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RCRA FACILITY ASSESSMENT

PR/VSI REPORT

1988
RECEIVED
HAZARDOUS WASTE
PROGRAM

White Sands Missile Range
White Sands, New Mexico
EPA I.D. Number NM2790211235

Prepared for:

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RECEIVED
HAZARDOUS WASTE COMPLIANCE
TECHNICAL SECTION

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TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1-1
1.1	Purpose and Scope of the RFA Program	1-1
1.2	Contents of this Report	1-2
2.0	FACILITY DESCRIPTION	2-1
2.1	Location	2-1
2.2	Current and Historical Operations	2-3
2.3	Identification of Solid Waste Management Units	2-5
2.4	Summary of Wastes Handled	2-5
3.0	ENVIRONMENTAL SETTING	3-1
3.1	Climate and Meterology	3-1
3.2	Floodplain and Surface Water	3-1
3.3	Geology and Soils	3-2
3.4	Ground Water	3-6
3.5	Receptor Information	3-19
4.0	RELEASE PATHWAYS	4-1
4.1	Air Pathways	4-1
4.2	Surface Water Pathways	4-1
4.3	Soil Pathway	4-1
4.4	Ground Water	4-2
5.0	DESCRIPTIONS OF SOLID WASTE MANAGEMENT UNITS	5-1
5.1	SWMU No. 1 Floor Drain System	5-2
5.1.1	Information Summary	5-2
5.1.2	Release Potential	5-3
5.2	SWMU Nos. 2-6 Bleach and Fixer Collection Systems (5)	5-3
5.2.1	Information Summary	5-3
5.2.2	Release Potential	5-4
5.3	SWMU No. 7 Silver Recovery Unit Tailing Tank	5-5
5.3.1	Information Summary	5-5
5.3.2	Release Potential	5-6

TABLE OF CONTENTS (Cont.)

		Page
5.4	SWMU Nos. 8-9 Waste Oil Tank and Sump	5-6
5.4.1	Information Summary	5-6
5.4.2	Release Potential	5-8
5.5	SWMU No. 10 Vehicle Wash Pad and Drains	5-8
5.5.1	Information Summary	5-8
5.5.2	Release Potential	5-9
5.6	SWMU No. 11 Sump and Oil/Water Separator Pad	5-10
5.6.1	Information Summary	5-10
5.6.2	Release Potential	5-11
5.7	SWMU No. 12 Vehicle Wash Ramp and Drains	5-11
5.7.1	Information Summary	5-11
5.7.2	Release Potential	5-12
5.8	SWMU No. 13 Sump and Oil/Water Separator Ramp	5-13
5.8.1	Information Summary	5-13
5.8.2	Release Potential	5-14
5.9	SWMU Nos. 14-15 Used Battery Accumulation Areas (2)	5-14
5.9.1	Information Summary	5-14
5.9.2	Release Potential	5-15
5.10	SWMU No. 16 Heavy Equipment Wash Pad and Drain	5-16
5.10.1	Information Summary	5-16
5.10.2	Release Potential	5-17
5.11	SWMU No. 17 Waste Underground Injection Pipe	5-18
5.11.1	Information Summary	5-18
5.11.2	Release Potential	5-18
5.12	SWMU No. 18 Waste Accumulation Area	5-19
5.12.1	Information Summary	5-19
5.12.2	Release Potential	5-20
5.13	SWMU No. 19 Steam Wash Pad and Drains	5-20
5.13.1	Information Summary	5-20
5.13.2	Release Potential	5-21
5.14	SWMU No. 20 Oil/Water Separator	5-22
5.14.1	Information Summary	5-22
5.14.2	Release Potential	5-22

TABLE OF CONTENTS (Cont.)

	Page
5.15 SWMU No. 21 Old Firefighting Training Area	5-23
5.15.1 Information Summary	5-23
5.15.2 Release Potential	5-24
5.16 SWMU No. 22 Abandoned Pit	5-25
5.16.1 Information Summary	5-25
5.16.2 Release Potential	5-25
5.17 SWMU Nos. 23-24 Old Hazardous Waste Tanks (2)	5-27
5.17.1 Information Summary	5-27
5.17.2 Release Potential	5-28
5.18 SWMU No. 25 Waste Accumulation Area	5-29
5.18.1 Information Summary	5-29
5.18.2 Release Potential	5-30
5.19 SWMU No. 26 Vapor Recovery Unit	5-30
5.19.1 Information Summary	5-30
5.19.2 Release Potential	5-31
5.20 SWMU Nos. 27-30 Sanitary Treatment Systems (4)	5-32
5.20.1 Information Summary	5-32
5.20.2 Release Potential	5-33
5.21 SWMU Nos. 31-32 Chemical Waste Tanks (2)	5-34
5.21.1 Information Summary	5-34
5.21.2 Release Potential	5-35
5.22 SWMU Nos. 33-34 Fluorspar Tanks (2)	5-36
5.22.1 Information Summary	5-36
5.22.2 Release Potential	5-37
5.23 SWMU Nos. 35-36 Ethylene Glycol Tanks (2)	5-38
5.23.1 Information Summary	5-38
5.23.2 Release Potential	5-38
5.24 SWMU No. 37 Waste Oil Accumulation Area at Bldg. 26121	5-39
5.24.1 Information Summary	5-39
5.24.2 Release Potential	5-39
5.25 SWMU Nos. 38-39 Construction Landfills (2)	5-40
5.25.1 Information Summary	5-40
5.25.2 Release Potential	5-41

TABLE OF CONTENTS (Cont.)

