAVEZ
3532 W BRADY
CLOVIS NM 88101

MODEL AIRPLANE CLUB
CHUCK & JOE WOOD
901 MITCHELL
CLOVIS NM 88101

VFW POST #3015
MR JERRY LEATHERS
2815 W 7TH ST
P O BOX 271
CLOVIS NM 88101

VFW POST #3280
CARNINE WISEMAN/DENNIS PATE
200 W GRAND
CLOVIS NM 88101

WHEATGROWERS ASSOCIATION
MR VIC STOUT
2713 ROSS
CLOVIS NM 88101

WOODMAN OF THE WORLD
FAMILY LIFE FRATERNITY
MR ANDREWS CHITWOOD
1408 WALLACE
CLOVIS NM 88101

YOUTH OPPORTUNITIES UNLIMITED
JUVENILE PROBATION OFFICE
414 MITCHELL
CLOVIS NM 88101

DOTTIE HOXIE
DIRECTOR CURRY CO CHAMBER OF COMMERCE
215 N MAIN
CLOVIS NM 88101

RAY MCKENNA
DEFENSE COMMISSARY AGENCY
116 WESTERFIELD
CLOVIS NM 88101

DR JAMES MOSS
912 WEST 21ST
CLOVIS NM 88101

MR GORDON SMITH
SYSTEM MANAGER
TCA CABLE
1106 MAIN
CLOVIS NM 88101

MR JOHNNY CHAVEZ
COUNTY COMMISSIONER
1012 W GRAND
CLOVIS NM 88101

MR RICHARD SOUTER
SUPERINTENDENT
PORTALES MUNICIPAL SCHOOLS
501 S ABILENE
PORTALES NM 88130

MR KEN GROSLEE
MANAGER - CITY OF PORTALES
100 W 1ST
PORTALES NM 88130

KATHY CORN
PRESIDENT
CLOVIS BOARD OF REALTORS
1321 PILE
CLOVIS NM 88101

WOMENS CLUB
MS FAYE MCGUIRE
1704 WILSHIRE
CLOVIS NM 88101

DR JAY GURLEY
CLOVIS COMMUNITY COLLEGE
417 SCHEPPS BLVD
CLOVIS NM 88101

TOMMY BONNER
DISTRICT MANAGER
SOUTHWESTERN PUBLIC SERVICE CO
500 PILE
CLOVIS NM 88101

STANLEY HARDWICK
FIRST NATIONAL BANK
711 PILE
CLOVIS NM 88101

MR MACK MITCHELL
CLOVIS MUNICPAL SCHOOLS
800 PILE
CLOVIS NM 88101

MR ELDRED NOBLE
CITY COMMISSIONER
1520 EAST 2ND
CLOVIS NM

DR EVERETT FROST
PRESIDENT
EASTERN NEW MEXICO UNIVERSITY
STATION #1
PORTALES NM 88130

MR KEN GROSLEE
PORTALES PUBLIC LIBRARY
218 S AVENUE B
PORTALES NM 88130

LEE TILLMAN
EXECUTIVE DIRECTOR
EASTERN PLAINS COUNCIL OF GOVERNMENTS
104 W 2ND
CLOVIS NM 88101

SANDY WHITE
DIRECTOR - CLOVIS-CARVER PUBLIC LIBRARY
701 N MAIN
CLOVIS NM 88101

RANDY VANDERDUSSEN
RAJEN DAIRY
ROUTE 1 BOX 265B
CLOVIS NM 88101

SELMUS PRICE
NAACP
P O BOX 453
CLOVIS NM 88101

JIM LEWTER
CLOVIS FEED YARDS INC
P O BOX 756
CLOVIS NM 88101

CLOVIS-CARVER PUBLIC LIBRARY
701 N MAIN
CLOVIS NM 88101

FORT SUMNER PUBLIC LIBRARY
300 WEST SUMNER AVE.
FORT SUMNER NM 88119

LAS VEGAS PUBLIC LIBRARY
500 NATIONAL AVE
LAS VEGAS NM 87701

HARRY BODEN
CHIEF OF POLICE
217 W 4TH STREET
CLOVIS NM 88101

LUCY BONNEY
RETIRED SENIOR VOLUNTEER PROGRAM
2401D N MAIN
CLOVIS NM 88101

EASTERN PLAINS COUNCIL OF GOVTS
104 W 2ND
CLOVIS NM 88101

PORTALES PUBLIC LIBRARY
218 SOUTH AVE B
PORTALES NM 88130

ROSWELL PUBLIC LIBRARY
301 N PENNSYLVANIA AVE
ROSWELL NM 88201

TAOS PUBLIC LIBRARY
238 LEDOUX
TAOS NM 87525

ROTC, MILITARY SCIENCE
CAPT BARNETT
STAT 36-ENMU
PORTALES NM 88130

RETIRED TEACHERS ASSOCIATION
173 YUCCA CIRCLE
PORTALES NM 88130

APPENDIX D

LIST OF ACRONYMS

ACRONYMS

ACC	-	Air Combat Command
AFB	-	Air Force Base
AOC	-	Area of Concern
CAFB	-	Cannon Air Force Base
CE	-	Civil Engineering
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act
CEVR	-	Civil Engineering, Environmental Restoration Office
CFR	-	Code of Federal Regulations
CMI	-	Corrective Measures Implementation
CMS	-	Corrective Measures Study
CRP	-	Community Relations Plan
DERP	-	Defense Environmental Restoration Program
DoD	-	Department of Defense
EPA	-	U.S. Environmental Protection Agency
FW	-	Fighter Wing
GWEN	-	Ground Wave Emergency Network
IRP	-	Installation Restoration Program
MAFR	-	Melrose Air Force Range
NMED	-	New Mexico Environment Department
PA	-	Public Affairs
PAO	-	Public Affairs Office
PCB	-	Polychlorinated Biphenyl
RAB	-	Restoration Advisory Board
RCAP	-	RCRA Corrective Action Program
RCRA	-	Resource Conservation and Recovery Act
RFA	-	RCRA Facility Assessment
RFI	-	RCRA Facility Investigation
SWMU	-	Solid Waste Management Unit
TAC	-	Tactical Air Command
TFW	-	Tactical Fighter Wing
TRC	-	Technical Review Committee

APPENDIX E

GLOSSARY

ADMINISTRATIVE RECORD: A file that is maintained on site and contains all information used by the lead agency to make its decision on the selection of a response action under RCRA or the IRP. This file is to be available for public review; a copy is usually maintained at one of the information repositories.

CLEANUP: Actions taken to eliminate or contain the pollutants at a site.

CONTAMINANT: Any substance which degrades an environmental resource or makes it unfit or unsafe for its typical use.

CORRECT MEASURES IMPLEMENTATION (CMI): The CMI involves formulation and approval of the engineering designs required to implement the selected remedial alternative. The CMI is the implementation of the selected remedial alternative, and consists of measures to eliminate the hazard or, at a minimum, reduce hazards to an acceptable level. Covering a landfill with an impermeable cap, pumping and treating contaminated groundwater, installing a new water distribution system, and in situ biodegradation of contaminated soils are examples of remedial measures that might be selected.

CORRECTIVE MEASURES STUDY (CMS): The CMS consists of the review and screening of remedial alternatives and a detailed evaluation of remaining alternatives with respect to: performance, reliability, implementability, safety, human health, and environmental health.

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM (DERP): DERP is the statutory authority for the evaluation and cleanup of contamination at DoD installations. DERP guides the Air Force IRP.

PUBLIC: Citizens directly affected by a site and other interested citizens, parties, or organized groups.

RCRA FACILITY ASSESSMENT (RFA): The RFA consists of activities designed to identify SWMUs; evaluate the potential for releases from the SWMUs; and determine which SWMUs may pose a threat to human health or the environment and, therefore, should be investigated in more detail (see RCRA Facility Investigation).

RCRA FACILITY INVESTIGATION (RFI): A comprehensive investigation of a SWMU to determine whether operations at the SWMU caused contamination of the soil, surface water, or groundwater. If contamination is detected, the level of contamination is compared to action levels to determine whether the SWMU must be remediated.

RECOMMENDED REMEDIAL ACTION: The remedial action alternative found to be most cost-effective and appropriate in the CMS.

RELEASE: The accidental or deliberate emission of contaminants into the environment.

REMEDIAL ACTION: The cleanup technology used at the IRP site, i.e. excavation of contaminated dirt, bioventing, groundwater treatment plant, etc.

REMEDIAL ACTION ALTERNATIVES: Potential, comprehensive solutions to site problems, composed of one or more remedial action technologies that clean up or mitigate site-specific contamination problems. These alternatives are developed and evaluated in detail in a CMS.

REMEDIAL DESIGN: Development of technical drawings and specifications used in the CMI, which is the actual cleanup technology used at the IRP site.

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 (RCRA): A Federal law that established a regulatory system to track hazardous substances from their generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent the creation of new, uncontrolled hazardous waste sites.

RESTORATION: The application of containment or decontamination technologies to eliminate existing public hazards or to render the property acceptable for conditional or unconditional uses.

RESTORATION ADVISORY BOARD (RAB): An advisory body that facilitates a partnership between the community and the Air Force during environmental restoration work. It is intended to bring together people who reflect diverse interests within the community, providing a forum for their discussion and exchange of information about environmental investigations and cleanup activities.

SOLID WASTE MANAGEMENT UNIT (SWMU): SWMUs are areas where RCRA-regulated hazardous wastes are stored, handled, or disposed.

TECHNICAL REVIEW COMMITTEE: A group consisting of representatives from the Air Force, regulatory authorities, local and state authorities, and the general public that meets during IRP activities to review and comment on reports and recommendations.

APPENDIX B

RESPONSES TO COMMENTS

FINAL RESPONSES TO COMMENTS RECEIVED FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY ON THE DRAFT WORKPLAN FOR THE MELROSE AIR FORCE RANGE RCRA FACILITY INVESTIGATION PHASE I

August 15, 1995

It is the understanding of the U.S. Air Force (USAF) and the U.S. Army Corps of Engineers (USACE) that the comments submitted to the USAF by the U.S. Environmental Protection Agency (EPA) regarding the Draft Workplan for the Melrose Air Force Range (MAFR) Phase I RCRA Facility Investigation (RFI), dated June 21, 1995, incorporate and supersede the comments on the referenced workplan submitted to the USAF by the New Mexico Environment Department (NMED) Hazardous and Radioactive Materials Bureau (HRMB), dated June 8, 1995. Consequently, these responses are considered to pertain to comments from both the EPA and NMED.

On August 9, 1995 a conference call was held between representatives of the USAF, USACE, EPA, NMED, and EBASCO to discuss and finalize the responses to the referenced comments. Participants in the conference call included:

USAF - Mr. Sanford Hutsell, Environmental Restoration, Cannon Air Force Base
USACE - Mr. Doug Mellema, CEMRO-ED-EC, Omaha, Nebraska
EPA - Mr. Richard Mayer, EPA Region VI, Dallas, Texas
NMED - Mr. Steve Pullen, HRMB, DSMOA Program
EBASCO - Mr. James Bush, MAFR RFI Manager;
- Ms. April Lafferty, MAFR Field Operations Leader

This document comprises the final responses approved by the participants in that conference call.

Comment 1. General Comment: The Helicopter Pad Disposal / Burn Site, the Domestic Waste Burial Site, and the World War Cantonment Disposal Site are units that were not identified in the RFA, performed by A. T. Kearney in 1987. However, EPA agrees that these units should be investigated. If the investigation results indicate hazardous constituent contamination, then these sites will be added to the HSWA permit via a Class I permit modification.

Response: General site investigations at these potential areas of concern (AOCs) are being pursued now in order to determine whether contamination is present or absent. The USAF appreciates the EPA's intent to wait until the results of this investigation are available before

making an administrative decision regarding their listing, and requests that until the results of these investigations are thoroughly evaluated EPA not add these sites to the HSWA permit.

Comment 2. General Comment: EPA would like to review the results of the geophysical and soil gas surveys before Melrose begins selecting the soil boring and groundwater well locations. Besides the above information obtained from the surveys, Melrose should also perform an aerial photography analysis. Please indicate in the revised workplan the approximate date the results from the surveys will be available for EPA's review.

Response: The results of the geophysical and soil gas surveys will be provided to EPA and NMED for review, along with proposed sampling locations, concurrent with review by USACE and USAF. The final selection of sampling locations is dependent on the review of these data, and scheduling is critical to completing the field program within budget, consequently EPA's timely review and input will be greatly appreciated. While the start date for the field investigations is not yet firm, it is expected that the results of these surveys will be available in late August or early September. Because of the critical nature of the schedule with respect to ongoing military activities at MAFR and the "window" of opportunity to investigate sites within the "active" portion of the range in the second half of September, EPA's timely review is important.

Aerial photography analysis is planned as part of the preliminary assessment of MAFR. The work to be conducted under the preliminary assessment is described in Section 4.6 of Volume I of the Final Work Plan.

Comment 3. General Comment: EPA requires angled soil borings underneath SWMUs that cannot be drilled directly within the unit in order to adequately determine a release. Please justify why angled borings are unsafe. If angled borings are not possible, then alternative investigative methods may be needed.

Response: Unexploded ordnance (UXO) is potentially present in virtually every site targeted for investigation. The lateral and vertical extent of these sites is unknown, and cannot be precisely defined by geophysical techniques. As described in the workplan, a potential for proximity fuses exists with many of the types of UXO that may be present, limiting the specific geophysical methods available to conduct clearance activities. In order to insure the safety of the personnel conducting field investigations, invasive sampling of the disposal sites themselves are not planned during this phase of the RFI. The maximum angle possible for angled boreholes using conventional techniques is about forty-five degrees, and in order to sample beneath the sites of interest, a risk of penetrating the edge of a disposal site is posed, while the attendant costs associated with this approach are both unwarranted and unnecessary at this stage in the RFI process. UXO clearance activities are planned for the borings around the peripheries of the targeted sites now, and substantially increase the effort and cost associated with this phase of the RFI. The presence or absence of contaminants in groundwater downgradient of each site will provide evidence of contaminant migration beneath targeted sites, and a rational approach to the assessment and evaluation of the risks associated with any detections will provide guidance

regarding whether additional sampling is necessary. If appropriate, additional sampling can be conducted in a subsequent phase of the RFI. However, if geophysical survey and UXO clearance activity results demonstrate that there is **NO** possibility of encountering UXO or other hazardous materials such as drums, etc. during borehole drilling within site boundaries, such drilling will be considered.

Comment 4. General Comment: The Field Sampling Plan and the Standard Operating Procedures are inconsistent regarding which analytical method will be used to analyze the soil gas samples. Please clarify in the revised workplan.

Response: Passive soil gas samples will be analyzed using modified EPA Method 8240, as described in the Standard Operating Procedure (SOP) for soil gas sampling (SOP 11). Section 8.0, Analytical Procedures, of the Quality Assurance Project Plan (QAPP) in Volume II of the workplan has been revised to include passive soil gas analytical procedures.

Comment 5. General Comment: EPA questions whether hydropunch technologies will be practicable in the geology encountered at Melrose, especially in the caliche beds. Please justify in the revised workplan.

Response: Hydropunch-type groundwater sampling is appropriate where permanent wells cannot be installed due to the risk of their destruction by the aerial bombing and other military activities which are conducted at MAFR (see Response to Comment 17 below). Hydropunch-type sampling is not intended in caliche beds, which occur at relatively shallow depths, but is expected to be effective at the depths where groundwater is first encountered at MAFR. Hydropunch-type sampling will be conducted in borings drilled to the first appearance of groundwater (approximately 90 ft depth), not driven from the ground surface. Because there is a likelihood that water will rise in the borehole above its first appearance, based on U.S. Geological Survey data, obtaining a groundwater sample from the borings where a hydropunch-type sampling approach is planned is expected to be feasible. Downhole conditions which may affect the representativeness of the Hydropunch™-type samples will be noted by the rig geologist in the field notes.

Comment 6. General Comment: Please explain why Melrose is not proposing an "active" soil-gas survey for the areas outside the trenches. The active survey could be done in conjunction with the passive soil gas survey conducted within the trenches.

Response: Conducting "active" soil gas surveys would provide a marginal benefit at best. Passive soil gas survey data are superior to "active" soil-gas survey data in that they are semi-quantitative instead of merely qualitative, and are supportable, EPA-approved data. Soil gas sampling grids will be laid out on a 50-ft centered grid and will extend 50 ft beyond the boundaries of the sites to cover areas outside of and adjacent to, as well as within, the targeted sites.

Comment 7. Sampling and Field Procedures, Volume II: Please justify not performing a soil gas survey at the following units: SWMU 117, NW Munitions Disposal Site, Helicopter Pad Disposal / Burn Site, and the Domestic Waste Burial Site. Presumably, these sites have the same potential to contain volatile organic compounds as those sites where the survey is proposed to occur.

Response: SWMU #117 was included in the sites proposed for passive soil gas sampling. Please refer to Section 2.3 of the Field Sampling Plan (FSP), Part B of Volume II of the Final Work Plan, specifically Subsection 2.3.2, Passive Soil Gas Sampling. The NW Munitions Disposal Site was used only for disposal of munitions and soil gas sampling there is unwarranted. At the other sites referenced, where a potential for volatile organic contaminants exists, additional passive soil gas sampling will be conducted. The work plan has been modified to include this additional soil gas sampling.

Comment 8. Sampling and Field Procedures, Volume II: EPA agrees with the general approach which Melrose is using to investigate the SWMUs. However, EPA disagrees with using a predetermined sampling interval for every SWMU and stating the exact number of borings for each SWMU, with no flexibility to add or eliminate borings.

Sampling intervals should be based on the characteristics of each SWMU. For example, if a SWMU had a waste placed in it from 6-12 feet, with 6 feet of cover, you would not want to take soil samples at the surface or at 3 feet. Also, if a different SWMU had obvious contamination for a length of 300 feet, but the workplan specifically stated that only 1 sample would be taken, preselecting the number of samples would be flawed. EPA recommends flexibility in sampling intervals and in the number of samples to be taken from a SWMU. Please revise the workplan accordingly.

Response: The workplan has been modified to provide flexibility regarding the number of soil borings and surface soil samples by providing for contingency borings and sampling on a case-by-case basis, dependent on the results of the geophysical and soil gas surveys, and visual inspections conducted at the time of site clearance activities. In addition to sampling at specified depth intervals, samples will be collected at intervals showing evidence, such as staining or PID/OVA readings, of contamination. Surface and near-surface sampling is necessary in order to evaluate potential environmental risks, consequently the selection of samples at ground surface, 3 ft and 8 ft depth is appropriate regardless of the known disposal practices employed at a specific site. In addition, given the presently limited knowledge of these practices, such sampling is prudent. However, at this stage in the RFI process at MAFR, sampling at specified intervals is the appropriate cost-effective approach to determining the presence or absence, nature, and extent of potential contamination. The effect of such sampling will be a conservative overestimation of potentially contaminated soil volumes.

Comment 9: Appendix B; Community Relations Plan, Volume I: It appears that the community relations plan submitted in the RFI workplan is the plan for Cannon AFB, not Melrose Range. Please explain why the town of Melrose was not included in the list of public

meeting locations. Please revise the workplan to include a plan tailored towards the Melrose community.

Response: The Community Relation Plan has been revised to include MAFR, and the Town of Melrose for public meeting locations, and is included in the final workplan.

Comment 10: Drilling Log, Volume II: Melrose must identify all visual and olfactory contamination in each drilling log or description log and must include the PID/OVA readings for the full boring length.

Response: All significant factors identified during the drilling and sampling, including drill rig behavior in response to subsurface conditions as well as visual, olfactory, and PID/OVA readings, will be recorded on the bore logs. Continuous coring and core recovery is unwarranted and not considered to be cost effective at this preliminary stage in the RFI process, however.

Comment 11: Page 1-5; Data Quality Objectives, Volume I: EPA would like to add that the purpose of the RFI is to find the vertical and horizontal extent of contamination in the appropriate media for each SWMU, using PQLs for the delineation "stopping point" for all hazardous constituents (except metals). For metals, background numbers can be used in association with an acceptable statistical procedure to determine the delineation "stopping point".

Response: As stated on page 2-3 of Section 2.3, Data Quality Objectives in Volume II - Quality Assurance Project Plan of the work plan, "...the possible use of data for risk assessment dictates the quality of analytical data required." The purpose of this preliminary phase of the RFI is primarily to determine whether potential contaminants have migrated beyond the site boundaries of the targeted sites, and to provide data to support rational risk-based evaluations of the sites under consideration, using EPA Region III Risk-Based Concentrations. Establishing practical quantitation limits (PQLs) as the standard to delineate "stopping points" for horizontal and vertical extent of all hazardous constituents obviates the cost-effectiveness approach on which the sampling protocols for this investigation are based by making quantitation limits, rather than risk-based assessments, the standard for decisions regarding the appropriate extent of the investigation, and would require either real-time sample analysis concurrent with field sampling and an open-ended field program, or the presumption of additional sampling phases in advance of an evaluation of the data to be collected in this phase. In short, it may not be necessary to delineate the detectable extent of something that is not posing a risk, particularly when the remote nature of the sites, their restricted access due to active military use, and the depth to groundwater (the most likely active potential pathway), all serve to reduce the potential for contaminant migration to possible receptors.

While it may be necessary to conduct additional phases of sample collection, a rational assessment—from a risk-based perspective—of the data developed by this investigation is the prudent, cost effective, and appropriate approach to follow at this stage in the RFI process.

Comment 12: Page 3-2; 1st Paragraph, Volume II: Please include the well construction diagram of the production well in the revised workplan.

Response: This comment apparently refers to page 3-2, 1st paragraph of Volume I of the workplan, not Volume II. According to Mr. Sanford Hutsell of Cannon Air Force Base (CAFB), the well construction diagram for the production well at MAFR cannot be located in the files or records of the base water plant, the superintendent for water at CAFB (which operates MAFR), or the civil engineering files (telephone communication with Ms. A. Lafferty, EBASCO, July 20, 1995). Because the well was constructed approximately 34 years ago and not registered until recently with the State of New Mexico, Mr. Hutsell believes it possible that construction diagrams for this well may no longer exist. However, the U.S. Geological Survey installed a monitoring well near the EOD pit in June 1993. The lithological log and the well construction diagram for that well have been included in the revised workplan.

Comment 13: Page 3-5; SOP Soil Sampling Method, Volume II: Samplers should not take a soil sample length greater than a foot. Also, EPA does not want semivolatile soil samples homogenized. In addition, there should be a contingency in the workplan that if soil layers other than the prescribed intervals are found contaminated, then those intervals should be sampled. Please revise.

Response: The 2-ft soil sample length is necessary in order to obtain sufficient soil volume for laboratory chemical analysis, and is consistent with the sampling protocols in use for investigations being conducted at CAFB that have been approved by the EPA.

Although the compositing protocol for soil samples for semivolatile organic compounds (SVOCs), total organic carbon (TOC), total recoverable petroleum hydrocarbons (TRPH), and metals is appropriate in order to improve the reproducibility of analytical results from a quality control (QC) perspective, Standard Operating Procedures (SOPs) Nos. 3 and 6 has been revised to remove the requirement to composite samples for SVOC analysis.

The soil sampling procedure described on page 3-5 of SOP 3 includes language requiring the geologist responsible for sample collection to "...pay close attention to any evidence of contamination,... ...to ensure that potentially significant non-standard sampling intervals are not overlooked." The workplan has been revised on page 4-3 of Volume I to include the collection of contingency samples at such intervals.

Comment 14: Page 4-2; Soil Borings and Subsurface Soil Sampling, Volume II: One soil boring is not enough at the Helicopter Pad site. EPA will require an additional soil boring.

Response: The Helicopter Pad site is a potential Area of Concern (AOC) that is only 1/4 acre in area. Sampling here is intended to be confirmatory for presence or absence of contamination, and a single boring is appropriate at this site. If the geophysical survey and UXO clearance results are acceptable, the boring may be located within the site boundaries to accomplish this objective.

Comment 15: Page 4-3; Surface and Sediment Soil Sampling, Volume II: Since sediment samples are not dependent on the soil gas survey, please include the locations of the sediment samples in the revised RFI workplan.

Response: A figure has been added to Section 2.2, SWMU #115—Explosives-Contaminated Burial Site (Arroyo Burial Site) of the Field Sampling Plan (FSP) presenting the proposed sediment sampling locations. Sediment sampling locations will be adjacent to and on the downgradient side of the site in the arroyo, and at distances of approximately 1/3 mile, 2/3 mile, and 1 mile downgradient of the site in the arroyo. The small reservoir into which the arroyo drains is approximately 1 mile from the site. Proposed locations will be adjusted to those most suitable dependent on site conditions at the time of sampling.

Comment 16: Page 4-3; Surface and Sediment Sampling, Volume II: EPA disagrees with compositing of soil samples in this particular case. Please revise the workplan to state that sediment soil samples will not be composited.

Response: The workplan (including SOP No. 6) has been revised to state that sediment soil samples will not be composited.

Comment 17: Page 4-5; 1st paragraph, Volume I: Please further explain/justify how wells will be destroyed at SWMU #115 or the NW Munitions site.

Response: Both sites are located within the active target range portion of MAFR and permanent well installations there would be at risk of damage or destruction by bomb, artillery, or gunfire impact. Other military activities conducted in the active portion of the range to set-up or remove practice targets, remove expended ordnance, or assess the results of training activities could result in damage to permanent well installations. The detrimental effects of such damage, including the loss of the expenses related to their original installation and the potential to open direct surface to groundwater pathways via damaged wells, justify the alternative groundwater sampling techniques proposed in the workplan for these sites. The remaining sites to be investigated are within the "buffer zone" of the range but outside the active target range.

Comment 18: Page 4-7; Color, Volume II: Melrose should use a Munsell color chart to describe the colors of the soil. Please revise.

Response: The last sentence of the first paragraph on page 4-8 of SOP 4—Borehole and Sample Logging, in Volume II of the workplan reads: "A Munsell color chart or equivalent must be used."

Comment 19: Background Sampling, Volume I: Please include a map in the revised workplan showing the location of the background samples and why these locations are appropriate.

Response: Proposed background sampling locations are expected to be located in the western region of MAFR, west of the west mesa area. A map showing preliminary proposed background sampling locations has been added to Section 4.5 of Volume I of the workplan, however, as noted in the text on page 4-7 of Volume I, these locations will selected based on a combination of Range-specific factors such as wind direction, historical land use, surface drainage, soil type, and subsurface lithology. Appropriate locations should be upwind and upgradient from known or potential contaminant source areas, and as representative of unaffected natural background conditions as is possible at this site.

Comment 20: Page 7-5; Groundwater SOP, Volume II: Twenty-foot well screens are not acceptable unless Melrose can provide sufficient justification for that length. EPA generally does not allow screen lengths greater than 10 feet.

Response: Due to water table fluctuations, a generally dropping water table over the long term, the costs associated with installing replacement wells in the event the water table drops below the bottom of the screen, the desire to install well screens near the phreatic surface in order to determine the presence of potential light non-aqueous phase liquid (LNAPL) contamination, and the fact that EPA has accepted 30-ft screens for groundwater monitoring wells at CAFB for similar reasons, 20-ft well screens are appropriate at MAFR. A reference to water table fluctuations has been added to Section 2.2.4 Hydrogeolology, of Volume I of the Final Work Plan.

Comment 21: Page 11-1; 1st paragraph, Volume I: Please include in the schedule the date the RFI report will be submitted to EPA.

Response: The schedule presented in Section 11 of Volume I of the Final Work Plan represents the time-line for the execution of this investigation. Initiation of the field investigations is dependent on EPA approval of the workplans. The "window" in the second half of September is critical to performing investigations at the sites within the active target range portions of MAFR. As noted in the response to Comment 2 above, the critical schedule is sensitive to EPA's requests to review geophysical and soil gas results prior to initiating other investigative activities. Consequently a fixed date for submittal of the RFI report to EPA is not possible at this time. However, as can be seen on the revised schedule included in the Final Work Plan, it is expected that the draft RFI report will be submitted to EPA in late April 1996, approximately 8 weeks after receipt of final laboratory analytical data.

FINAL
VOLUME III - SITE SAFETY AND HEALTH PLAN

SITE SAFETY AND
HEALTH PLAN
RCRA FACILITY
INVESTIGATION PHASE I
FOR MELROSE AIR
FORCE RANGE
CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO

Command 27 FW
Cannon Air Force Base
100 South D.L. Ingram Blvd.
Suite 100
Cannon AFB, New Mexico 88103-5214

August 1995

F. EBASCO SERVICES, INCORPORATED

FINAL SITE SAFETY AND HEALTH PLAN
FOR
PA/SI/RFI
MELROSE AIR FORCE RANGE
CANNON AIR FORCE BASE, NEW MEXICO

Prepared for:

49 CES/CEV
Cannon Air Force Base, NM

and

HQ ACC/CEVC
Langley Air Force Base, VA

RECEIVED
12 1995

Prepared by:

Ebasco Services Incorporated
143 Union Boulevard, Suite 1010
Lakewood, Colorado 80228-1824

and

Groundwater Technology
Government Services, Inc.
2501 Yale Boulevard, S.E., Suite 204
Albuquerque, New Mexico 87106

Under Contract No. DACW45-94-D-0003

Delivery Order 6, Work Authorization Directive 13

U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska

August 1995

TABLE OF CONTENTS

1.0 GENERAL 1-1

2.0 KEY PERSONNEL AND RESPONSIBILITIES 2-1
2.1 PROGRAM MANAGER 2-1
2.2 DELIVERY ORDER MANAGERS 2-1
2.3 PROGRAM HEALTH AND SAFETY MANAGER 2-2
2.4 SITE HEALTH AND SAFETY OFFICER 2-2
2.5 HEALTH AND SAFETY TECHNICIANS 2-3
2.6 UNEXPLODED ORDNANCE PERSONNEL 2-4
2.6.1 Senior UXO Supervisor 2-4
2.6.2 UXO Supervisor 2-4
2.6.3 UXO Specialist 2-4
2.7 TEAM MEMBERS 2-4

3.0 SCOPE OF WORK 3-1

4.0 HAZARD ASSESSMENT 4-1
4.1 CHEMICAL HAZARDS 4-1
4.2 ACTIVITY HAZARD ANALYSIS 4-6
4.3 HAZARD COMMUNICATION 4-6

5.0 TRAINING 5-1
5.1 PREASSIGNMENT TRAINING 5-1
5.2 SUPERVISOR TRAINING 5-1
5.3 3-DAY ON-THE-JOB TRAINING 5-1
5.4 SITE-SPECIFIC TRAINING 5-2
5.5 SITE SAFETY MEETINGS 5-3
5.6 FIRST AID AND CARDIOPULMONARY RESUSCITATION TRAINING . . . 5-3
5.7 RECORDKEEPING 5-4

6.0 ZONES, PROTECTION, AND COMMUNICATION 6-1
6.1 SITE ZONES 6-1
6.2 WORK ZONES 6-1
6.3 SITE VISITORS 6-2
6.4 BUDDY SYSTEM 6-2
6.5 PERSONAL PROTECTION 6-3
6.5.1 Level D Protection 6-3

6.5.2 Modified Level D Protection 6-5
6.5.3 Level C Protection 6-5
6.5.4 Level B Protection 6-6
6.6 COMMUNICATIONS 6-6

7.0 MONITORING 7-1
7.1 REAL-TIME MONITORING 7-1
7.2 ORGANIC VAPOR MONITORING 7-1
7.3 COLORIMETRIC TUBES 7-2
7.4 CGI/O_2 MONITORING 7-2
7.5 INTEGRATED SAMPLING 7-2
7.6 MEDICAL SURVEILLANCE REQUIREMENTS 7-4

8.0 SAFETY CONSIDERATIONS FOR SITE OPERATIONS 8-1
8.1 SLIPS, TRIPS, AND FALLS 8-1
8.2 SPLASHES AND SPILLS 8-1
8.3 ILLUMINATION 8-1
8.4 ELECTRICALLY POWERED EQUIPMENT 8-1
8.5 NOISE 8-2
8.6 BLOODBORNE PATHOGEN EXPOSURE 8-2
8.7 HEAT STRESS 8-2
8.8 COLD STRESS 8-4
8.9 OVERHEAD UTILITIES 8-4
8.10 BURIED UTILITY LINES 8-6
8.11 INCLEMENT WEATHER 8-6
8.12 MANUAL LIFTING 8-6
8.13 PORTABLE LADDERS 8-7
8.14 HEAVY EQUIPMENT SAFETY 8-8
8.15 DRIVER SAFETY 8-8
8.16 POWER AND HAND TOOLS 8-9
8.17 HAND PROTECTION 8-9
8.18 LOCKOUT/TAGOUT 8-9
8.19 TRAFFIC CONTROL 8-9
8.20 EXCAVATION SAFETY 8-9
8.21 CRANE OPERATIONS 8-10
8.22 HOT WORK 8-10
8.23 LEAD EXPOSURE CONTROL 8-10

9.0 UNEXPLODED ORDNANCE 9-1
9.1 GENERAL 9-1

9.2 GENERAL SAFETY CONCERN 9-1
9.3 ORDNANCE-RELATED HTRW ACTIVITIES. 9-5
9.3.1 Geophysical Surveys 9-5
9.3.2 Soil Gas Sampling 9-5
9.3.3 Surface Sampling 9-6
9.3.4 Drilling 9-6
9.4 RESTRICTED AREA/EXCLUSION OPERATIONS. 9-8

10.0 DECONTAMINATION 10-1
10.1 PERSONNEL 10-1
10.2 SAMPLING EQUIPMENT 10-2
10.3 HEAVY EQUIPMENT 10-2
10.4 DISPOSAL OF MATERIALS GENERATED ON SITE 10-2