	Page
5.26 SWMU No. 40 Waste Oil Accumulation Drum	5-42
5.26.1 Information Summary	5-42
5.26.2 Release Potential	5-42
5.27 SWMU Nos. 41-46 Oscura Detonation/Burn Field and Disposal Pits (6)	5-43
5.27.1 Information Summary	5-43
5.27.2 Release Potential	5-45
5.28 SWMU No. 47-49 North Oscura Landfills (3)	5-45
5.28.1 Information Summary	5-46
5.28.2 Release Potential	5-47
5.29 SWMU Nos. 50-54 Red Rio Munitions Disposal Areas (5)	5-47
5.29.1 Information Summary	5-47
5.29.2 Release Potential	5-48
5.30 SWMU No. 55 Burn Pan Hazardous Test Area	5-49
5.30.1 Information Summary	5-49
5.30.2 Release Potential	5-50
5.31 SWMU No. 56 Detonation Pit (HTA)	5-51
5.31.1 Information Summary	5-51
5.31.2 Release Potential	5-52
5.32 SWMU Nos. 57-60 Burial Areas (Tula Peak Pit) (4)	5-53
5.32.1 Information Summary	5-53
5.32.2 Release Potential	5-54
5.33 SWMU No. 61 Incinerator	5-55
5.33.1 Information Summary	5-55
5.33.2 Release Potential	5-55
5.34 SWMU No. 62 Former STP	5-56
5.34.1 Information Summary	5-56
5.34.2 Release Potential	5-57
5.35 SWMU Nos. 63 65 Former Sanitary Landfills on Post (3)	5-58
5.35.1 Information Summary	5-58
5.35.2 Release Potential	5-59
5.36 SWMU No. 66 Influent Sewer Line (STP)	5-61
5.36.1 Information Summary	5-61
5.36.2 Release Potential	5-61

TABLE OF CONTENTS (Cont.)

	Page
5.37 SWMU No. 67 Bar Screen/Grinder	5-62
5.37.1 Information Summary	5-62
5.37.2 Release Potential	5-62
5.38 SWMU Nos. 68-69 Primary Clarifiers (2)	5-63
5.38.1 Information Summary	5-63
5.38.2 Release Potential	5-63
5.39 SWMU No. 70 Grid Ditch/Spitter Box 1	5-64
5.39.1 Information Summary	5-64
5.39.2 Release Potential	5-65
5.40 SWMU Nos. 71-72 Trickling Filters (2)	5-66
5.40.1 Information Summary	5-66
5.40.2 Release Potential	5-66
5.41 SWMU No. 73 Splitter Box 2	5-67
5.41.1 Information Summary	5-67
5.41.2 Release Potential	5-67
5.42 SWMU Nos. 74-75 Secondary Clarifier (2)	5-68
5.42.1 Information Summary	5-68
5.42.2 Release Potential	5-69
5.43 SWMU No. 76 Splitter Box 3	5-69
5.43.1 Information Summary	5-69
5.43.2 Release Potential	5-70
5.44 SWMU No. 77 Primary Digester	5-70
5.44.1 Information Summary	5-70
5.44.2 Release Potential	5-71
5.45 SWMU No. 78 Secondary Digester	5-72
5.45.1 Information Summary	5-72
5.45.2 Release Potential	5-72
5.46 SWMU No. 79 Sludge Beds	5-73
5.46.1 Information Summary	5-73
5.46.2 Release Potential	5-74
5.47 SWMU No. 80 Waste Pile	5-74
5.47.1 Information Summary	5-74
5.47.2 Release Potential	5-75

TABLE OF CONTENTS (Cont.)

	Page
5.48 SWMU No. 81 Boiler	5-76
5.48.1 Information Summary	5-76
5.48.2 Release Potential	5-76
5.49 SWMU Nos. 82-83 Former Drainage Ditches (2)	5-77
5.49.1 Information Summary	5-77
5.49.2 Release Potential	5-78
5.50 SWMU No. 84 Effluent Pipeline	5-78
5.50.1 Information Summary	5-78
5.50.2 Release Potential	5-79
5.51 SWMU No. 85 Playa Lake	5-79
5.51.1 Information Summary	5-79
5.51.2 Release Potential	5-80
5.52 SWMU No. 86 Sanitary Landfill	5-81
5.52.1 Information Summary	5-81
5.52.2 Release Potential	5-82
5.53 SWMU No. 87 Construction Landfill	5-83
5.53.1 Information Summary	5-83
5.53.2 Release Potential	5-83
5.54 SWMU No. 88 Container Storage Building (S22895)	5-84
5.54.1 Information Summary	5-84
5.54.2 Release Potential	5-85
5.55 SWMU No. 89 Former Evaporation Tank (S22896)	5-86
5.55.1 Information Summary	5-86
5.55.2 Release Potential	5-87
5.56 SWMU No. 90 Evaporation Tank (HWSF)	5-88
5.56.1 Information Summary	5-88
5.56.2 Release Potential	5-89
5.57 SWMU No. 91 Hazardous Waste Landfill	5-90
5.57.1 Information Summary	5-90
5.57.2 Release Potential	5-91
5.58 SWMU Nos. 92-100 Evaporation/Neutralization Pits (9)	5-92
5.58.1 Information Summary	5-92
5.58.2 Release Potential	5-93

TABLE OF CONTENTS (Cont.)