11.0 EMERGENCY RESPONSE PLAN 11-1
11.1 EMERGENCY CONTACTS 11-1
11.1.1 Emergency Telephone Numbers 11-1
11.1.2 Medical Treatment 11-1
11.1.3 Emergency Route to Hospital 11-2
11.1.4 Information and Response Organizations 11-2
11.1.5 Project Personnel 11-2
11.1.6 Explosive Ordnance Disposal Personnel 11-2
11.2 EMERGENCY PROCEDURES 11-3
11.2.1 Physical Injury 11-4
11.2.2 Injury from Chemical Exposure 11-4
11.3 RADIO COMMUNICATIONS 11-5
11.4 EMERGENCY RESPONSE FOLLOW-UP 11-5
11.5 SPILL RESPONSE 11-6

12.0 AUTHORIZATIONS 12-1

13.0 MEDICAL DATA SHEETS 13-1

14.0 FIELD TEAM REVIEW SHEET 14-1

15.0 APPROVALS 15-1

16.0 REFERENCES 16-1

LIST OF TABLES

Number	Title	Page
Table 3-1	Summary of RFI Activities and Sampling Criteria	3-2
Table 4-1	Chemical Hazards of Potential Contaminants of Concern	4-2
Table 6-1	Levels of Protection	6-4
Table 7-1	Combustible Gas/O_2 Monitoring Action Levels	7-3
Table 8-1	Minimum Clearance from Energized Overhead Electric Lines	8-5
Table 9-1	Drilling Summary	9-8

LIST OF ATTACHMENTS

ATTACHMENT A - Activity Hazard Analysis

ATTACHMENT B - Forms

ATTACHMENT C - UXO Summary

ACRONYM LIST

AOC	Area of Concern
CAFB	Cannon Air Force Base
CFR	Code of Federal Regulations
CGI	Combustible gas indicator
COR	Contracting Officer's Representative
CPR	Cardiopulmonary Resuscitation
DO	Delivery Order
EBASCO	Ebasco Services Incorporated
EED	Electroexplosive Device
EMR	Electromagnetic Radiation
HST	Health and Safety Techniques
LEL	lower explosive limit
MAFR	Melrose Air Force Range
MSDS	Material Safety Data Sheet
O_2	oxygen
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PHSM	Program Health and Safety manager
PID	Photoionization detector
PPE	personal protective equipment
PZ	Piezoelectric
RF	Radio Frequency
RFI	RCRA Facility Investigation
SHSO	Site Health and Safety Officer
SI	Site Inspection
SSHP	Site Safety and Health Plan
SWMU	Solid Waste Management Unit
TNT	Trinitrotoluene
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance
WP	White Phosphorus
°F	degrees Fahrenheit

1.0 GENERAL

This Site Safety and Health Plan (SSHP) provides site-specific health and safety procedures and controls to be followed during the Resource Conservation and Recovery Act Facility Investigation (RFI) at Cannon Air Force Base (CAFB), New Mexico. This SSHP has been written for the exclusive use of Ebasco Services Incorporated (EBASCO), its employees and subcontractors, and visitors to the site. It is written for the specified site conditions, scope of work, and personnel. If any conditions or scope of work covered by the plan change, this plan shall be amended before work begins.

Elements of the plan contain site history, a description of the work to be performed and the requirements for personnel, training, personnel monitoring, protection, site control, and decontamination. The plan also provides a hazard evaluation, and details emergency response and first aid practices. All EBASCO employees, subcontractors, and site visitors are required to comply with this SSHP.

2.0 KEY PERSONNEL AND RESPONSIBILITIES

The following sections briefly describe the responsibilities or key project personnel for implementing the site-specific health and safety program.

2.1 PROGRAM MANAGER

Program management personnel are responsible for overall operations during fieldwork on site, including the health and safety of personnel during site activities. Specific responsibilities under the health and safety program include the following:

- Ensuring the implementation of the site-specific SSHP
- Performing on-site inspections to ensure that the SSHP is being followed
- Coordinating with the Site Health and Safety Officer (SHSO) on health and safety issues
- Ensuring that resources are available for all health and safety requirements
- Providing the appropriate monitoring and safety equipment necessary for implementing this SSHP

Program management personnel have the ability to authorize the following safety-related suspensions:

- Temporary suspension of field activities if the health and safety of personnel are endangered, pending an evaluation by the Program Health and Safety Manager (PHSM)
- Temporary suspension of an individual from field activities for infraction of the SSHP

2.2 DELIVERY ORDER MANAGERS

The Delivery Order (DO) Manager is responsible for administrative tasks, including the following:

- Ensuring site safety and Implementing the SSHP
- Ensuring that contractual requirements are met
- Informing facility personnel of scheduled activities
- Ensuring that site permits are obtained before work begins
- Communicating work schedules to the SHSO

2.3 PROGRAM HEALTH AND SAFETY MANAGER

The PHSM is responsible for ensuring that this SSHP meets the Program Health and Safety guidelines and all corporate health and safety policies and procedures. Additional responsibilities include the following:

- Reviewing and approving changes to this plan
- Investigating serious accidents
- Planning, coordinating, and implementing project health and safety services
- Providing industrial hygiene and safety guidance to the SHSO
- Ensuring that health and safety records are maintained and updated
- Conducting site audits, including audits of subcontractors
- Maintaining a working knowledge of applicable federal, state, and U.S. Department of Defense health and safety standards

2.4 SITE HEALTH AND SAFETY OFFICER

The SHSO is responsible for assisting the Program Manager and the DO Manager to implement the requirements of this SSHP. Specific duties include the following:

- Conducting site-specific orientations and health and safety training
- Ensuring that daily health and safety meetings are conducted

- Modifying and/or developing procedures or revisions to this plan after consultation with the PHSM, when the scope of work is changed through natural causes or contract modifications
- Investigating all accidents and incidents
- Calibrating, maintaining, and overseeing the use of monitoring equipment
- Maintaining site health and safety records
- Maintaining copies of the EBASCO Health and Safety Program Manual and copies of this SSHP on site
- Monitoring compliance with this plan and work practices
- Conducting site audits
- Taking corrective actions as necessary
- Directing health and safety activities on site

The SHSO has "stop-work authorization" if an imminent danger or potentially dangerous work practice exists. Authorization to proceed with work will be verified by the PHSM. The SHSO shall coordinate with the CAFB Safety Office, Industrial Hygiene Office, and Security Office to insure compliance with all site requirements.

2.5 HEALTH AND SAFETY TECHNICIANS

Health and safety technicians (HST) will assist the SHSO in implementing the provisions of this plan. Specific duties include the following:

- Ensuring that each individual within his or her jurisdiction complies with the provisions of this plan
- Documenting safety practices
- Conducting field monitoring and documenting the results

- Auditing safety practices used by on-site teams
- Monitoring workers for heat or cold stress
- Distributing health and safety equipment
- Communicating with command post for on-site activities
- Initiating emergency services

2.6 UNEXPLODED ORDNANCE PERSONNEL

2.6.1 Senior UXO Supervisor

The Senior Unexploded Ordnance (UXO) Supervisor is the individual who has direct responsibility and is the technical lead for all UXO operations on site. The Senior UXO Supervisor shall conduct safety briefings regarding UXO issues.

2.6.2 UXO Supervisor

The UXO Supervisor oversees the UXO sweep team and brush removal/survey teams.

2.6.3 UXO Specialist

The UXO Specialist performs surveys, sweeps, and downhole clearances under the supervision of the UXO Supervisor.

2.7 TEAM MEMBERS

All team members will be responsible for understanding and complying with all site health and safety requirements. All members of this group will have been provided training regarding the hazards and protection involved with this project.

3.0 SCOPE OF WORK

Work to be conducted under this plan is defined by the site-specific work plan for the RFI, March 1995 (EBASCO 1995). During the project, seven solid waste management units (SWMUs) and potential areas of concern (AOCs) will be investigated. They include:

- SWMU 114 Expended Ordnance and Industrial Waste Burial Site
- SWMU 115 Explosive-Contaminated Burial Site
- SWMU 117 Domestic Waste Burial Site
- Unnumbered potential AOC Northwest Munitions Disposal Site
- Unnumbered potential AOC World War II Cantonment Disposal Site
- Unnumbered potential AOC Disposal/Burn Site
- Unnumbered potential AOC Domestic Waste Burial Site

The following tasks will be conducted during the investigation:

- Geophysical Survey
- Soil Gas
- Surface Water Sampling
- Surface Soil and/or Sediment Sampling
- Soil Borings
- Monitoring Well Installation
- Groundwater Sampling

A summary of activities and sampling criteria are included in Table 3-1.

Table 3-1 Summary of RFI Activities and Sampling Criteria

Site	Location	Planned Activities	Potential COCs	Chemical Analyses	Geotechnical Analyses
SWMU 114	Motor Pool Trenches	Geophysics, Soil Gas, Soil Borings, Monitoring Well Installation and Sampling	Explosives, Chlorinated Solvents, Petroleum Hydrocarbons, Furans, Metals, Fuels, PCBs	Metals, Organics, Explosives	Grain size, Moisture content, pH, Organic carbon content
SWMU 115	Arroyo Burial Trench	Geophysics, Soil Borings, and Groundwater Sampling	Explosives, Metals, Organics	Metals, Organics, Explosives	Grain size, Moisture content, pH, Organic carbon content
SWMU 117	The "Bog"	Geophysics, Sediment/Surface Bog-Soil Sampling, Soil Borings, Monitoring Well Installation and Sampling	Explosives, Metals, Organics	Metals, Organics, Explosives	Grain size, Moisture content, pH, Organic carbon content
Unnumbered AOC	Northwest Munitions Disposal Site	Geophysics, Soil Borings, and Hydropunch-Type Groundwater Sampling	Explosives, Metals, Organics	Metals, Organics, Explosives	Grain size, Moisture content, pH, Organic carbon content
Unnumbered AOC	WWII Cantonment Disposal Site	Geophysics, Soil Gas, Soil Borings, Monitoring Well Installation and Sampling	Explosives, Metals, Organics	Metals, Organics, Explosives	Grain size, Moisture content, pH, Organic carbon content
Unnumbered AOC	North of Helicopter Pad	Geophysics, Soil Gas, Soil Borings, Monitoring Well Installation and Sampling	Explosives, Metals, Organics	Metals, Organics, Explosives	Grain size, Moisture content, pH, Organic carbon content
Unnumbered AOC	East of Fire Station	Geophysics, Soil Gas, Soil Borings, Monitoring Well Installation and Sampling	Explosives, Metals, Organics	Metals, Organics, Explosives	Grain size, Moisture content, pH, Organic carbon content

4.0 HAZARD ASSESSMENT

The following sections provide details of the chemical contaminants that may be encountered and an Activity Hazard Analysis documenting the anticipated health and safety hazards associated with the work to be performed.

4.1 CHEMICAL HAZARDS

Contaminants of concern for this project include petroleum hydrocarbons, chlorinated hydrocarbons, explosives, metals, benzene, toluene, ethylbenzene, and xylene. Each potential contaminant's exposure limits, routes of exposure, overexposure signs and symptoms, and physical properties are outlined in Table 4-1. It is unclear as to where these contaminants exist, so a prudent assumption would be that these contaminants exist at all areas of investigation. UXO hazards will exist during the investigation. UXO may exist on the ground surface. UXO personnel are to be alerted to all unidentified UXO hazards so they may be marked or disposed of. Field personnel are not to handle, touch, kick, or otherwise disturb the ordnance. Trinitrotoluene (TNT) and other explosive compounds used in ordnance may also exist on the ground surface. TNT is identified by its dark rust color, and shall be treated as ordnance. It should be noted that the information provided in Table 4-1 is for pure product. The contamination concentrations expected are anticipated to be low. Additional reliance on hazard control methods, monitoring, personal protective equipment (PPE), and good work practices should result in very low exposure hazards. Observations made during the review of the data include the following:

- Potential exposures should be easily detected
- Exposures via skin contact pose a concern for unprotected personnel at some sites

Table 4-1 Chemical Hazards of Potential Contaminants of Concern

Contaminant	PEL	TLV	Route of Exposure	Signs and Symptoms of Exposure: Acute	Signs and Symptoms of Exposure: Chronic	Signs and Symptoms of Exposure: Target Organs	IP	Specific Gravity	VP (mm)	Flash Point	LEL (%)	UEL (%)
Acetone	1000 ppm	750 ppm	Inhalation Absorption Contact	Headache, dizziness,and dermatitis	None	Respiratory system, skin, kidneys	9.69	0.79	180	0	2.5	13
Anthracene	-	-	Inhalation Ingestion Contact	Skin, eye, respiratory tract irritation	Pulmonary edema	Skin, eye, respiratory tract	N/A	1.3	6.15	121 C	0.6	-
Aroclor 1260	0.5 mg/m3 skin	0.5 mg/m3 skin	Inhalation Absorption Contact Ingestion	Low acute toxicity	Chloracne, jaundice	Eyes, skin, liver	Unk.	1.58	.00004	286 F	N/A	N/A
Arsenic	0.5 mg/m^3	0.01 mg/m^3	Inhalation Absorption Contact Ingestion	Ulceration of nasal septum, dermatitis, respiratory irritation	GI disturbances, peripheral neuropathy, cancer	Liver, kidney, skin, lungs	N/A	5.73	0.0	-	-	-
Benzene	1 ppm	10 ppm	Inhalation Contact Absorption	Irritation of eyes, nose, and respiratory system, dermatitis, headache, nausea	Bone marrow depression, anorexia, leukemia	Blood, CNS, skin, bone marrow, eyes, respiratory tract	9.24	0.88	75	12	1.3	7.9
Benzo(a) anthracene	Suspect Carcinogen		Inhalation Ingestion Contact Absorption	"Coal tar warts", eye irritationand photosensitivity	Cancer, liver damage, leukoplakia	Skin, kidney, liver, respiratory and GI tract, eyes	N/A	$5x10^{-9}$ torr	N/A	N/A	N/A	N/A
Bis(2-ethylhexyl) Phthalate	5 mg/m^3	5 mg/m^3	Ingestion Contact Ingestion	CNS depression, mucous membrane irritation	Unknown	CNS, skin	N/A	0.99	0.01	420 F	0.3	N/A

C - degrees Celsius
VP - Vapor Pressure
LEL - Lower Explosive limit
UEL - Upper Explosive limit
mm - millimeters
GI - Gastrointestinal
F - degrees Fahrenheit
CNS - Central Nervous System
PEL - Permissible Exposure Limit
TLV - Threshold Limit Value
N/A - Information Not Available
ppm - parts per million
mg/m - milligrams per cubic meter

FWENC/0192 3/30/95 4:29 pm tjd

Table 4-1 Chemical Hazards of Potential Contaminants of Concern

Contaminant	PEL	TLV	Route of Exposure	Signs and Symptoms of Exposure: Acute	Signs and Symptoms of Exposure: Chronic	Target Organs	IP	Specific Gravity	VP (mm)	Flash Point	LEL (%)	UEL (%)
Cadmium	0.005 mg/m³	0.01 mg/m³	Inhalation Ingestion	Dyspnea, nausea, headache, tight chest, pulmonary edema	Cancer, muscle aches, vomiting, diarrhea	Lungs, kidneys, blood	N/A	8.65	0.0	-	-	-
Carbon Disulfide	4 ppm	10 ppm	Inhalation Absorption Ingestion	Dizziness, headache, fatigue, anorexia	Parkinson's like symptoms, liver damage, heart disease	CNS, liver, kidneys, skin	N/A	1.26	297 torr	30 C	-	-
Chromium	-	0.5 mg/m³	Inhalation Ingestion	GI irritation, nausea, diarrhea	Fibrotic formation in the lungs	Respiratory system	N/A	varies	varies	-	-	-
Dibenzofuran	-	-	Inhalation Absorption	Eye, throat, skin irritation	Rash, skin growths	Skin, eyes, respiratory tract	N/A	1.1	0.004	N/A	N/A	N/A
Dichloro-ethane	100 ppm	100 ppm	Inhalation Ingestion Contact	Skin irritation, kidney damage, CNS depressant	Unknown	Skin, liver, kidneys	N/A	1.8	230	22 F	5.6	11.4
Dichloro-ethene	1 ppm	5 ppm	Inhalation Contact Ingestion	CNS depression	Hepatic, renal dysfunction	Kidney, liver, CNS	N/A	1.21	591	3 F	5.6	11.4
Ethylbenzene	100 ppm	100 ppm	Inhalation Contact	Mucous membrane irritation, dermatitis, nausea, headache	Experimental teratogen	Eyes, upper respiratory tract	8.76	0.87	10	55	1.0	6.7