	Page
5.59 SWMU No. 101 Acid Neutralization Pit	5-94
5.59.1 Information Summary	5-94
5.59.2 Release Potential	5-95
5.60 SWMU No. 102 Burn Pan	5-95
5.60.1 Information Summary	5-95
5.60.2 Release Potential	5-96
5.61 SWMU No. 103 Scrap Metal Yard	5-97
5.61.1 Information Summary	5-97
5.61.2 Release Potential	5-97
5.62 SWMU No. 104 Old Evaporation Pond (TTF)	5-98
5.62.1 Information Summary	5-98
5.62.2 Release Potential	5-100
5.63 SWMU No. 105 New Evaporation Tank (TTF)	5-101
5.63.1 Information Summary	5-101
5.63.2 Release Potential	5-102
5.64 SWMU No. 106 Discharge Pipe (TTF)	5-102
5.64.1 Information Summary	5-102
5.64.2 Release Potential	5-103
5.65 SWMU No. 107 Storage Tank (TTF)	5-103
5.65.1 Information Summary	5-103
5.65.2 Release Potential	5-104
5.66 SWMU No. 108 Gas Extraction Wells (TTF)	5-105
5.66.1 Information Summary	5-105
5.66.2 Release Potential	5-105
5.67 SWMU No. 109 Drum Storage Area/Splash Pad (TTF)	5-106
5.67.1 Information Summary	5-106
5.67.2 Release Potential	5-107
5.68 SWMU No. 110 MeCl Catchment System (TTF)	5-108
5.68.1 Information Summary	5-108
5.68.2 Release Potential	5-108
5.69 SWMU Nos. 111-112 Methylene Chloride Separation System (TTF) (2 tanks)	5-109
5.69.1 Information Summary	5-109
5.69.2 Release Potential	5-109

TABLE OF CONTENTS (Cont.)

	Page
5.70 SWMU No. 113 Salt Water Tanks (TTF)	5-110
5.70.1 Information Summary	5-110
5.70.2 Release Potential	5-111
5.71 SWMU No. 114 Rhodes Canyon Landfill (Active)	5-111
5.71.1 Information Summary	5-111
5.71.2 Release Potential	5-112
5.72 SWMU No. 115 Rhodes Canyon Landfill (Inactive)	5-113
5.72.1 Information Summary	5-113
5.72.2 Release Potential	5-114
5.73 SWMU Nos. 116-118 Rhodes Canyon Subgrade Storage Tanks	5-114
5.73.1 Information Summary	5-114
5.73.2 Release Potential	5-115
5.74 SWMU No. 119 Stallion Range Landfill (Active)	5-116
5.74.1 Information Summary	5-116
5.74.2 Release Potential	5-116
5.75 SWMU No. 120 Former Stallion Center Landfill	5-117
5.75.1 Information Summary	5-117
5.75.2 Release Potential	5-117
5.76 SWMU Nos. 121-123 Subgrade Tanks (Stallion Range) (3)	5-118
5.76.1 Information Summary	5-118
5.76.2 Release Potential	5-119
5.77 SWMU No. 124 Waste Oil Storage Tank (Stallion Range)	5-119
5.77.1 Information Summary	5-119
5.77.2 Release Potential	5-120
5.78 SWMU No. 125 Vet Clinic Incinerator	5-121
5.78.1 Information Summary	5-121
5.78.2 Release Potential	5-121
5.79 SWMU No. 126 McAffee Clinic Incinerator	5-122
5.79.1 Information Summary	5-122
5.79.2 Release Potential	5-123
5.80 SWMU No. 127 Autoclave (McAffee)	5-123
5.80.1 Information Summary	5-123
5.80.2 Release Potential	5-124

TABLE OF CONTENTS (Cont.)

		Page
5.81	SWMU No. 128 Silver Recovery System Tailings Tank	5-124
5.81.1	Information Summary	5-124
5.81.2	Release Potential	5-125
5.82	SWMU No. 129 Cyanide Treatment Unit	5-126
5.82.1	Information Summary	5-126
5.82.2	Release Potential	5-127
5.83	SWMU Nos. 130-131 Former Spent Developer Storage Tank/ Acetic Acid Spill Containment Tank	5-127
5.83.1	Information Summary	5-127
5.83.2	Release Potential	5-128
5.84	SWMU No. 132 Waste Stabilization Pond (Orogrande)	5-129
5.84.1	Information Summary	5-129
5.84.2	Release Potential	5-130
5.85	SWMU No. 133 NOMTS Machine Shop Accumulation Area	5-131
5.85.1	Information Summary	5-131
5.85.2	Release Potential	5-131
5.86	SWMU No. 134 NOMTS Outside Accumulation Area	5-132
5.86.1	Information Summary	5-132
5.86.2	Release Potential	5-133
5.87	SWMU No. 135 Paint Shop Accumulation Area	5-133
5.87.1	Information Summary	5-133
5.87.2	Release Potential	5-134
5.88	SWMU No. 136 Paint Shop Spray Booth	5-134
5.88.1	Information Summary	5-134
5.88.2	Release Potential	5-135
5.89	SWMU No. 137 Paint Shop Sump	5-136
5.89.1	Information Summary	5-136
5.89.2	Release Potential	5-136
5.90	SWMU No. 138 Waste Accumulation Area at RATSCAT	5-137
5.90.1	Information Summary	5-137
5.90.2	Release Potential	5-138

TABLE OF CONTENTS (Cont.)

		Page
6.0	AREAS OF CONCERN	6-1
6.1	AOC A Sinks & Drain System	6-1
6.2	AOC B Battery Storage at N. Oscura	6-1
6.3	AOC C Areas Where Heavy Pesticides/Herbicides Were Used	6-1
6.4	AOC D Drum Storage Area at STP	6-2
6.5	AOC E Pesticide Storage Area	6-2
6.6	AOC F Methane Vent (Flare)	6-2
6.7	AOC G Brine (MeCl) Storage Tanks - TTF	6-3
6.8	AOC H-L MeCl Expansion Tanks - TTF (5)	6-3
6.9	AOC M Exploded/Unexploded Low Level Radioactive Ordnance	6-3
6.10	AOC N Process Spills at HELSTF	6-4
6.11	AOC O Miscellaneous Areas Identified from Aerial Photographs	6-5
6.12	AOC P Chemistry Lab Drains	6-6
6.13	AOC Q HELSTF Lab Drains	6-6
6.14	AOC R Strafing Areas-Oscura Range	6-7
6.15	AOC S Septic Tanks with Leach Fields	6-7
6.16	AOC T Collection Lines to STP	6-7
6.17	AOC U Miscellaneous Spills	6-8
6.18	AOC V HELSTF Pressure Recovery System	6-9
6.19	AOC W Rhodes Canyon Inactive Impoundment	6-9
6.20	AOC X Rhodes Canyon Satellite Storage Area	6-9
6.21	AOC Y Stormwater Drainage Ditches	6-9
6.22	AOC Z Abandoned Underground Storage Tank	6-10
7.0	CONCLUSIONS AND SUGGESTED ACTIONS	7-1
8.0	REFERENCES	8-1
APPENDIX A	VSI PHOTOGRAPH LOG AND TRIP SUMMARY	

LIST OF FIGURES

		Page
2.1	Official Road Map of White Sands Missile Range (Including Location of Solid Waste Management Unit and Areas of Concern)	2-2
3.1	Hydrologic Conditions at White Sands Missile Range.....	3-8
3.2	Location of Wells at White Sands Missile Range Post Headquarters and Adjacent Areas.....	3-9
3.3	Yearly Pumpage in the Post Headquarters Well Field, 1968-82, and Water Level Fluctuation in the Main Gate Well.....	3-16
3.4	Cross Section of Hydrologic Units at White Sands Missile Range	3-18

LIST OF TABLES

2.1	Solid Waste Management Units at the White Sands Missile Range.....	2-7
2.2	Example Pesticides, Insecticides, Herbicides Handled at White Sands Missile Range.....	2-11
3.1	Water Supply Well Locations, Well Depths and Depth to Ground Water.....	3-10
3.2	Depth to Water in Test and Observation Wells.....	3-11
3.3	Well record information, transmissivity estimates, and hydraulic conductivity estimates of water-bearing zones in basin fill deposits, Tularosa Basin.....	3-13
3.4	Major Chemical Constituent Analyses of Water from Selected Supply Wells, Post Headquarters Area, 1985.....	3-20

1.0 INTRODUCTION

This section of the PR/VSI report covers the purpose and scope of the RFA program. The contents of the other sections of this report also are described.

1.1 Purpose and Scope of the RFA Program

The 1984 Hazardous and Solid Waste Amendments (HSWA) provide new authority to EPA to require comprehensive corrective actions on Solid Waste Management Units (SWMUs) and other Areas of Concern (AOCs) at interim status hazardous waste management facilities, particularly those applying for RCRA permits. These corrective actions are intended to address unregulated releases of hazardous constituents to air, surface water, soil, and ground water, as well as the generation of subsurface gas.

One of the major segments of EPA's corrective action program consists of RCRA Facility Assessments (RFAs) to identify releases or potential releases requiring further investigation. According to EPA's RCRA Facility Assessment Guidance Document, the four purposes of an RFA are to:

1. Identify and gather information on releases at RCRA-regulated facilities;

2. Evaluate solid waste management units and other areas of concern for releases to all media and regulated units for releases other than ground water;

3. Make preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility; and

4. Screen from further investigation those SWMUs which do not pose a threat to human health and the environment.

The three basic steps of an RFA consist of a preliminary review (PR) of available information, a Visual Site Inspection (VSI) to obtain additional information on releases and a sampling visit, if necessary, to fill data gaps by obtaining field and analytical data.

1.2 Contents of this Report

This report presents the results of the PR and VSI of the White Sands Missile Range facility in White Sands, New Mexico. The principal sources of information used in conducting the PR included the facility's RCRA Part B permit application, Installation Assessment of White Sands Missile Range Report No. 138, Update of the Initial Installation Assessment of White Sands Missile Range, and various contractor reports prepared for White Sands Missile Range. These documents were obtained during a search of relevant files at the EPA Regional Office in Dallas as well as the New Mexico Health and Environmental Department in Santa Fe. File material encompassed RCRA, the Clean Water Act and the Clean Air Act.

The VSI was conducted May 16-20, 1988. The White Sands Missile Range representatives who were present included Robert Andreoli, Reina Gallegos, Fred Chavez, Lee Banicki, Tom Moore and Bill Mol. The A.T. Kearney representatives were Ann Anderson, Paul Letki, Patricia Shanley and Marianne Smith. Based on the size and diversity of the facility, a two-team approach to the VSI was undertaken.

Because of the large territory within the range, some areas were not inspected due to the unlikelihood of the presence of SWMUs. These areas included the White Sands National Monument and the San Andreas National Wildlife Refuge which are located within the boundaries of WSMR, but in which no wastes reportedly are managed.

Two extension areas associated with WSMR were not inspected also. These areas are located on the north and east boundaries of the range and consist of ranches. Residents living in the extension areas are evacuated periodically during missile testing to avoid injuries in case of misfires. No waste management activities are reported in the extension areas.

Section 2.0 of this report contains a description of the White Sands Missile Range facility, including its historical and current operations. Individual SWMUs are also identified in Section 2.0 along with a summary description of the wastes managed by the facility. Section 3.0 provides an overview of the environmental setting at the facility, comprising meteorology and air quality, floodplain and surface water, geology and soils, ground water, and receptor information. In Section 4.0, a broad assessment of release pathways is made, covering the potential for releases to soil, ground water, surface water, and air. Section 5.0 contains detailed discussions of each SWMU, while Section 6.0 covers other areas of concern (i.e., releases from production areas, spills, and evidence of contamination of unknown origin). Section 7.0 identifies suggested actions to be taken, the reasons for these actions and any supplemental information. Section 8.0 provides a list of references. The VSI photograph log and trip summary are presented as an appendix to the report.