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Fluoranthene	5 mg/m³	0.2 mg/m³	Inhalation Ingestion Contact	Headache, dizziness, weakness, nausea, pulmonary edema	Unknown	Eyes, skin, lungs	N/A	1.25	0.01	Slight fire hazard	-	-
Lead	0.05 mg/m³	0.15 mg/m³	Inhalation Ingestion Contact	Eye irritation	Weakness, anorexia, tremors, nephropathy, hypotension	GI tract, CNS, kidneys, blood, gingival tissue	N/A	11.34	0	-	-	-
Mercury	0.01 mg/m³	0.01 mg/m³	Inhalation Ingestion Contact Absorption	CNS damage depending on group of mercurial	Same as acute effects	CNS, kidneys, eyes, skin, respiratory system	N/A	13.6	0.0012	-	-	-
Methyl Chloroform	350 ppm	350 ppm	Inhalation Ingestion Contact	Light headedness, incoordination, impaired equilibrium	Kidney and liver damage	Skin, CNS, CVS, eyes	11.0	1.34	100	N/A	7.5	12.5
Methylene Chloride	500 ppm	50 ppm	Inhalation Ingestion Contact	Fatigue, Weakness, numb limbs	CNS damage	Skin, CNS,CVS, eyes	11.32	1.33	350	N/A	14	22
Methyl-ethyl-ketone	200 ppm	200 ppm	Inhalation Ingestion Contact	Eye, nose, throat irritant, CNS depressant, headache, nausea	Neuropathy	CNS, eyes, respiratory tract	N/A	0.805	77.5 torr	-9 C	1.8	10
Silver	0.01 mg/m³	0.1 mg/m³	Inhalation Ingestion Contact	Eye, skin, mucous membrane irritation	Blue-grey eyes, skin ulcerations, GI disturbances	Nasal septum, skin eyes, GI tract	-	10.49	0	-	-	-

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Table 4-1 Chemical Hazards of Potential Contaminants of Concern

Contaminant	PEL	TLV	Route of Exposure	Signs and Symptoms of Exposure: Acute	Signs and Symptoms of Exposure: Chronic	Signs and Symptoms of Exposure: Target Organs	IP	Specific Gravity	VP (mm)	Flash Point	LEL (%)	UEL (%)
Toluene	200 ppm	50 ppm	Inhalation Contact Absorption	Dermatitis, fatigue, weakness, confusion, muscular fatigue	Insomnia	CNS, liver, kidneys, skin	8.82	0.87	20	40	1.2	7.1
Trinitro-toluene	1.5 mg/m3 skin	0.5 mg/m3 skin	Inhalation Contact Absorption	eye irritation	Unknown	Liver, kidney, blood, CNS, eyes	10.6	1.654	.0002	High Explosive		
Xylene	100 ppm	100 ppm	Inhalation Ingestion Contact Absorption	Pulmonary edema, hepatic impairments, vomiting, giddiness	Unknown	CNS, eyes, GI tract, blood, liver, kidneys, skin	8.5	0.87	8	63 F	1.0	7.0

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FWENC/0192 3/30/95 4:29 pm tjd

4.2 ACTIVITY HAZARD ANALYSIS

A preliminary Activity Hazard Analysis has been written in accordance with EM 385-1-1, Sections 01.A.09 and 01.A.10 (USACOE 1992), for the work under this SSHP. This analysis provides a summary of the project activities and anticipated hazards, and the means used to control the hazards. Control methods listed on the analysis are given in the form of references to an appropriate section of this SSHP that summarizes pertinent points of the control method. A copy of the analysis is provided in Attachment A.

The preliminary analysis shall be reviewed prior to the beginning of each activity or when work specifications or scope are changed in meetings with project, CAFB, and U.S. Army Corps of Engineers (USACE) personnel. During the meeting the updated analysis shall be reviewed to inform personnel of the presence or absence of additional health and safety hazards and actual field conditions. The revised analysis will also be reviewed with affected personnel prior to starting all activities. All reviews shall be documented.

4.3 HAZARD COMMUNICATION

To provide employees with adequate information enabling them to safely work with hazardous chemicals that are incidental to the performance of work under this contract but not covered in Section 4.1 of this plan, EBASCO has implemented a Hazard Communication Program in accordance with 29 Code of Federal Regulations (CFR) 1910.1200. Material safety data sheets (MSDSs) will be received and maintained on site for all chemicals purchased for site use.

As a part of their site-specific training, personnel working under this SSHP will receive training covering the hazards associated with the tasks to which they are assigned. This training will include the potential hazards of chemicals procured for each activity and where the MSDSs are maintained.

5.0 TRAINING

All site personnel are required to be trained to recognize the hazards and hazard controls on site, the provisions of this SSHP, and the responsible personnel.

The following sections address the requirements for preassignment, supervisor, on-the-job, site-specific, and cardiopulmonary resuscitation (CPR)/First Aid training. Safety meeting requirements are also addressed.

5.1 PREASSIGNMENT TRAINING

Before arrival on site, each employer shall be responsible for certifying that field personnel meet the requirements 29 CFR 1910.120 paragraph (e)(3). Each employer will provide the SHSO with a document certifying when they received the 40-hour hazardous waste health and safety training. Personnel must receive 8 hours of annual refresher training on an annual basis after completing the basic 40-hour course, and must provide the SHSO with certificates documenting 8-hour refresher training.

5.2 SUPERVISOR TRAINING

The SHSO and DO Manager will have completed the basic 40-hour training course, 3 days of on-the-job training, first-aid training, and at least 8 hours of supervisor training, which is specialized training on managing hazardous waste operations.

5.3 3-DAY ON-THE-JOB TRAINING

All employees will be required to receive a minimum of 3 days of on-the-job training documented by an experienced supervisor. Employers are required to provide documentation to the SHSO for the 3-day on-the-job training. If employers cannot provide documentation or if a new employee is assigned to the site, supervised on-site training time will be performed by the

DO Manager or SHSO and documented on a form to be kept in the individual's on-site health and safety file.

5.4 SITE-SPECIFIC TRAINING

Site-specific training will be conducted for all field employees, including subcontractors, before starting field and/or laboratory activities. The following topics from the SSHP will be discussed at this meeting:

- Names of health and safety personnel and alternates responsible for site health and safety
- Health and safety organization
- Locations where the site-specific SSHP can be found
- Hazards at the site
- Hazard Communication Program
- Exposure risk
- PPE to be used
- Personnel and equipment decontamination procedures
- Air monitoring
- Emergency procedures

All field personnel have access to a copy of this SSHP and are responsible for understanding it at the completion of training. At the end of the meeting, attendants shall be quizzed informally to assess their understanding of the health and safety requirements. In addition, they shall sign a Field Team Review Sheet (Section 14.0) stating that they have read, understand, and agree to comply with the provisions of the SSHP. Anyone refusing to sign the form will be prohibited from working at the site.

When a new employee has been assigned to the site, the SHSO must present a similar briefing to the employee before he or she participates in any field activities. All new employees must sign the Field Team Review Sheet before beginning fieldwork.

5.5 SITE SAFETY MEETINGS

Site safety orientation/training meetings shall be conducted by the SHSO before field personnel begin work at specific sites, when there are modifications to this SSHP, or when additional personnel begin fieldwork. Meetings shall be attended by all personnel involved in field activities. Additionally, a daily site safety meeting will be held before the start of field activities. All field personnel will attend and the meeting will be documented in the site log book.

The meeting agenda shall include the following activities:

- Description of the assigned tasks and their potential hazards
- Coordination of site activities
- Identification of methods and precautions to prevent injuries
- Discussion of emergency planning
- Any modifications to SSHP
- Input from field personnel on health and safety issues pertaining to site activities

All site training will be documented and retained in project files.

5.6 FIRST AID AND CARDIOPULMONARY RESUSCITATION TRAINING

At least two site employees per shift will have current certified First Aid and CPR training consistent with the requirements of the American Red Cross Association.

5.7 RECORDKEEPING

All health and safety recordkeeping requirements mandated by 29 CFR 1910.1904 and 1910.120 shall be adhered to. Records that will be maintained include on-site logs, accident/incident reports, Occupational Safety and Health Administration (OSHA) Form 200s, exposure monitoring, 3-day on-the-job training and the health and safety field log books. Copies of pertinent health and safety forms are included in Attachment B.

6.0 ZONES, PROTECTION, AND COMMUNICATION

The following sections address site zones, site visitors, the use of the buddy system, personal protection, and communications.

6.1 SITE ZONES

Work sites shall be controlled to reduce the possibility of exposure to any contaminants present and their transport by personnel or equipment from the site. The possibility of exposure or translocation of substances shall be reduced or eliminated in a number of ways, including the following:

- Setting up security and physical barriers to exclude unnecessary personnel from the general area
- Minimizing the number of personnel and equipment on site consistent with effective operations
- Establishing work zones within the site
- Establishing control points to regulate access to work areas or zones
- Conducting operations in a manner to reduce the exposure of personnel and equipment and to eliminate the potential for airborne dispersion
- Implementing appropriate decontamination procedures

6.2 WORK ZONES

Work sites shall be controlled to reduce the possibility of exposure to any contaminants present and their transport by personnel or equipment from the site. The possibility of exposure or translocation of substances shall be reduced or eliminated in a number of ways, including the following:

- Setting up security and physical barriers to exclude unnecessary personnel from the general area

- Minimizing the number of personnel and equipment on site consistent with effective operations
- Establishing work zones within the site
- Establishing control points to regulate access to work areas or zones
- Conducting operations in a manner to reduce the exposure of personnel and equipment and to eliminate the potential for airborne dispersion
- Implementing appropriate decontamination procedures

Work zones shall be established by the SHSO on a case by case basis. These zones may consist of a single area designed to prevent unauthorized personnel from entering or a more complex system using an Exclusion, Contamination Reduction, and Support Zone. Each zone will be marked with caution tape and/or traffic cones and designated access points. Decontamination areas will be co-located with the access points.

6.3 SITE VISITORS

Access to the site by visitors will be restricted as follows:

- All site visitors must be cleared by the SHSO or his/her designee before obtaining access to the Support Zone.
- Site visitors entering the Exclusion Zone will be strictly limited. The SHSO must approve entry and the visitor must demonstrate medical and training clearance to enter the Exclusion Zone and must be given site-specific training.
- All site visitor access must be clearly documented, and visitors must comply with all provisions of the site SSHP.

6.4 BUDDY SYSTEM

The buddy system will be used during all field activities. At no time will an individual work alone in the work zone.

6.5 PERSONAL PROTECTION

Personnel shall wear protective equipment when field activities involve known or suspected atmospheric contamination; vapors, gases, particulates, or splashes may be generated by site activities; or potential occurrence of direct contact with skin. PPE will be described by a level of protection which will be designated for all activities. The levels of protection are defined in the following sections.

Levels of protection for the activities to be conducted are provided in Table 6-1. Decisions concerning upgrading the level of protection will be made by the SHSO, who will then provide appropriate documentation to the PHSM.

6.5.1 Level D Protection

The following PPE will be considered Level D protection:

- Cotton coveralls
- Leather or chemical-resistant boots with a steel toe and shank
- Outer latex disposable boots (optional)
- Work gloves
- Safety glasses or chemical splash goggles and face shield when necessary, as determined by the SHSO
- Hard hat
- Hearing protection (when appropriate)
- Two-way radio communications

Table 6-1 Levels of Protection

Activity	Level of Protection
Drilling	D/Modified D/C
Soil Gas	D
Geophysics	D
Surface Water Sampling	D
Surface Soil and/or Sediment Sampling	D
Groundwater Sampling	Modified D
Surveying	D

Level D protection is used when the following criteria are met:

- No hazardous air pollutants are measured
- Work functions preclude splashes, immersion, or potential for unexpected inhalation or dermal contact with any chemicals

Level D protection is primarily a work uniform and will be worn only in areas where there is no potential for exposure to toxic substances.

6.5.2 Modified Level D Protection

Modified Level D protection shall be used when an increased need for dermal protection is recognized but respiratory protection is not indicated. The following equipment shall be used for Modified Level D protection:

- The chemical protective clothing and equipment required for Level C with the addition of safety glasses
- Full-face piece, air-purifying cartridge respirator with organic vapor/high-efficiency particulate filter cartridges, carried or readily available to upgrade

6.5.3 Level C Protection

The following PPE will be considered Level C protection:

- Full-face piece, air-purifying cartridge respirator with organic vapor/high-efficiency particulate filter cartridges
- Chemical-resistant clothing (Tyvek coveralls for particulate hazard or Saranex coveralls for liquid hazard)
- Disposable nitrile outer gloves
- Nitrile or latex inner gloves
- Polyvinyl chloride boots (chemical-resistant) with a steel toe and shank
- Latex outer booties (optional)

- Hard hat
- Hearing protection (as required)
- Two-way radio communications

The use of a full-face piece, air-purifying cartridge respirator is approved only if the following applies:

- Substances are identified and their concentrations measured
- Substances have adequate warning properties and adsorption properties
- Individual passes a qualitative fit test for the mask
- Appropriate cartridge is used, and its service limit concentration is not exceeded

It is particularly important that the air be monitored effectively when personnel are wearing Level C protection. Continual surveillance using direct-reading instruments is needed to detect changes in air quality necessitating a higher or lower level of respiratory protection.

6.5.4 Level B Protection

Level B protection is not anticipated for use during the activities to be conducted. If action levels for Level C are exceeded, work will be stopped and the PHSM and the Contracting Officer's Representative (COR) contacted for assistance.

6.6 COMMUNICATIONS

Verbal communication at the sites may be impeded by on-site background noise caused by heavy equipment and the use of PPE. Two-way radios will be used on site when communication is necessary between working zones. Hand signals to be used between personnel within the Exclusion Zone will be reviewed during the site safety meetings conducted before starting work at the individual sites.

The following hand signals will be used in the event of an emergency where audible communication is not possible:

- Clutching throat—personal distress
- Arm waving in a circle over the head—if given in the Exclusion Zone, need assistance; if given in the Support Zone, evacuate

External communication between on-site and off-site personnel will be conducted through the use of telephones located at facilities in proximity to the sites. The exact locations of the telephones and numbers are listed in Section 11.0 and will be posted on site and given to all site personnel.

7.0 MONITORING

The following sections provide the practices to be implemented for direct reading instrumentation, integrated air sampling, and the calibration and maintenance of instrumentation.

7.1 REAL-TIME MONITORING

Photoionization detectors (PIDs), combustible gas indicators (CGIs), and oxygen (O_2) meters will be used to measure airborne concentrations of suspect contaminants and flammable/explosive environments. Colorimetric detector tubes will be used for specific chemicals of concern. For chemicals that can be detected with a PID or a flame ionization detector, colorimetric tubes will be used to characterize specific contaminant concentrations. As directed by the SHSO, these instruments will be used to monitor entry into Exclusion Zones at varying site perimeters and at specific work locations.

The majority of exposure monitoring will be conducted using direct reading instruments in the workers' breathing zone. Initial upwind background readings will be obtained before initiation of activities. Readings will be taken periodically for all activities. Monitoring results will be recorded in a log book. Monitoring, calibration, and maintenance of instruments will be the responsibility of the SHSO or a designee. The calibration results will be documented in the SHSO's log book.

7.2 ORGANIC VAPOR MONITORING

A PID will be used to measure airborne levels of organic vapors during the performance of all activities to determine the proper level of respiratory protection. For the PID, an 10.2 electron volt probe will be used. It should be noted that if airborne concentrations are above background, colorimetric tubes shall be used to determine if benzene is present.

7.3 COLORIMETRIC TUBES

Direct-reading colorimetric indicator tubes will be used to determine if benzene is present in the organic vapor if PID readings greater than 1 part per million are detected.

7.4 CGI/O_2 MONITORING

CGI and O_2 levels will be measured prior to entry into open excavations or sumps. To ensure accurate measurements, readings will be taken in the following order:

1. O_2 concentration
2. Lower explosive limit (LEL) concentration

Action levels for LEL and O_2 concentrations are summarized in Table 7-1. When used, LEL/O_2 meters shall be calibrated before and after use. Maintenance will be conducted in accordance with the manufacturer's instructions.

7.5 INTEGRATED SAMPLING

Personal air sampling will be conducted for potential contaminants. Sample results will be used to validate employee exposures and the adequacy of PPE used on the project. In completing the sampling, the following practices will be followed:

- Sampling will be conducted in accordance with National Institute of Occupational Safety and Health analytical methods.
- Sampling pumps will be calibrated before and after use.
- Sampling will be initiated if Level C action levels are reached and with the concurrence of the PHSM.
- Sampling strategy will follow the premise that worst-case exposures are to be evaluated.
- Sample seals and chain-of-custody documentation will be used to ensure the integrity of samples and the analysis results.

Table 7-1 Combustible Gas/O_2 Monitoring Action Levels

Equipment	Concentration	Action Level
O_2 Meter	$19\% \leq O_2 \leq 23.5\%$	Continue Work
O_2 Meter	$19\% > O_2 > 23.5\%$	Stop Work
CGI	LEL < 10%	Continue Work
CGI	LEL > 10%	Stop Work
PID/ FID	0 - 5 ppm	Level D
	5 ppm - 25 ppm	Level C
	> 25 ppm	Stop work and contact the SHSO

PID Photoionization detector
0_2 Oxygen
CGI Combustible gas indicator
ppm Parts per million

- Field blanks will be submitted for analysis in conjunction with exposed sorbent media.
- Employees will be notified in writing by the SHSO of results and be provided an opportunity to discuss their significance.
- Field results will be forwarded to corporate health and safety personnel for inclusion in each employee's medical record.
- Field implementation of the sampling program will be at the direction of the SHSO.