2.0 FACILITY DESCRIPTION

2.1 Location

The White Sands Missile Range (WSMR) is a large military installation centrally located in the southern half of New Mexico. WSMR is approximately 99 miles (160 kilometers) from north to south and 25-40 miles (64 kilometers) east to west, covering approximately 3,500 square miles. The shape of WSMR is roughly rectangular with the most irregular boundary along the southwest side. WSMR occupies portions of the following five counties: Dona Ana, Socorro, Lincoln, Alamogordo, and Sierra. The Main Post Area is located in the southwestern portion of WSMR, 27 miles east-northeast of Las Cruces, New Mexico. El Paso, Texas is located 45 miles south of WSMR. Figure 2.1 is an official road map of the WSMR. The WSMR latitude is 32 degrees, 23 minutes and 45 seconds and the longtitude is 106 degrees, 19 minutes and 45 seconds.

There are two extension areas associated with WSMR. The extension areas are located on the north and east boundaries of the range. The north area is approximately 36 miles wide and 35 miles long. The western extension area is approximately 90 miles long and 15 miles wide. Residents living in the extension areas are evacuated periodically during missile testing when deemed necessary.

WSMR is bordered on the east by Holloman Air Force Base. Along the southern boundary of WSMR is the Fort Bliss Military Reservation.

Six parcels of land comprise WSMR. These land parcels are: 1) The Fort Bliss Transfer Area; 2) the Alamogordo Bombing Range; 3) the White Sands National Monument; 4) the San Andreas National Wildlife Refuge; 5) the Jornada Experimental Range; and 6) the Ordnance/California Institute of Technology Area. The Department of Defense has termed this land consolidation as "Integrated Range".

FIGURE 2.1

Official Road Map of White Sands Missile Range

All public lands in the Integrated Range were placed under the responsibility of the Department of the Army in May 1952. The Air Force transferred all its leases to the Army in 1963, but maintained its leases for the Holloman Air Force Base and the Holloman Supplemental Area. (Reference 109)

Land acquisition and maintenance by WSMR has been predominantly accomplished by exclusive leases with Federal, State, and private owners. An effort to acquire all land within WSMR was begun in 1969. By 1987, all land within WSMR was federally owned. The land was obtained largely through condemnation proceedings. (Reference 109)

2.2 Current and Historical Operations

WSMR is utilized as a national range designated for the support of missile development and test programs for the Army, Navy, Air Force, the National Aeronautics and Space Administration, and other government agencies. Thousands of missile firings, air drops, and static tests have been conducted as part of the mission of WSMR.

A number of private and federal offices and operations are tenants at WSMR. These tenants include:

1. U.S. Army Laboratory Command ASL
2. U.S. Army Laboratory Command VAL
3. U.S. Army Special Security Detachment
4. U.S. Army TMDE Support Center
5. U.S. Army TRADOC Analysis Center
6. U.S. Army Troop Support Command
7. Military Intelligence Command
8. Corps of Engineers
9. Naval Ordnance Missile Test Station
10. Office of the Test Director
11. Patriot Project Field Office, U.S. Army Missile Command
12. Roland Field Office, U.S. Army Missile Command

13. Stinger/MLRS Field Office
14. TECOM Management Engineering Office, Western Team
15. U.S. Army Armament, Munitions and Chemical Command
16. U.S. Army Criminal Investigation Command - Sixth Region
17. U.S. Army Dental Clinic
18. Defense Investigative Service
19. Defense Mapping Agency/DMAHTC
20. Deputy for Air Force, WSMR
21. DOD Area Frequency Coordinator
22. Ground-Based Electro-optical Deep-Space Surveillance Experimental Test Site
23. Ground Based Laser Project Office GEODSS
24. McAffee U.S. Army Health Clinic
25. MICOM Targets Management Systems Engineering Division
26. National Aeronautics & Space Administration
27. U.S. Army Information Systems Command

In order to make effective use of time during the VSI, these tenant offices and operations were prioritized based on the likelihood of solid and hazardous waste generation and management. The tenants identified as a high priority were inspected at the time of the VSI. A preliminary determination was made during the PR and VSI that most of the tenants do not handle hazardous substances, or probably were not associated with a SWMU/AOC. The preliminary determination was substantiated by contacting appropriate tenants by phone subsequent to the VSI. The individual tenant contacts were questioned to determine the type of operations, if hazardous substances were used, and if any solid waste was generated by that tenant.

The National Aeronautics & Space Administration (NASA) area was not included within the scope of this project at the request of the Region. Although a tenant of WSMR, NASA operates under a separate EPA ID NM8800019434 and an RFA has already been conducted at that facility.

2.3 Identification of Solid Waste Management Units

One hundred thirty-eight Solid Waste Management Units (SWMUs) and 26 Areas of Concern (AOCs) have been identified at the White Sands Missile Range as a result of the PR and VSI. A list of SWMUs and AOCs are presented in Table 2.1. This list also identifies the SWMUs which are RCRA-regulated. Table 2.2 identifies the location of SWMUs and AOCs on a facility map.

2.4 Summary of Wastes Handled

The wastes at the White Sands Missile Range are generated by the following operations:

1. Light industrial operations which include vehicle washing and maintenance, photoprocessing, facility maintenance, warehousing, various types of welding, soldering, painting, sheet metal work, carpentry, electronic assembly and maintenance, and machining of metals
2. Laboratory operations
3. Range photography lab
4. Material proof and surveillance test operations
5. Training areas

The types of wastes generated include:

1. Unexploded ordnance (UXO)
2. Low level radioactive waste
3. Petroleum, oil, lubricants, (POL) (i.e., JP-4)
4. Industrial wastewater
5. PCB wastes
6. Insecticides - See Table 2.2
7. Herbicides - See Table 2.2
8. Pesticides - See Table 2.2

9. Solvents (i.e., methylene chloride, xylene, toluene, acetone, Freon TF, isobutyl alcohol, 1,1,1-Trichloroethane)
10. Propellants (i.e., diesel fuel, ethylene glycol, inhibited red fuming nitric acid (IRFNA), monomethyl hydrazine (MMH), aniline, furfuryl alcohol, unsymmetrical dimethyl hydrazine (UDMH), monomethyl amine, isopropyl alcohol, ethyl alcohol, methyl benzyl alcohol, etc.)
11. Sewage wastewater
12. Facility refuse
13. Acids & bases (i.e., hydrofluoric acid, nitric acid, phosphoric acid, chromic acid, sodium hydroxide, etc.)

Table 2.1

Solid Waste Management Units
At the White Sands Missile Range
White Sands, New Mexico

SWMU No.	Unit Name	RCRA-Regulated[1]
Building 1621 - Visual Information:		
1.	Floor Drain System	No
2-6.	Bleach and Fixer Collection Systems (5)	No
7.	Silver Recovery Unit	No
Building 1794 Area - Vehicle Maintenance Shop:		
8-9.	Waste Oil Tank and Sump	No
10.	Vehicle Wash Pad and Drains	No
11.	Sump and Oil/Water Separator Pad	No
12.	Vehicle Wash Ramp and Drains	No
13.	Sump and Oil/Water Separator Ramp	No
14-15.	Used Battery Accumulation Areas (2)	No
Building 1736 Area:		
16.	Heavy Equipment Wash Pad and Drain	No
Building 1753 Area:		
17.	Waste Underground Injection Pipe	No
18.	Waste Accumulation Area	No
19.	Steam Wash Pad and Drains	No
20.	Oil/Water Separator	No
21.	Old Firefighting Training Area	No
22.	Abandoned Pit	No
High Energy Laser Test Facility (HELSTF):		
23-24.	Old Hazardous Waste Tanks (2)	No
25.	Waste Accumulation Area	No
26.	Vapor Recovery Unit	No
27-30.	Sanitary Treatment Systems (4)	No
31-32.	Chemical Waste Tanks (2)	Yes
33-34.	Fluorspar Tanks (2)	No
35-36.	Ethylene Glycol Tanks (2)	No
37.	Waste Oil Accumulation Area at Bldg. 26121	No
38-39.	Construction Landfills (2)	No
Oscura:		
40.	Waste Oil Accumulation Drum	No
41-46.	Detonation/Burn Field and Disposal Pits (6)	Yes
North Oscura		
47-49.	Landfills (3)	No
50-54.	Red Rio Munitions Disposal Areas (5)	Yes

[1] Included in a RCRA Interim Permit or Final Permit or Final Permit Application.

Table 2.1 (Cont.)

Solid Waste Management Units
At the White Sands Missile Range
White Sands, New Mexico

SWMU No.	Unit Name	RCRA-Regulated[1]
Hazardous Test Area:		
55.	Burn Pan	Yes
56.	Detonation Pit	Yes
Tula Peak:		
57-60.	Pit and Burial Areas (4)	No
61.	Incinerator	No
Post Area:		
62.	Former STP	No
63-65.	Former Sanitary Landfills on Post (3)	No
Sewage Treatment Plant (STP):		
66.	Influent Pipeline to STP	No
67.	Bar Screen/Grinder	No
68-69.	Primary Clarifiers (2)	No
70.	Grid Ditch/Spitter Box 1	No
71-72.	Trickling Filters (2)	No
73.	Splitter Box 2	No
74-75.	Secondary Clarifier (2)	No
76.	Splitter Box 3	No
77.	Primary Digester	No
78.	Secondary Digester	No
79.	Sludge Beds	No
80.	Waste Pile	No
81.	Boiler	No
82-83.	Former Drainage Ditches (2)	No
84.	Effluent Pipeline	No
85.	Playa Lake	No
86.	Sanitary Landfill	No
87.	Construction Landfill	No
Hazardous Waste Storage Facility (HWSF):		
88.	Container Storage Building (S22895)	Yes
89.	Former Evaporation Tank (S22896)	Yes
90.	Evaporation Tank (HWSF)	Yes
91.	Hazardous Waste Landfill	Yes
Petroleum/Oil/Lubricants (POL):		
92-100.	Evaporation Pits (9)	No
101.	Acid Neutralization Pit	Yes
102.	Burn Pan	Yes
103.	Scrap Metal Yard	No

[1] Included in a RCRA Interim Permit, Final Permit or Final Permit Application.

Table 2.1 (Cont.)