7.6 MEDICAL SURVEILLANCE REQUIREMENTS

All EBASCO personnel and subcontractors performing field work on site will be required to have current medical approval for hazardous waste site work. The medical exams will be performed by an occupational physician or equivalent and shall include a written opinion on the person's ability to perform work on a hazardous waste site. The medical records to be maintained on site by the SHSO include the following:

- Qualification statement for hazardous waste work
- Qualification documentation for respirator use
- Respirator fit test results
- Emergency Medical Data Sheet (Section 13.0)

8.0 SAFETY CONSIDERATIONS FOR SITE OPERATIONS

Because of the nature of work to be conducted, physical hazards potentially pose the greatest health and safety concern during this project. The following sections provide a review of practices that will be followed to control the aforementioned physical hazards.

8.1 SLIPS, TRIPS, AND FALLS

Field personnel shall become familiar with the specific hazards associated with each structure and work area. Hazards causing slips, trips, and falls may be a result of debris, uneven terrain, sampling at elevated locations, and poor lighting. Field personnel will remain alert to the surrounding conditions. Upon arrival at a site, personnel will inspect the area for hazards. These hazards will either be removed from the immediate area or marked to prevent injury.

8.2 SPLASHES AND SPILLS

Field personnel will wear the appropriate chemical-resistant clothing to prevent dermal exposure from accidental splashes and spills.

8.3 ILLUMINATION

Artificial/supplementary lighting will be provided when field operations continue past dusk. The lighting will be adequate so that the entire work area will be illuminated to an intensity of 5-foot-candles.

8.4 ELECTRICALLY POWERED EQUIPMENT

All electrical equipment including portable tools, lighting, and power cords will conform with 29 CFR 1926.400. All power tools shall be inspected before use. A weekly inspection of power tools will also be performed and recorded.

8.5 NOISE

The main sources of noise for this project are the excavation-related equipment, vehicles, and electric generators. Hearing protection must be when the SHSO determines that exposures may be in excess of 85 decibels (A-weighted scale). Exposures may be determined by using a type I sound level meter on the A-weighted scale. The sound level meter will be calibrated before and after use. Personnel exposed to noise hazards shall be included in their company's Hearing Conservation Program.

8.6 BLOODBORNE PATHOGEN EXPOSURE

Bloodborne pathogen exposure risks are associated with medical emergencies requiring CPR; the stabilizing of a victim bleeding or with an open wound; or cleanup of blood, body fluids or tissues, or broken or sharp objects that might be contaminated with blood. Personnel trained in CPR and first aid shall be trained in the Bloodborne Pathogens Program.

8.7 HEAT STRESS

Site employees must learn to recognize and treat various forms of heat stress through preventive heat stress management. In general, the following procedures should be observed:

- Have workers drink 16 ounces of water before beginning work. Provide disposable, 4-ounce cups, and water that is maintained at 50 to 60 degrees Fahrenheit (°F). Urge workers to drink one or two of these cups of water every 20 minutes, for a total of 1 to 2 gallons per day. Provide a cool, preferably air-conditioned, area for rest breaks. Discourage the use of alcohol in nonworking hours, and discourage the intake of coffee during working hours. Monitor for signs of heat stress.

- Acclimate workers to site work conditions by slowly increasing workloads, i.e., do not begin site work activities with extremely demanding activities.

- Provide cooling devices to aid natural body ventilation; however, these devices add weight, and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing

- Ensure that adequate shelter is available to protect personnel against heat, which can decrease physical efficiency and increase the probability of heat stress. If possible, set up a rest area in the shade

The following are examples of heat-related stress that may be encountered:

- Heat rash—caused by continuous exposure to heat and humid air, aggravated by chafing clothes. Signs—a decreased ability to tolerate heat and obvious signs of discomfort.

- Heat cramps—caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs—muscle spasm and pain in the extremities and abdomen.

- Heat exhaustion—caused by increased stress on various organs to meet increased demands to cool the body. Signs—shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and fatigue.

For strenuous field activities that are part of ongoing site work activities in hot weather, the following procedures shall be used to monitor the body's physical response to heat and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures are instituted when the temperature exceeds 70°F.

Work-rest regimes are based on ambient temperature and level of protective equipment worn. Three means are available to measure the physiologic responses to heat stress: heart rate, oral temperature, and body water loss. A Wet-Bulb Globe Temperature index will be calculated for Level D applications. This index is not valid when higher levels of protection are worn. One or more of the following physiologic monitoring methods will be used for work conducted in protective clothing:

- Measure heart rate by monitoring the radial pulse for 30 seconds as early as possible in the resting period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period is shortened 33 percent, and the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle

is further shortened by 33 percent. The procedure is continued until the rate is maintained below 110 beats per minute.

- Body temperature is measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99°F. If it does, the next work period is shortened by 33 percent, and the length of the rest period stays the same. However, if the oral temperature exceeds 99.6°F at the beginning of the next period, the following work cycle is further shortened by 33 percent. Oral temperature is measured again at the end of the rest period to ensure that it has dropped below 99°F. Anyone with an oral temperature exceeding 100.6°F will not wear impermeable clothing.

8.8 COLD STRESS

Cold stress in not anticipated to be a concern with the work to be performed.

8.9 OVERHEAD UTILITIES

Any overhead wire shall be considered an energized line unless the person owning that line, or the electrical utility authorities, indicates that it is not an energized line and it has been visibly grounded.

A person shall be designated to observe equipment and to give timely warning of all operations where it is difficult for the operator to maintain the desired clearance by visual means.

All parts of excavation or other equipment working in the area of energized or unidentified overhead electrical lines shall maintain a minimum clearance in accordance with Table 8-1.

Until proven otherwise, electricity will be considered "on" within all structures.

Table 8-1 Minimum Clearance From Energized Overhead Electric Lines

Nominal System Voltage	Minimum Required Clearance
0-50 KV	10 feet
51-100 KV	12 feet
101-200 KV	15 feet
201-300 KV	20 feet
301-500 KV	25 feet
501-750 KV	35 feet
751-1000 KV	45 feet

KV Kilovolt

8.10 BURIED UTILITY LINES

A review will be made of any available property maps, red-line, or as-built drawings before sampling activities to identify potential buried utilities. CAFB utilities-locating personnel shall also be utilized to identify, mark, and de-energize buried utilities prior to starting intrusive activities. If additional concerns remain regarding the location of buried utilities, the PHSM shall be contacted for guidance.

8.11 INCLEMENT WEATHER

Natural phenomena, including excessive heat or cold, rain, snow, ice, and lightning, can affect work activities and increase risk. At the daily morning health and safety meetings, the SHSO will discuss potential weather issues that could affect workers. Additionally, extremes in temperature and moisture could affect the function of monitoring instrumentation and PPE. It is the responsibility of the SHSO to recognize weather conditions and adjust site activities accordingly.

8.12 MANUAL LIFTING

Personnel performing material handling shall abide by the following guidelines:

- **DO** design manual lifting and lowering out of the task and workplace. If manual lifting must be done by a worker, perform it between knuckle and shoulder height.
- **DO** be in good physical shape. If you are not used to lifting and vigorous exercise, do not attempt to do difficult lifting or lowering tasks.
- **DO** think before acting. Place material conveniently within reach. Have handling aids available. Make sure sufficient space is cleared.
- **DO** get the load close to the body. Test the weight before trying to move it. If it is too bulky or heavy, get a mechanical lifting aid or somebody else to help, or both. Place the feet close to the load. Stand in a stable position with the feet pointing in the direction of movement. Lift mostly by straightening the legs.
- **DO NOT** twist the back or bend sideways.

- **DO NOT** lift or lower awkwardly.
- **DO NOT** hesitate to get mechanical help or help from another person.
- **DO NOT** continue heaving when the load is too heavy.

8.13 PORTABLE LADDERS

All portable ladders will be used for their designated purposes only. All ladders will be constructed, maintained, and used in accordance with American National Standards Institute standards A-14.1 and A-14.2, OSHA 29 CFR 1926 Subpart X, and manufacturers' instructions. Before use, each ladder will be inspected to verify that all parts are in good condition and all components function properly. Defective ladders will be tagged "do not use" by the SHSO.

The following guidelines should be followed when using portable ladders:

- Ladders should be set on flat, firm surfaces.
- Both handrails of straight ladders should be in contact with upper support.
- Straight ladders will be secured by either a person on the ground holding the ladder to prevent slipping or by tying at the top of the ladder.
- Workers will retain a 4 to 1 ratio regarding the height of extension related to the distance the bottom of the ladder is from the well or vertical plane (1 foot out for every 4 feet up).
- The handrails of a straight ladder will extend at least 36 inches above the landing.
- Metal ladders will not be used around electrical conductors.
- No more than one person will be on a straight ladder at a time.
- Workers will not stand on the top rung or steps of ladders.
- Ladders will be positioned so that workers do not have to lean more than half of their body outside either handrail.

- Before ladder use, the SHSO will review ladder raising and usage techniques, as applicable.

8.14 HEAVY EQUIPMENT SAFETY

Because heavy equipment may present a diverse number of hazards, the following practices will be observed:

- Subcontractors will be required to provide equipment that meets the requirements of all relevant OSHA standards.
- Equipment will be inspected by the SHSO before use. At a minimum, guarding, hydraulics, hoisting, rigging, and overall condition will be reviewed. Deficiencies found will be corrected before use.
- Operator qualifications will be verified before initiating work.
- Noise monitoring will be conducted to ensuring adequate protection is afforded to employees.
- All equipment will be equipped with operational backup alarms and fire extinguisher.
- Copies of any pertinent inspections will be provided to the SHSO before the start of work.
- Any health and safety concerns arising during the course of work shall be reported to the SHSO.

8.15 DRIVER SAFETY

During the performance of this work, all personnel using project vehicles shall posses a valid drivers license and obey all posted speed limits, signs, and traffic signals. Personnel riding in vehicles shall wear seat belts at all times. The DO Manager shall coordinate with CAFB police to procure any necessary permits.

8.16 POWER AND HAND TOOLS

Power and hand tools used shall be in accordance with the following practices:

- Tools shall be maintained in good condition and be inspected prior to use
- Electrical tools shall be double insulated or have a ground plug
- Tools shall be used for their intended purpose
- Unsafe tools shall be removed from service

8.17 HAND PROTECTION

In addition to the PPE required for work in contaminated areas, heavy leather gloves shall be worn when handling materials or performing other work that could result in hand injuries.

8.18 LOCKOUT/TAGOUT

As necessary, lockout/tagout procedures shall be used to control employee exposure to hazardous energy sources in accordance with 29 CFR 1910.147 throughout this project and, in particular, to control access to below and above ground utilities and services. Subcontractors shall present their lockout/tagout procedures to the PHSM who will coordinate their approval with the project manager or the COR.

8.19 TRAFFIC CONTROL

The addition to the use of zones as outlined in Section 6.1 and 6.2, unauthorized vehicles shall be controlled through the use of barricades, cones, or other warning devices. The DO Manager shall coordinate all activities impacting base traffic with the CAFB Police.

8.20 EXCAVATION SAFETY

Excavations shall be maintained in accordance with 29 CFR 1926, Subpart P, Excavations. This standard provides the requirements for daily inspections, work practices, soil testing, and

protective systems. Subcontractors shall provide copies of their excavation safety procedures to the PHSM coordinating their review and approval.

8.21 CRANE OPERATIONS

Crane operations shall be conducted in accordance with 29 CFR 1926.550 and EM-385-1-1, Section 15 and 16C (USACE 1992). In addition, the subcontractor shall present a prelift plan addressing the following points:

- Centers of gravity for loads
- Lift points
- Sling types, attachment method, and capacities
- Safety practices to be used during lifts

This plan shall be reviewed and approved by the PHSM and the COR.

8.22 HOT WORK

Work involving the use of cutting or welding equipment shall be conducted/using a hot work procedure. The SHSO shall coordinate with CAFB Fire Department the initiation of permits. If it is necessary to use internal procedures, the subcontractor procedure shall be reviewed and approved by the PHSM and the COR.

8.23 LEAD EXPOSURE CONTROL

If cutting or welding is performed, an evaluation shall be conducted by the subcontractor to determine the potential for lead exposure during the operations. If lead is present, an exposure control program shall be implemented by the subcontractor. The subcontractor procedure shall be reviewed and approved by the PHSM and the COR.

9.0 UNEXPLODED ORDNANCE

9.1 GENERAL

This plan is prepared to ensure the safety of personnel working on sites that may contain ordnance explosive waste/unexploded ordnance. Records indicate that dropped munitions with proximity fuzes were employed in the areas of interest. There were also references to training activities by U.S. Navy SEALS . These past activities require extreme vigilance at all times. Appendix (C) depicts and describes the ordnance and fuzes that might be found in the potential AOC. Extreme care must be exercised in the areas that were used by the SEALS since they are known to use unorthodox weapons that were not documented.

There is no "SAFE" procedure for dealing with UXO, merely procedures which are considered least dangerous. However, maximum safety in any UXO operation can be achieved through strict adherence to applicable safety precautions, a planned approach and intensive supervision. Only those personnel absolutely essential to the operation shall be allowed in the restricted area/exclusion zone during UXO activities (DoD 6055.9-STD) All UXO activities shall be conducted in accordance with HS 7-1 (UXO operations) of the EBASCO Health and Safety Program Manual.

9.2 GENERAL SAFETY CONCERN

Care must be observed in searching for, probing for, excavating, moving, and handling UXO. Operations on the UXO should be conducted only after the establishment of a complete plan for the operation involved and careful preparation to insure its implementation. Plans shall be based upon the minimum amount of UXO consistent with efficient operations and maximum safety.

Only UXO-qualified personnel shall be involved in UXO procedures. UXO procedures consist of gaining access (manual excavation) to subsurface UXO, identification, transportation, storage, and disposal of UXO. All personnel engaged in UXO operations shall be thoroughly trained in

explosive safety and be capable of recognizing hazardous explosive exposures. Only personnel who have graduated from the US Naval Explosive Ordnance Disposal School, Indian Head, Maryland are authorized to handle UXO and perform UXO procedures. Hazardous Devices Technicians who have graduated from the Hazardous Devices School, Redstone Arsenal are not trained nor qualified to handle military UXO and will not be involved in UXO operations.

The use of electroexplosive devices (EED) susceptible to electromagnetic radiation (EMR) devices in the radio frequency (RF) range, that is, radio, radar, and television transmitters, has become almost universal. Radio frequency electromagnetic radiation consists of waves of electrical energy at radio transmission frequencies. These waves are radiated in a line-of-sight from the antennas of electronic devices that transmit radio, radar, television, or other communication or navigation radio frequency signals. The energy is usually equally radiated in all directions; however, certain types of antennas focus the energy, transmitting it in a single direction or sector only. EMR (RF) can also be reflected from large metallic surfaces or objects into areas not directly reached by the line-of-sight-radiated electric energy. Under highly undesirable conditions, enough of the energy may be picked up by portions of the EED, associated circuitry, or related objects acting as receiving antennas, to initiate the EED.

In general, all ordnance items, even those normally safe when intact, are hazardous when extensively damaged. The damage may expose components, trailing wires, or breaks in shielding integrity that permit the entrance of EMR (RF) energy into the ordnance item and then into the EED.

The presence of antennas, communication, and radar devices should be a point of interest on initial site visits and preliminary assessments.

Do not wear outer or undergarments made of wool, silk, or synthetic textiles such as rayon and nylon while working on UXO. These materials can generate sufficient static charge to ignite fuels or initiate explosives. Any person coming in contact with an UXO shall ground himself prior to touching EEDs. This must be done to discharge any electrostatic charge accumulation from the body.

Make every effort to identify the UXO. Carefully examine the item for markings and other identifying features such as shape, size, and external fittings. However, do not move the item to inspect it. If an unknown UXO is encountered, photographs shall be taken and express-mailed to CEHND-ED-SY, which has access to the TM 60-Series publications.

UXO which penetrates the earth to a depth where the force of the explosion is not enough to rupture the earth's surface forms an underground cavity called a camouflet. Camouflets will be filled with the end product of the explosion, carbon monoxide gas. Camouflet detection and precautions must be considered if records search indicates the site was used as an impact area.

Avoid inhalation of, and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.

Consider UXO which has been exposed to fire and detonation as extremely hazardous. Chemical and physical changes may have occurred to the contents which render it much more sensitive than it was in its original state.

Do not rely on the color coding of UXO for positive identification of contents. Munitions having no, incomplete, or improper color coding have been encountered.

Avoid the area forward of the nose of a munition until it can be determined that the item is not a shaped charge and High Explosive Anti-Tank UXO. The explosive jet can be fatal to great distances forward of the longitudinal axis of the item. Assume any shaped charge munition to contain a piezoelectric (PZ) fuzing system until the fuzing is otherwise identified. A PZ fuse is extremely sensitive, can fire at the slightest physical change, and may remain hazardous for an indefinite period of time. Examine a projectile for the presence or absence of an unfired tracer.

Approach an unfired rocket motor from the side. Ignition will create a missile hazard and hot exhaust. Do not expose electrically fired rocket motors within 25 feet of any exposed electronic transmitting equipment or exposed antenna leads.

Consider an emplaced landmine armed until proven otherwise. It may not be possible to tell, or it may be intentionally rigged to deceive. Many training units contain firing indicator charges capable of inflicting serious injury.

Assume a practice UXO contains a live charge until it can be determined otherwise. Expended pyrotechnic/practice devices may contain red/white phosphorus residue. Due to incomplete combustion, phosphorus may be present and reignite spontaneously if subjected to friction or if the crust is broken.

Do not approach a smoking white phosphorus (WP) UXO. Burning WP may detonate the burster or dispersal explosive charge at any time.

The detection and identification of suspect explosive materials shall be accomplished in accordance with Chapter 13, TM 9-1300-214, "Military Explosives".

Upon detection and/or identification of what may be considered "live" ordnance, the Melrose Range Chief shall be immediately contacted. He will be in charge of EOD. At no time shall EBASCO or subcontractor personnel attempt to dispose of the ordnance.

9.3 ORDNANCE-RELATED HTRW ACTIVITIES.

29 CFR 1926.100a requires personnel to wear protective helmets in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock or burns. During field activities on ordnance projects, hardhats will be worn when a head injury threat is present. Safety shoes will not be worn by magnetometer operators.

Soil samples, test pit excavation, and/or monitoring well installation are sometimes conducted in areas where subsurface UXO may be found. These intrusive activities must be preceded by a magnetometer survey to assure the safety of the sampling crews. HS 7-2 outlines how UXO operations will proceed during intrusive (drilling) activities. UXO personnel will perform surface sweeps prior to the mobilization of all field activities including soil gas and geophysics, and will escort all field personnel into areas known to contain potential UXO hazards. These procedures are outlined below.

9.3.1 Geophysical Surveys

An UXO Specialist or Supervisor will accompany geophysics personnel during geophysical surveys and will perform the following duties:

- Ensure a safe path of entrance/egress from each survey area.
- Perform a surface sweep of each survey area

9.3.2 Soil Gas Sampling

An UXO Specialist or Supervisor will accompany the soil gas personnel and perform the following duties:

- Ensure a safe path of entrance/egress from each area.
- Perform a surface sweep of the general area that contains each sampling site.
- Perform a downhole clearance prior to the soil gas probe being hammered into the ground. If UXO personnel deem it unsafe to insert the probe, an alternate location for sampling shall be attempted.

9.3.3 Surface Sampling

Surface sampling includes surface water, soil and/or sediment sampling. Surface sampling crews will be escorted to sampling locations by UXO personnel. UXO personnel will perform surface sweeps of the sampling areas and will ensure safe entrance and egress from each sampling area. UXO personnel will also conduct a downhole clearance for each soil and/or sediment sample location.

9.3.4 Drilling

Prior to entry of work crews coming on site to conduct intrusive activities, UXO personnel will conduct a surface sweep and magnetometer survey of the area.

A plan for designating the route of access/egress shall be developed for each work site. Each access route will be cleared to a width (normally a minimum of 20 feet) that will allow equipment and vehicles to pass safely into the work area. Each work site shall be cleared to a diameter large enough to permit equipment and vehicles to maneuver within the area to perform their activity while allowing sufficient room for safe access and egress.

UXO personnel will perform downhole clearance operations for each boring. This procedure will occur as follows:

1. UXO personnel will clear the boring location from 0 to 2 feet.
2. Sampling crew will continue to hand auger to 4 feet. (Hand augering will occur until it is physically impossible to continue)

3. At 2 feet UXO personnel will clear from 2 to 4 feet.

4. Sampling crew will continue to hand auger and repeat steps 2 and 3 to 8 feet or refusal.

5. At the point of hand auger refusal, the drill rig will be set up at a distance of 6 to 12 inches from the hand auger boring and begin drilling.

6. The drill crew will drill and pull split spoon samples at scheduled sampling depths to the depth that was cleared during hand augering (UXO personnel will inspect each split spoon sample for explosive material).

7. When the drill crew has reached the downhole clearance depth, they will stop drilling, pull drilling equipment, and pull the drill rig away from the boring a distance of at least 20 feet.

8. When the next 4 feet have been cleared, the drill rig will be moved back on to the boring. Drilling and sampling will continue for 4 feet.

9. Steps 7 and 8 will be repeated until the boring has reached its targeted clearance depth, or if UXO personnel detect a downhole hazard.

If UXO personnel detect a downhole hazard, drilling operations will cease immediately, the Melrose Range Chief will be contacted, the boring will be abandoned, and an alternate drilling location shall be selected.

If UXO personnel detect a downhole hazard, drilling operations will cease immediately, the boring will be abandoned, and an alternate drilling location shall be attempted.

Table 9-1 outlines the number of borings and the corresponding target depths in each SWMU/AOC.

Table 9-1 Drilling Summary

SWMU/AOL	Number of Borings	Target Depth (feet)
114	4	50
115	4	20
117	4	30
Northwest Munitions Disposal Site	4	30
World War II Cantonment Disposal Site	4	40
Disposal/Burn Site	1	20
Domestic Waste Burial Site	1	20

9.4 RESTRICTED AREA/EXCLUSION OPERATIONS.

Do not allow unauthorized or unnecessary personnel to be present in the vicinity of UXO. During the time frame that UXO procedures are being accomplished, only necessary UXO personnel shall be within the restricted area/exclusion zone. When non-UXO personnel enter the restricted area/exclusion zone, all UXO procedures will cease. Limit personnel exposure time. UXO operations will always be based upon minimum exposure consistent with efficient operations. Plan for, provide, and know the measures to be taken in the event of an accident. Provide a designated emergency vehicle in the area in case of an accident or other emergency.

Attachment C contains information regarding the identification, operation, and hazards of various dropped munitions.

10.0 DECONTAMINATION

It is the responsibility of the SHSO to ensure that all personnel and pieces of equipment leaving the site are properly decontaminated according to the procedures outlined in this section. Documentation of decontamination must be made in the field log notebook which will become part of the permanent project file.

10.1 PERSONNEL

Decontamination procedures will be followed by all personnel exiting the Exclusion Zone. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the site before decontamination. The SHSO may simplify the procedures in the field if minimal contamination has occurred to specific protective equipment.

Respirators will be decontaminated daily. Taken from the drop area, the face pieces will be disassembled, the cartridges disposed, and all other parts placed in a cleansing solution. After an appropriate time in the solution, the parts will be removed and rinsed with tap water. Face pieces will be allowed to air dry before placing in sanitized bags. Personnel will inspect their respirators on a daily basis to make certain they are in proper operation.

Decontamination procedures for the use of Level D PPE will be modified from the procedures above to include removal of loose debris, washing/rinsing of disposable garments, and discarding of disposable materials. Subsequent to personal decontamination, all personnel (regardless of level of protection worn) will shower as soon as possible upon leaving the site.

Disposable items (e.g., Tyvek coveralls, inner gloves, and latex overboots) will be changed on a daily basis at a minimum. Decontamination solutions will be changed daily or as conditions require. Respirator cartridges will be changed at least on a daily basis.

10.2 SAMPLING EQUIPMENT

Small equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as much of the instruments as possible with plastic, without hindering the operation of the unit. As necessary, air monitoring equipment will be placed in clear plastic bags that allow reading of the scale and operation of the knobs. The sensors can be partially wrapped, keeping the sensor tip and discharge port clear.

Contaminated equipment will be taken from the drop area and the protective coverings removed and disposed in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

10.3 HEAVY EQUIPMENT

Heavy equipment (e.g., drilling rig) will be decontaminated using high-pressure steam cleaning. Waste generated from decontamination will be contained and disposed properly.

10.4 DISPOSAL OF MATERIALS GENERATED ON SITE

Investigation-derived materials (e.g., PPE, decontamination fluid) shall be contained and placed in a secure area before final disposition on site.

11.0 EMERGENCY RESPONSE PLAN

In the event of injury, accident, or other emergency, all personnel are responsible for following the provisions of this SSHP. When personnel are working in the field, they will have a copy of this SSHP with them.

11.1 EMERGENCY CONTACTS

Emergency contact numbers will be conspicuously posted on site to allow for easy access to all personnel.

11.1.1 Emergency Telephone Numbers

All Emergencies:

From a commercial phone	911
From a base phone	4117
Fire Department	505-784-3117-Report only
	505-784-4852-All others
Security Police	505-784-2667

11.1.2 Medical Treatment

For life threatening emergencies:

CAFB Hospital, Building 1400	505-784-4033 (Ambulance)
	505-784-4852 (All others)

For non-life threatening emergencies:

Clovis High Plains Hospital, 2100 North Thomas	505-769-2141

11.1.3 Emergency Route to Hospital

The routes to the CAFB Hospital and Clovis High Plains Hospital are shown in Figure 11-1. This figure will be included at a later date.

11.1.4 Information and Response Organizations

CHEMTREC	1-800-424-9300
Poison Control Center (National)	1-800-458-5842
Toxic Substances Control Act Hotline	202-554-1404
Centers for Disease Control	404-452-4100 or 404-329-2888
National Response Center	1-800-424-8802
Pesticide Information Center	1-800-845-7633
Resource Conservation and Recovery Act Hotline	1-800-424-9346

11.1.5 Project Personnel

Program Health and Safety Manager:

Diane M. Morrell, CIH	(303) 988-2202
Program Manager: Fred Wall	(303) 988-2202
Site Health and Safety Officer:	Kent Mahanna (303) 988-2202
Emergency Coordinator:	TBD

11.1.6 Explosive Ordnance Disposal Personnel

Melrose Range Chief:

Tim Quakenbush	505-784-6644 or 505-478-2340

Cannon Flight Chief:
Senior Master Sergeant, Ernest Lorelli 505-784-7507

11.2 EMERGENCY PROCEDURES

The following standard emergency procedures will be used by on-site personnel. The SHSO shall be notified of any on-site emergencies and shall be responsible for ensuring that the appropriate procedures are followed. The SHSO will notify and keep the PHSM informed of the situation.

Personal Injury.

Upon notification of an injury, the SHSO will assess the nature of the injury and activate the appropriate response agency. If the cause of the injury does not affect the performance of site personnel, operations may continue with the appropriate on-site field personnel initiating the appropriate first aid and necessary follow-up. In the event that the injury increases the risk to others, all field personnel shall move to a designated location until further instructions. Activities on site will stop until the added risk is removed or minimized.

The CAFB Ambulance Service will provide emergency medical treatment and ambulance service in support of this activity.

Fire and Explosion

Upon notification of a fire or explosion on site, all site personnel shall assemble at the decontamination line. The fire department shall be alerted. All site personnel will be moved a safe distance from the involved area.

PPE Failure

In the event that a site worker experiences a failure or alteration of PPE that affects the protection factor, that person and his or her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure

If any other equipment on site fails to operate properly, the SHSO shall be notified and shall determine the effect of this failure on continuing operations. If the failure affects the safety of personnel or prevents completion of assigned tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

11.2.1 Physical Injury

In the event of physical injury, the following steps will be taken:

- Evaluate the extent of injuries.
- Summon emergency help as deemed necessary by the SHSO.
- Modify decontamination procedures as appropriate considering the actual levels of contaminants on the person (if any) and types or severities of injuries.
- Apply first aid.

If minor injuries occur, decontaminate and transport the individual to Clovis High Plains Hospital. Medical attention must be sought regardless of how minor the injuries appear to be.

If possible, major or life-threatening injuries should be transported by ambulance. If this is not possible, it is preferable to make arrangements to transfer the injured person to paramedics within CAFB.

11.2.2 Injury from Chemical Exposure

If it is suspected that a person has suffered from chemical exposure the following procedures shall be undertaken:

Skin Contact

Flush with water. Remove clothing, if necessary. Wash and rinse affected area for at least 15 minutes. Decontaminate and provide appropriate medical attention.

Inhalation

Move person away from area; administer CPR as needed. Decontaminate and transport to hospital for medical attention.

Ingestion

Decontaminate and transport to hospital for medical attention.

Eye Contact

Irrigate with water for at least 15 minutes. Decontaminate and transport to hospital for medical attention.

11.3 RADIO COMMUNICATIONS

Radio communications will be provided for every operating group during all operations. All sampling operations shall be supplied within a hand-held radio set for operational and emergency communications. Typically, the SHSO will have the radio at the work site.

A communication center will be established at the EBASCO field office. This office will be equipped with radio and telephone communications and shall be attended at all times during operations.

11.4 EMERGENCY RESPONSE FOLLOW-UP

In the event of a serious or fatal accident/injury, an immediate telephone report will be made by the SHSO to the PHSM outlining all details of the accident/injury and action(s) taken.

All incidents involving personal injury or exposure to potentially hazardous materials during any activity will be documented and reported to the PHSM, the CAFB Safety Office, Commanding Officer/COR and Cannon Contracting Officer. This reporting procedure will be accomplished using the EBASCO Accident/ Incident Report. The report shall include the following information:

- Chronological history of the incident
- Facts concerning the incident and when they became available
- Titles and names of personnel involved
- Actions: decisions made and by whom
- Order given: to whom, by whom, and when
- Action taken: who did what, when, where, and how
- Possible exposure(s) of site personnel
- History of all injuries or illnesses during or as a result of the emergency

11.5 SPILL RESPONSE

In the event of a spill of hazardous materials on site, the SHSO shall control the spill and proceed to absorb and containerize the material. In addition the SHSO may conduct air monitoring to characterize any exposure hazards.

12.0 AUTHORIZATIONS

Personnel authorized to enter the work areas while operations are being conducted must be approved by the USACE and the SHSO and/or HST. Authorization will involve completion of appropriate training courses, medical examination requirements as specified by OSHA 29 CFR 1920.120, and review and sign-off of this SSHP.

The following EBASCO personnel are authorized to perform work on site (additional personnel may be identified at a later date):

1. TBD
2. TBD
3. TBD
4. TBD
5. TBD
6. TBD
7. TBD
8. Remediation Staff

Other personnel authorized to enter the site subject to the above conditions are:

1. USACE Personnel
2. Regulatory Agency Personnel
3. Subcontractors
4. CAFB environmental staff and designees

13.0 MEDICAL DATA SHEETS

This brief Medical Data Sheet will be completed by all on-site personnel and will be kept in the Support Zone by the SHSO during conduct of site operations. Completion of this form is required in addition to compliance with the Medical Surveillance Program requirements. This data sheet will accompany any personnel when medical assistance is needed or transport to hospital facilities is required.

Project:

Name:_____ Home Telephone:_____

Address:_____

Age:_____ Height:_____ Weight: _____ Blood Type: _____

Emergency contact:_____

Drug or other allergies:_____

Particular sensitivities:_____

Do you wear contacts? _____

Provide a checklist of previous illnesses

Previous exposures to hazardous chemicals_____

_____

List what medications you are presently using:_____

_____

_____

Do you have any medical restrictions?_____

_____

Name, address, and phone number of personal physician:

_____

_____

_____

14.0 FIELD TEAM REVIEW SHEET

I have received site-specific training in and understand the requirements of the Site-Specific Health and Safety Plan for the Melrose AFR RFI. I will comply with the provisions contained therein.

Name:

15.0 APPROVALS

By their signature the undersigned certify that this SSHP is approved and will be utilized during the PA/SI/RFI at Cannon AFB.

Jel Lowrey
Delivery Order Manager

8-22-95
Date

Project Superintendent

Date

Site Health and Safety Officer

Date

Jel Lowrey
Project Health and Safety Manager

8-22-95
Date

16.0 REFERENCES

ACGIH (American Conference of Governmental Industrial Hygienists)
1993-1994. Threshold Limit Values for Chemical Substances and Physical agents and biological Exposure Indices

American National Standards Institute. Current Issue. Standards A-14.1 and A-14.2.

EBASCO
1995 EBASCO Health and Safety Program Manual cited on page 2-3, Site-Specific Work Plan for the PA/SI/RFI cited on page 3-1.

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Occupational Health and Safety Standards for the Construction Industry (29 CFR Part 1926). With Amendments of August 1, 1991.

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Title 29 CFR Part 1910.

Title 29 CFR Part 1926.

U.S. Department of Health and Human Services.
1990. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards.

USACE (U.S. Army Corps of Engineers)
1992 EM385-1-1, Safety and Health Requirements Manual. October 1992.

ATTACHMENT A

ACTIVITY HAZARD ANALYSIS

Cannon Air Force Base Activity Hazard Analysis

Activity	SWMU/Potential AOC	Hazard	Control Method
Geophysics/Surveying	All	Slips, Trips, Falls	Pay close attention to walking/working surfaces
		Animal/Spider/Insect Bites	Avoid obvious shelters or nesting sites of poisonous snakes, spiders, and other insects
		UXO	Do not touch or kick any items that resemble ordnance. Have an escort (UXO expert) when driving/walking in known ordnance areas.
Soil Gas	All	Exposure to Hazardous Chemicals	Take special care in the handling of hazardous chemicals, use PPE if necessary
		UXO	Do not touch or kick any items that resemble ordnance. Have an escort (UXO expert) when driving/walking in ordnance areas.
		Back Strain	Use proper technique when hammering probe into the soil
		Blisters	Use leather gloves while hammering
Drilling	All	Overhead Power Lines	See Section 8.0 and Table 8-1
		Slips, Trips, Falls	Pay attention to walking/working surfaces and housekeeping. All personnel must be tied off with acceptable fall protection when working 6 feet or more above ground
		Injection/Ingestion of Hydraulic Fluid	Perform regular checks on hydraulic lines and fittings
		Falling or Flying Objects	PPE-hard hat, safety glasses
		Exposure to Hazardous Material	PPE, monitoring, good work practices
		UXO	Do not touch or kick any item that resembles ordnance. Have an escort (UXO expert) when driving/walking in known ordnance areas.