Solid Waste Management Units
At the White Sands Missile Range
White Sands, New Mexico

SWMU No.	Unit Name	RCRA-Regulated[1]
Temperature Test Facility (TTF):		
104.	Old Evaporation Pond (TTF)	Yes
105.	New Evaporation Tank (TTF)	Yes
106.	Discharge Pipe (TTF)	No
107.	Storage Tank (TTF)	No
108.	Gas Extraction Wells (TTF)	No
109.	Drum Storage Area/Splash Pad (TTF)	No
110.	MeCl Catchment System (TTF)	No
111-112.	Separation System (TTF) (2 tanks)	No
113.	Salt Water Waste Tanks (TTF)	No
Rhodes Canyon Range Center:		
114.	Rhodes Canyon Landfill (Active)	No
115.	Rhodes Canyon Landfill (Inactive)	No
116-118.	Rhodes Canyon Subgrade Storage Tanks (3)	No
Stallion Range Center:		
119.	Stallion Landfill (Active)	No
120.	Former Stallion Landfill	No
121-123.	Subgrade Tanks (Stallion) (3)	No
124.	Waste Oil Storage Tank (Stallion Range)	No
Other Post Area Units (except SWMU Nos. 132 and 138):		
125.	Vet Clinic Incinerator	No
126.	McAffee Clinic Incinerator	No
127.	Autoclave (McAffee)	No
128.	Silver Recovery System Tailings Tank	No
129.	Cyanide Treatment Unit	No
130-131.	Former Spent Developer Storage Tank/ Acetic Acid Spill Containment Tank	No
132.	Waste Stabilization Pond (Orogrande)	No
133.	NOMTS Machine Shop Accumulation Area	No
134.	NOMTS Outside Accumulation Area	No
135.	Paint Shop Accumulation Area	No
136.	Paint Shop Spray Booth	No
137.	Paint Shop Sump	No
138.	Waste Accumulation Area at RATSCAT	No

[1] Included in a RCRA Interim Permit, Final Permit or Final Permit Application.

Table 2.1 (Cont.)

Solid Waste Management Units
At the White Sands Missile Range
White Sands, New Mexico

AOC No.	Area of Concern
A.	Sinks and Drain System - Bldg. 1621
B.	Battery Storage at N. Oscura
C.	Areas where heavy pesticides/herbicides were used
D.	Drum Storage Area at STP
E.	Pesticide Storage Area
F.	Methane Vent (Flare)
G.	Brine (MeCl) Storage Tanks - TTF
H-L.	MeCl Expansion Tanks - TTF (5)
M.	Exploded/Unexploded Low Level Radioactive Ordnances
N.	Process Spills at HELSTF
O.	Miscellaneous Areas Identified from Aerial Photographs
P.	Chemistry Lab Drains
Q.	HELSTF Lab Drains
R.	Strafing Areas - Oscura Range
S.	Septic Tanks with Leach Fields - miscellaneous
T.	Collection Lines to the STP
U.	Miscellaneous Spills
V.	HELSTF Pressure Recovery System
W.	Rhodes Canyon Inactive Impoundment
X.	Rhodes Canyon Satellite Storage Area
Y.	Stormwater Drainage Ditches
Z.	Abandoned Underground Storage Tanks

[1] Included in a RCRA Interim Permit, Final Permit or Final Permit Application.

Table 2.2

Example Pesticides, Insecticides and Herbicides
Handled at White Sands Missile Range

Aniline
Arsenous-ox
Antimony trichloride
Parathion
Phenylmecuric Acid
Lead Arsenate
DDT
Dieldrin
Chlordane
Diazinon
Di-syston
Kelthane
Malathion
Thiodad
Solution
2-4-D

Toxaphene
Orthovolk
Silvex
Indole Buteric Acid
Lindane
Sulphur Mercury
Metal Cyanide
Heptachlor
Chromic Acid
Dymid
Arsenic Trioxide
LOP-64
Grain/Panogen
Ferric Chloride

Arsenic Chromium
Solution
Mercury Salts
Organic Liquids
Solution

Source: Reference 16

3.0 ENVIRONMENTAL SETTING

3.1 Climate and Meteorology

The average annual precipitation at White Sands Missiles Range is about eight inches, with half of this occurring in the rainy season, from July to September. Precipitation varies widely from year to year and month to month. For example, at White Sands National Monument, the measured precipitation was 20.89 inches in 1941 and 2.80 inches in 1956. At the same location, monthly precipitation was 9.68 inches in September 1941 and none in September 1959. For a 24-hour period, the maximum rainfall was 5.31 inches on September 21 to 22, 1941. (Reference 6)

The average annual air temperature ranges from 62°F in the south to 54°F in the north. Summers are hot, with average highs of 95°F in July and August with frequent readings over 100°F. Winters are relatively mild, but nighttime temperatures often go below freezing and are even lower in the mountains. The lowest recorded temperature on the installation is 25°F.

The prevailing wind is from the west at an annual average wind speed of 6.1 miles per hour and is strongest in spring and lightest in fall. Strongest gusts have been measured at 82 miles per hour from the southwest. (Reference 6)

Potential evaporation, estimated from Class A pan measurements, averages 105 inches for the year. (Reference 6)

3.2 Flood Plain and Surface Water

WSMR, established on July 9, 1945, measures approximately 25-40 miles east-to-west and 99 miles north to south and comprises approximately 3,500 square miles. It represents the consolidation of six component parcels of land in the Tularosa Basin of central New Mexico. The parcels included are: (1) The Fort Bliss Transfer Area; (2) The Alamogordo

Bombing Range; (3) The White Sands National Monument; (4) The San Andres National Wildlife Refuge; (5) The Jornada Experimental Range; and (6) The Ordnance/California Institute of Technology Area. This land consolidation was known as the Department of Defense "Integrated Range". In 1959 the Army established the Range Extension Area as a co-use area for missile systems with a required trajectory over 160 kilometers. (Reference 16)

Much of the WSMR lands are under exclusive leases with federal, state and private owners. Since 1969 efforts have been made to acquire the State and private lands and to extinguish the grazing and mining rights through condemnation proceedings. (Reference 16)