SWMU Solid Waste Management Unit
AOC Area of Concern
UXO Unexploded Ordnance
PPE Personal Protective Equipment

ATTACHMENT B

FORMS

A Division of Ebasco Services Incorporated

☐ Recordable ☐ Non-Recordable

ACCIDENT/INCIDENT REPORT

☐ Original Submittal
☐ Correction Submittal

Report Prepared By (please print):

Date Prepared:

Project:

Project Location (Address, City, State, Zip):

Involved Employee Name (Last, First, M.I.):

Social Security No.:

Severity of Injury/Illness
0 First Aid
1 Medical
2 Lost Time
3 Fatal
4 Non-Industrial

Lost Work Days:
Est.:
Actual:

Restricted Work Days:
Est.:
Actual:

Sex: M or F	Age:	Date Reported:	Accident Date:	Accident Time (Military):

Home Address: _____
Street
_____ Phone: ( )
City State Zip

Company Name:

Department:

Work Phone: ( )

Regular Job Title: Supervisor:

Time on Job: Years: Months

Time Employed: Years: Months:

Experience: Years: Months:

Witnesses to Incident:

1. Name: _____ Company: _____
   Address: _____
   Home Phone: ( ) _____ Work Phone: ( ) _____

2. Name: _____ Company: _____
   Address: _____
   Home Phone: ( ) _____ Work Phone: ( ) _____

If Hospitalized:

Name of Hospital: _____ Phone: ( ) _____
Address: _____
Street City State Zip

Physician's Name: _____ Phone: ( ) _____
Address: _____
Street City State Zip

Property Damage (describe property damaged and dollar estimate of damage):

_____
_____
_____
_____

ACCIDENT/INCIDENT REPORT (cont.)

Narrative Report of Accident/Incident (include date, time, location, etc.):

Causative Factors of Accident/Incident (i.e., training, carelessness, faulty equipment, weather conditions, etc.):

Use Space Below to Map Location of Accident/Incident (include landmarks such as well number, borehole number, cross street names, section number, etc.):

ACCIDENT/INCIDENT REPORT (cont.)

Additional Information:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Report Prepared By: _____ **Date:** _____

Signature

Accident/Incident Investigation Participants:

1. **Name:** _____ **Date:** _____

   Print Signature

2. **Name:** _____ **Date:** _____

   Print Signature

3. **Name:** _____ **Date:** _____

   Print Signature

Incident Analysis (circle one from each category):

Worker Class
1 technician
2 assistant
3 associate
4 engineer
5 other

Craft
01 administration
02 driller
03 laborer
04 electrician
05 engineer
06 technician
07 welder
08 geologist/hydrogeologist
09 health and safety
10 biologist
11 meteorologist
12 air quality
13 QA/QC
14 other

Work Phase
01 excavation
02 construction
03 general labor
04 mechanical
05 office
06 warehouse
07 welding
08 drilling
09 sampling (specify)
_____
_____
10 other

Employment Period
01 1 week or less
02 2–4 weeks
03 1–2 months
04 2–6 months
05 6–12 months
06 1–2 years
07 2–5 years
08 5–10 years
09 over 10 years
10 unknown

Approximate Age
01 under 20
02 20–30
03 31–40
04 41–50
05 51–60
06 over 61
07 unknown

Time of Accident
01 0801–1000
02 1001–1200
03 1201–1400
04 1401–1600
05 1601–1800
06 1801–2000
07 2001–2200
08 2201–2400
09 0001–0200
10 0201–0400
11 0401–0600
12 0601–0800

Injury Type
01 amputation
02 strain/sprain
03 crush/mash/smash
04 fracture
05 cut/puncture/laceration
06 burn
07 contusion/abrasions
08 foreign body/eye injury
09 faint/dizziness
10 bruises
11 blisters
12 hearing loss
13 none—refer to illness code
14 other

Body Part
01 head/face
02 eye
03 ear
04 neck/shoulders
05 arm/elbow
06 wrist/hand
07 thumb/finger
08 back
09 chest/lower trunk
10 ribs
11 hip
12 leg/knee
13 foot/ankle
14 toe
15 hernia/rupture
16 heart attack
17 internal
18 death
19 other

Injury Cause

Struck by Tool or Object
01 hand tool or machine in use
02 falling or flying objects
03 tipping, sliding, or rolling objects
04 object handled by others
05 moving parts of machine
06 object being lifted or handled
07 motor vehicle

Strain or Overexertion
10 lifting
11 using tool or machine
12 pushing or pulling
13 holding or carrying
14 reaching

Cut, Puncture, Scrape Injury by
15 hand tool/not powered
16 powered hand tool/ appliance
17 object being lifted/handled
18 broken glass

Fall or Slip
21 on same level
22 from different level
23 slipped, but not fall

Striking Against
31 object being handled
32 stepping on sharp objects
33 stationary object
34 moving parts of machine
35 moving object

Motor Vehicle Injuries
41 collision with another vehicle
42 collision with a fixed object
43 vehicle upset

Caught On, In, or Between
51 machine or machine parts
52 mechanical apparatus
53 object handled/other object

Burn or Heat–Cold Exposure
61 steam or hot fluids
62 welding operatios
63 fire or flame
64 contact with hot object
65 acids–chemicals
66 heat exhaustion
67 heat stroke
68 hyperthermia
69 frostbite

Miscellaneous Causes
71 contact with electrical current
72 suffocation
73 explosion or flashback
74 by animal or insect
75 foreign body in eye
76 miscellaneous describe

Illness
91 skin disease
92 respiratory disease
93 accidental poisoning
94 systemic effects
95 disorders due to physical agents
96 repetitive trauma disorders
97 other describe

ACCIDENT/INCIDENT REPORT FOLLOW-UP

Date: _____

Name of Involved Employee:

_____
First Middle Last

Date of Accident/Incident: _____ **Project:** _____

Actions Taken to Prevent Recurrence:

_____

_____

_____

_____

_____

Outcome of Incident:

_____

_____

_____

_____

_____

_____

_____

Physician's Recommendations (attach return-to-work form if available):

_____

_____

_____

_____

Follow-up Report Prepared By:

_____ _____
Print Clearly Signature

Attach any additional information to this form.

EBASCO ENVIRONMENTAL	SUPERVISED FIELD EXPERIENCE

_____
(Name)

_____
(Payroll Number)

The above named individual received a minimum of three days Hazardous Waste Site field experience as listed below.

HAZARDOUS WASTE SITE EXPERIENCE

Location(s), Date(s), and Hour(s) experience received:	Data from:

Field experience validated by: _____ _____
(Sign/Print Name) *(Date)*

_____
(Title of Validator)

Manager: _____ _____
(Sign/Print Name) *(Date)*

_____
(Title of Manager)

Report No. ___

ENSERCH ENVIRONMENTAL
HEALTH AND SAFETY WEEKLY REPORT

SITE INFORMATION:	INJURIES AND ILLNESSES:
SITE: _____	FIRST AID INJURIES: _____
PROJECT TITLE/TASK: _____	OSHA RECORDABLE: _____
WEEK ENDING: _____	LOST TIME: _____
HOURS WORK ON SITE: _____	LOST WORK DAYS: _____
MANUAL: ____ NONMANUAL: ____	If injuries or illnesses occur, attach investigation report.

ACTIVITIES CONDUCTED AT SITE THIS WEEK:

_____
_____
_____

SIGNIFICANT EVENTS OCCURRING AT SITE THIS WEEK (This section should include anything worth noting that occurred on the site.)

_____
_____
_____
_____

REGULATORY INSPECTIONS THIS WEEK: YES NO

If yes, attach agency, date, reason for inspection and findings.

OUTSTANDING AUDIT/INSPECTION FINDINGS: YES NO

If yes, attach status/update and estiamted completion date.

FIRST AID CASES:

DATE	PERSON	DESCRIPTION OF INJURY/ILLNESS	TREATMENT/ OUTCOME

SITE SAFETY BRIEFING FORM

SITE: _____ DATE: _____

LOCATION: _____

TASK: _____

TIME: _____

HEALTH & SAFETY
OFFICER: _____

BRIEFING: _____

TOPICS

- SITE HASP
- CHEMICAL HAZARDS
- EQUIPMENT HAZARDS
- ELECTRICAL HAZARDS
- HEAT STRESS
- RADIATION HAZARDS
- PERSONAL DECONTAMINATION
- PERSONAL HYGIENE
- EMPLOYEE RIGHTS/RESPONSIBILITIES
- HAZARD EVALUATIONS
- EMERGENCY RESPONSE PROCEDURES
- EXPLOSIVE HAZARDS

PERSONS IN ATTENDANCE:
(Name/Organization)

_____
_____
_____
_____

PERSONS IN ATTENDANCE:
(Name/Organization)

_____
_____
_____
_____

NOTES/COMMENTS:

_____
_____
_____
_____
_____
_____
_____
_____

EBASCO ENVIRONMENTAL

RESPIRATORY FIT TEST RECORD

NAME: _____ SSN: _____

PAYROLL #: _____ DATE: _____

COMPANY: _____

PROJECT: _____

LOCATION: _____

_____

_____

RESPIRATOR INFORMATION

MANUFACTURER: _____ MODEL: _____

TYPE: _____ SIZE: _____

TESTS PERFORMED

POSITIVE/NEGATIVE PASS/FAIL	IRRITANT SMOKE PASS/FAIL	QUANTITATIVE PASS/FAIL PROTECTION FACTOR _____

COMFORT: ☐ VERY COMFORTABLE ☐ COMFORTABLE ☐ TOLERABLE ☐ UNCOMFORTABLE ☐ VERY UNCOMFORTABLE

COMMENTS: _____

_____

1. I UNDERSTAND WHY RESPIRATORY PROTECTION IS NEEDED AND WHERE AND WHEN IT SHOULD BE USED.
2. I KNOW HOW TO USE THIS RESPIRATOR PROPERLY.
3. I KNOW HOW TO CLEAN AND INSPECT THIS RESPIRATOR.
4. I UNDERSTAND THE LIMITATIONS AND RESTRICTIONS OF THE RESPIRATORS I WILL BE USING.
5. I WORE THIS RESPIRATOR EQUIPMENT IN NORMAL AIR AND CHECKED THE FACEPIECE FIT.
6. I WORE THIS RESPIRATORY EQUIPMENT IN A TEST ATMOSPHERE GENERATED BY SMOKE OR OTHER MEANS.
7. I UNDERSTAND THAT A GOOD GAS-TIGHT FACE SEAL CANNOT BE ACHIEVED WITH OBSTRUCTIONS SUCH AS FACIAL HAIR OR GLASSES (WITH FULLFACE MASK).

PERSON ADMINISTERING TEST: _____ TITLE: _____
Signature

ACKNOWLEDGEMENT OF FIT: _____ DATE: _____
Signature

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory civil penalties against employers of up to $7,000 for each serious violation and for optional penalties of up to $7,000 for each nonserious violation. Penalties of up to $7,000 per day may be proposed for failure to correct violations within the proposed time period and for each day the violation continues beyond the prescribed abatement date. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $70,000 for each such violation. A minimum penalty of $5,000 may be imposed for each willful violation. A violation of posting requirements can bring a penalty of up to $7,000.

There are also provisions for criminal penalties. Any willful violation resulting in the death of any employee, upon conviction, is punishable by a fine of up to $250,000 (or $500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment. Falsifying records, reports, or applications is punishable by a fine of $10,000 or up to six months in jail or both.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

Posting Instructions

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29, Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, GA	(404) 347-3573
Boston, MA	(617) 565-7164
Chicago, IL	(312) 353-2220
Dallas, TX	(214) 767-4731
Denver, CO	(303) 844-3061
Kansas City, MO	(816) 426-5861
New York, NY	(212) 337-2378
Philadelphia, PA	(215) 596-1201
San Francisco, CA	(415) 744-6670
Seattle, WA	(206) 442-5930

Lynn Martin

Lynn Martin, Secretary of Labor

Washington, DC
1992 (Reprinted)
OSHA 2203

U.S. Department of Labor

Occupational Safety and Health Administration

To report suspected fire hazards, imminent danger safety and health hazards in the workplace, or other job safety and health emergencies, such as toxic waste in the workplace, call OSHA's 24-hour hotline: 1-800-321-OSHA.

This information will be made available to sensory impaired individuals upon request. Voice phone: (202) 523-8615; TDD message referral phone: 1-800-326-2577

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ATTACHMENT C

UXO SUMMARY

PART ONE

DROPPED MUNITIONS

OBJECTIVES

To learn identification, operation, explosive fillers, hazards, related equipment, and the disposal procedures for dropped munitions.

INTRODUCTION

This text will provide a review of the older type bombs and a more detailed study of the newer type bombs being used in SEA. Most EOD technicians do not get involved in the build up of munitions and are not completely familiar with the installation, or removal of the bomb fins, or the set screws that physically lock items in place.

This text will also provide a review of the operation of arming lanyards and associated components for bombs equipped with internal conduits. The review will be helpful to those who have not been working with conventional weapons the last few years. This text will be used in conjunction with classroom discussion.

GP BOMBS

1-1. Type: Old Series Bombs (reference figures 2-1, 2-2, and 2-3)

1-2. Identification:

a. Sizes: 100- to 2000-pounds

b. Markings: In yellow or black. The number of yellow bands on the nose and tail indicate the explosive filler.

c. Lugs and Fins: 14- and 30-inch suspension. These bombs may use box or conical fins.

1-3. Fillers: (50 percent weight ratio)

a. TNT

b. Tritonal

c. Amatol

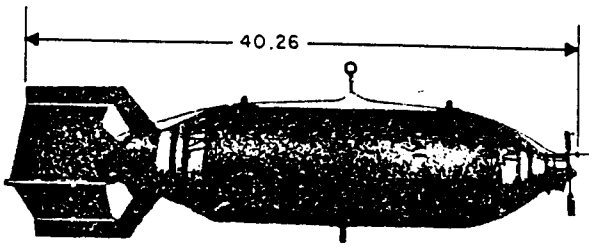
d. Comp B

1-4. Hazards: The smoke and fumes from burning TNT is highly toxic. Comp B and tritonal are more sensitive to drop.

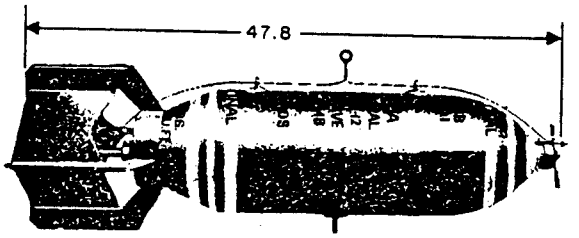
1-5. Related Equipment: (reference figure 2-3)

a. Fuzes (nose and/or tail)

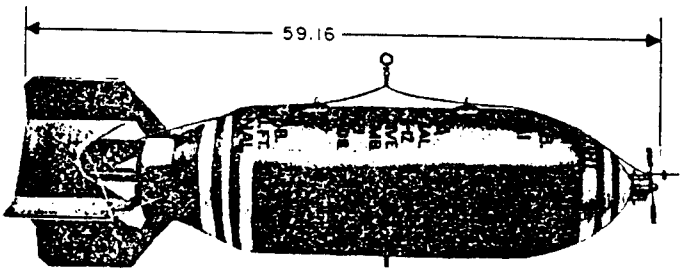
b. Fin assembly



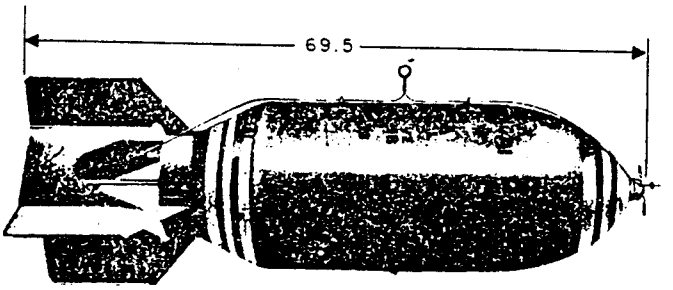
Bomb, GP, tritonal, 100-lb, AN-M30A1



Bomb, GP, tritonal, 250-lb, AN-M57A1



Bomb, GP, tritonal, 500-lb, AN-M64A1



Bomb, GP, tritonal, 1,000-lb, AN-M65A1

Figure 2-1. Bomb, General Purpose, Series

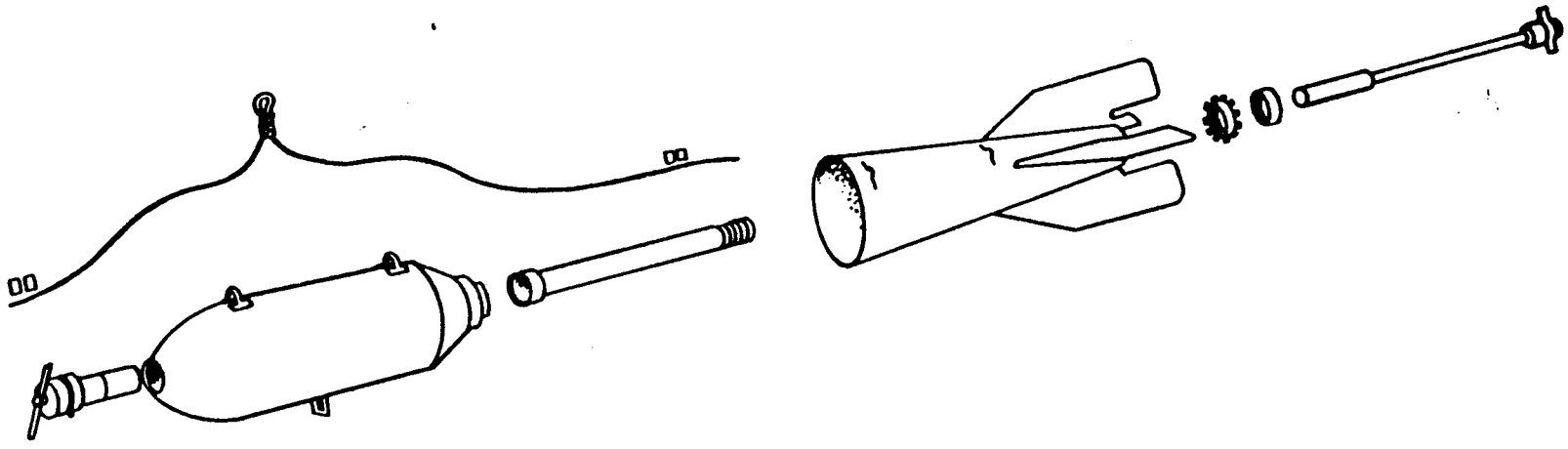


Figure 2-2. Bomb, General Purpose, w/Conical Fin

HORIZONTAL DANGEROUS RADIUS OF BOMB CASING FRAGMENTS

BOMB	MAXIMUM DANGER RADIUS OF FRAGMENTS FROM POINT OF DETONATION
100 lb GP	3000 feet
250 lb GP	3000 feet
500 lb GP	3000 feet
1000 lb GP	3000 feet
2000 lb GP	3000 feet

BLAST EFFECT ON PERSONNEL

BOMB	APPROXIMATE MAXIMUM EFFECTIVE DISTANCE ON PERSONNEL
100 lb GP	40 feet
250 lb GP	55 feet
500 lb GP	75 feet
1000 lb GP	90 feet
2000 lb GP	110 feet

FILLER	USE	COLOR CODE		
		BASE COLOR	COLOR & NO OF BANDS	MARKINGS
High Explosive	General Purpose	Olive Drab	3 Yellow/Tritonal 2 Yellow/Comp B 1 Yellow/Other HE	Black or Yellow
	Fragmentation		or 1, 3" Yellow/All HE	
Inert (w/ Spotting charges in most cases)	Practice	Blue (May also be black, metallic, or orange	None	White
Inert	Drill	OD	1 Black	Black
Leaflets	Leaflet	OD	1 Aluminum	Black

Figure 2-3. Classification of Aircraft Bombs

c. Adapter booster

d. Arming wire and fahnstock clips

1-6. Disposal: Detonate

DEMOLITION BOMBS

1-7. Type: New Series Bombs (reference figure 2-4)

1-8. Identification:

a. Sizes:

(1) 750-lb M 117

(2) 3000-lb M 118

b. Markings:

(1) OD bomb body

(2) Markings in yellow

(3) 1 wide yellow band (3 inch)

c. Lugs: 14- and 30-inch

d. Fins: Conical or retarded (MAU 91/B for M 117)

1-9. Fillers: Normally tritonal; minol can be used.

1-10. Hazards:

a. Tritonal is sensitive to drop.

b. Minol--do not trepan and steam.

1-11. Related Equipment:

a. Nose and tail plugs.

b. Arming wires/lanyards with fahnstock clips.

c. Charging well for special fuzing (electrical/mechanical).

d. Adapter boosters: T 45 and T 46 for older fuzes, M 59 and M 134 for the new type fuzes. The latter incorporates electrical detonators.

1-12. Disposal: Detonate

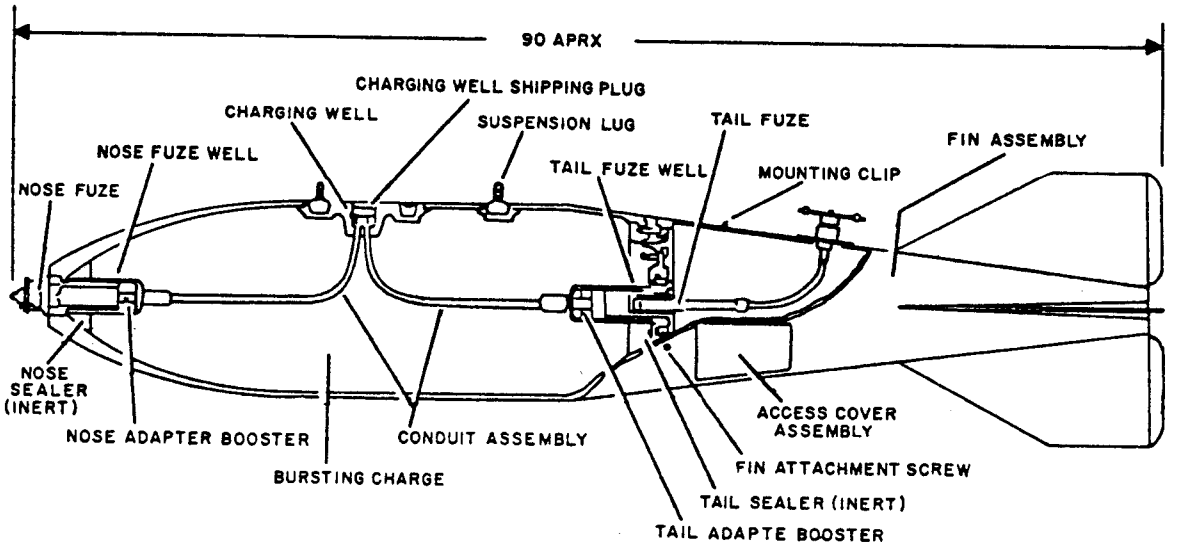


Figure 2-4. M117, 750-lb. GP Bomb w/Plumbing

GP BOMBS

1-13. Type: Low Drag Bombs (reference figures 2-5, 2-6, and 2-7)

1-14. Identification:

a. Sizes:

(1) 250-lb MK 81

(2) 500-lb MK 82

(3) 1000-lb MK 83

(4) 2000-lb MK 84

b. Markings:

(1) OD bomb body

(2) Yellow markings

(3) 1 wide yellow band (3 inch)

c. Lugs: 14- and 30-inch (screw-in type)

d. Fins: Conical and snakeye

1-15. Filler: Tritonal

1-16. Hazards: Tritonal is sensitive to drop (12 inches).

1-17. Related Equipment:

a. Nose plugs and tail plugs are used with some fuzing.

b. Internal conduit and charging wells.

c. Retaining screw-in nose.

d. Interchangeable adapter boosters, dependent on fuzing.

e. Arming wires/lanyard with fahnstock clips.

1-18. Disposal: Detonate

NOTE: Fuze Extenders: Fuze extenders may be used on all GP series bombs. These extenders contain either tetryl or Comp B. M 103 or M 904 can be used for fuzing.

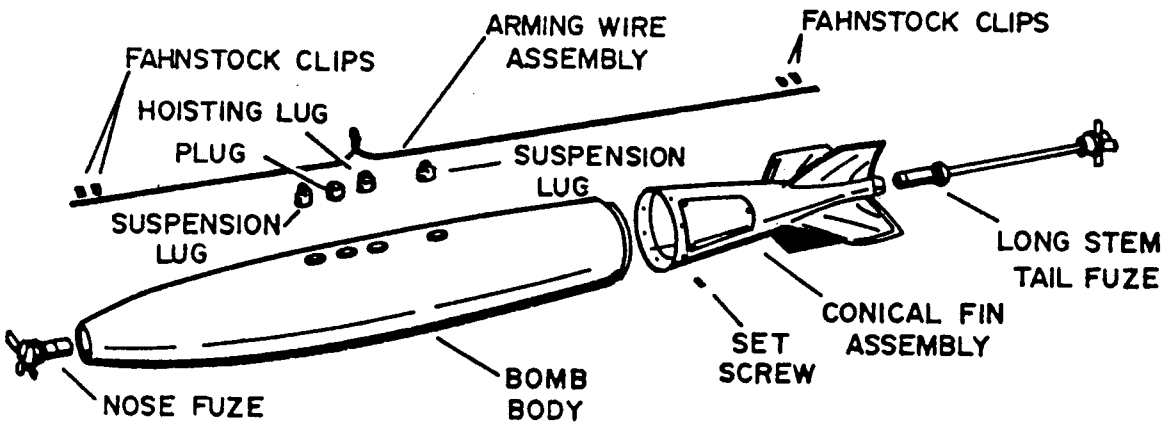


Figure 2-5. Bomb, General Purpose MK 82 Mod 1

AIR BURST FUZE

2-41. Type: M 914 (reference figures 2-34a and 2-34b)

2-42. Identification: This fuze is of the bar type, incorporating a transmitter and receiver. It is vane armed and proximity fired. Fuze designation and loading information is stenciled on the lower portion of the fuze body.

2-43. Hazardous Components:

a. Electric detonator.

b. Explosive lead-in.

c. Booster.

2-44. Function: When the arming wire is extracted, the vanes turn a generator supplying power to transmitter/receiver circuits and firing capacitor. An arming rotor is attached to the generator shaft and is aligned to the armed condition at Min SAT. When a material object enters the zone of influence of the fuze, a reflected radio wave causes the receiver to close a firing switch, discharging the capacitors through the detonator.

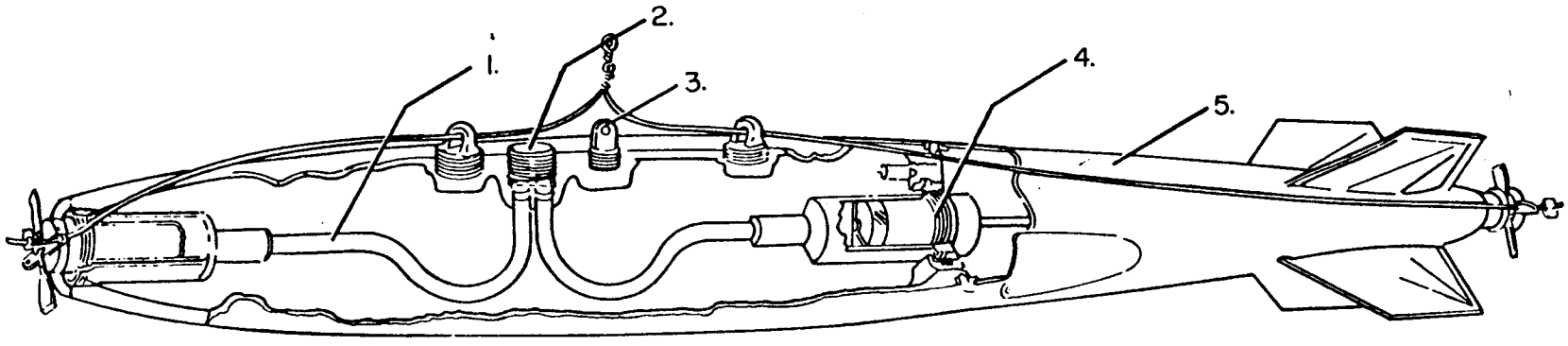
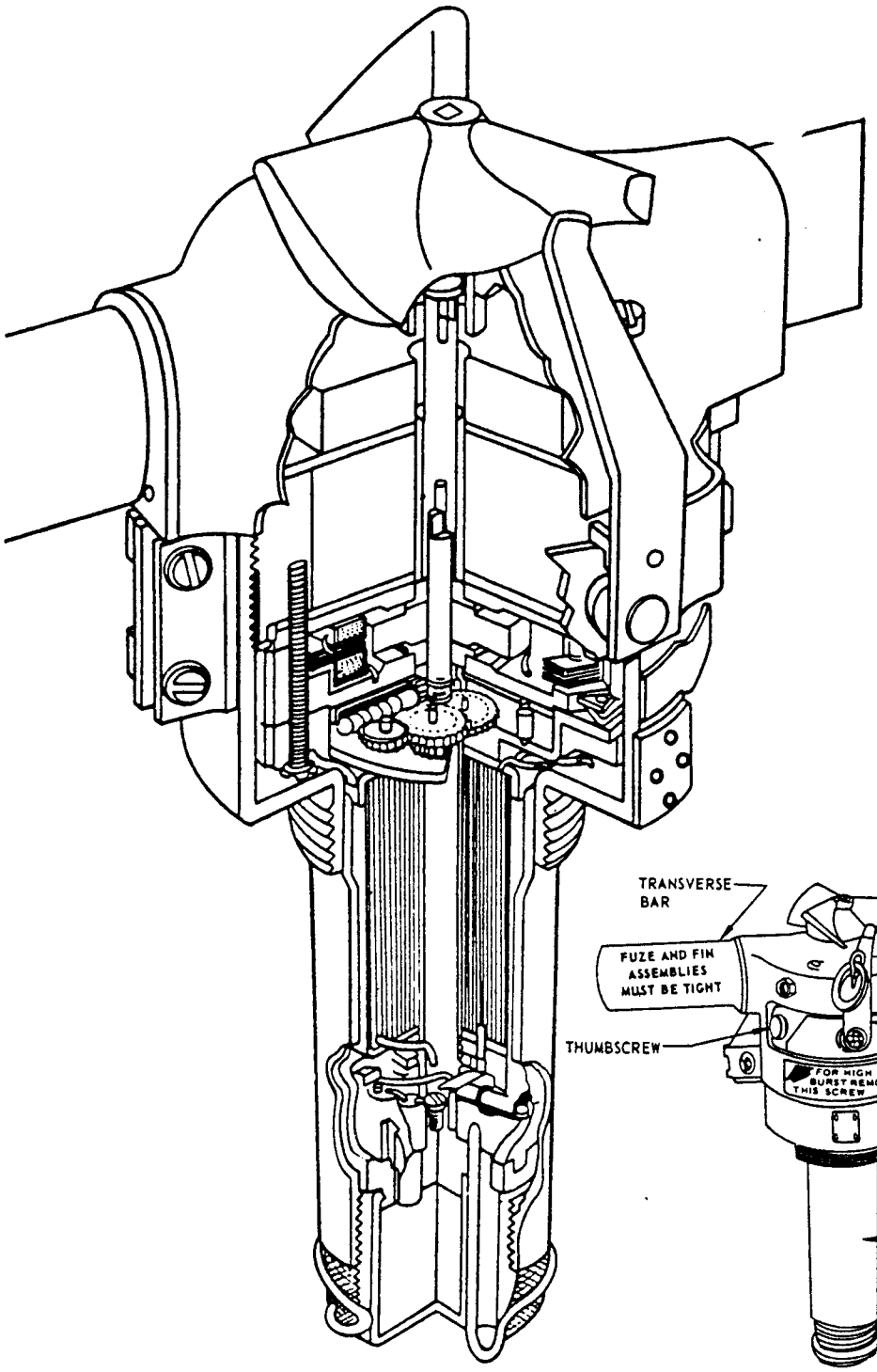


Figure 2-6. Bomb, General Purpose MK 81 Mod 1



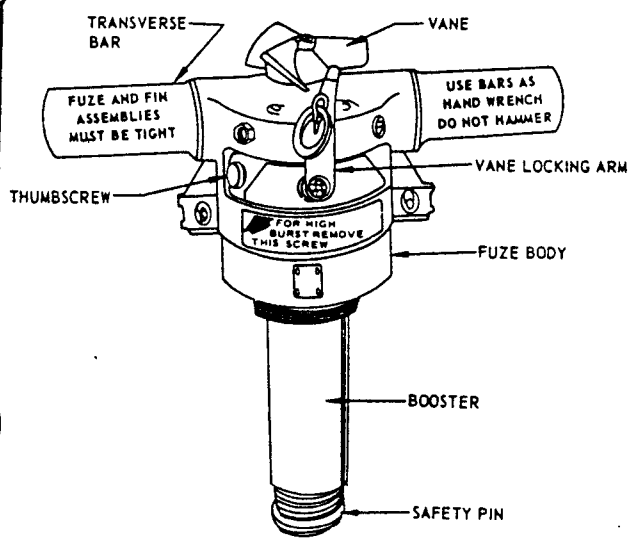


Figure 2-34A. Proximity Fuze M914 Cutaway

Figure 2-34B. Proximity Fuze M914