The total relief of the area is approximately 5,000 feet. There are no surface waters or intermittent streams located in the immediate operational areas and the site is removed from the 100-year floodplain. Surface waters at WSMR are normally scarce due to low precipitation, high evaporation and the absorption characteristics of the soils. At the base of the mountains and sloping toward the basin are steep alluvial aprons. The surface drainage originating in the mountains flows across the alluvial fans and terminates in the lowest portion of the basin which is Lake Lucero. Although the local drainage courses are oriented toward the center of the basin, the overall drainage is to the south. (Reference 340)

3.3 Geology and Soils

3.3.1 Regional Geology

WSMR lies within the Mexican Highland Section of the Basin and Range Province which is characterized by a series of tilted fault blocks forming longitudinal, asymmetric ridges or mountains, and broad intervening basins (see Figure 2.1). The major portion of WSMR lies within the Tularosa Basin and the northwest portion lies within the Jornada del Muerto Basin. The basin is bounded on the west by the Organ

and San Andres Mountains which are separated by St. Augustine Pass. Approximately five miles further to the northeast are the Oscura Mountains which extend to the northern range boundary. The eastern limit of Tularosa Basin lies just outside WSMR proper and is formed from north-to-south by the Jicarille, Sierra Blanca and the Sacramento Mountains. (References 16, 340)

Rocks of Pennsylvania age overlie the granite and quartzite of the Precambrian basement complex in the northern third of the WSMR area and early Paleozoic rocks overlie the basement complex in the southern two thirds of the WSMR area. Rock of Permian age overlie the Pennsylvania rocks, possibly disconformably. Triassic strata lie, apparently conformably, on the Permian rocks. A thick sequence of Cretacesous rocks overlies Triassic rocks and generally is best exposed in the eastern and northwestern parts of the area. (Reference 339)

Tertiary and Quaternary sedimentary rocks were derived by weathering, principally from Paleozoic and Mesozoic rocks, and they generally have a chemical and mineralogic character similar to those of the rocks from which they were derived.

Rocks of Quaternary age are widespread through the area and are thickest in the Tularosa Basin and the Jornada del Muerto. These deposits consist mainly of silt, sand, and gravel weathered from the mountain masses surrounding the basins. Thus, deposits contain materials derived from rocks ranging in age from Precambrian through Tertiary. (Reference 339)

The maximum thickness of Quaternary alluvium ranges from about 150 feet under the Rio Grande flood plain to 500 feet or more in some parts of the Tularosa Basin and the Jornada del Muerto. (Reference 339)

3.3.2 Site Geology

WSMR Post Headquarters Area:

Numerous soil borings and monitoring wells were installed to evaluate the extent of chlorinated hydrocarbon contamination in the soil underlying the Temperature Test Facility (TTF) at WSMR (Reference 299). As a result of this investigation, nine alluvial units in the upper part of the unsaturated zone at the TTF facility were identified. In general, the units display a shallow dip toward the southeast; however, the contacts between units are sufficiently irregular that the units vary widely in thickness across the TTF site. (Reference 299)

Unit 1 consists of poorly sorted sandy gravel and gravelly sand up to about 20 feet in total thickness, unit two is a relatively thin but stratigraphically continuous sandy and silty clay unit two to four feet in thickness. It is underlain by approximately 30 to 40 feet of gravelly sands; generally, two distinct subunits are apparent in Unit 3, the upper one being cemented by calcium carbonate, and the lower one poorly indurated. Units 4 (sandy clay) and 5 (sandy silt clay) both contain root molds and calcic modules, and are generally similar except for a color difference, Unit 4 being moderate brown to pale yellowish brown, and Unit 5 greenish to grayish yellow or light olive gray. Units 4 and 5 are up to 20 feet in total thickness, and in general appear to restrict downward movement of water. (Reference 299) Unit 6 is a thin (two to seven feet) fine to medium sand, with interbedded, laterally discontinuous coarse grained lenses. It is underlain by a 14 to 26 foot thick silty clay of Unit 7 which may further impede downward water migration. The Unit 7, in turn, is underlain by a permeable sand layer designated as Unit 8 which is about eight feet thick. The Unit 9 underlies Unit 8 and was completely penetrated by only a few boreholes. (Reference 299)

Lithology in the saturated zone beneath the TTF is generally similar to that in the unsaturated zone, but has not been mapped in detail. RCRA

monitor wells at the site were completed in a fine sand containing some silt and clay, at about 200 feet beneath the land surface. The sand unit is underlain by 30 feet of silty to sandy clay unit. The thickness of the underlying clay unit and the nature of deeper alluvial material are unknown. It is likely that the sand unit thins eastward, as the lithologic log for test well T-27, about one mile east of the TTF, includes only ten feet of sandy silt from 210 to 220 feet depth, overlain and underlain by silty clay units. (Reference 299)

White Sands Test Facility-NASA Area:

Although the NASA test facility is not included in this PR/VSI report, its proximity to the WSMR (approximately 1.5 miles NW of the Post Area) provides important area-wide geologic and hydrologic information.

The soils in the area of NASA lagoons are part of the Nickel-Tencee soil association. The Nickel Series is a deep, well drained gravelly loam soil developed on gravelly alluvium sediments. The Tencee Series is a very gravelly loam with indurated caliche formed in calcareous gravelly loamy alluvial sediments on alluvial fans. (Reference 337) The subsurface characteristics of the soil in the NASA area are based on the logs of the eight RCRA groundwater monitoring wells located in the proximity of six lagoons in the 300, 400 and 600 areas. The top 90 to 150 feet of the soil consist of graded coarse sand, gravel, cobbles and boulders indicating high permeability. Within the sand and gravel layers, discontinuous well graded sand and gravel, clayey sand, and silty gravel were noted. The clayey sand and silty gravel will impede downward movement of water. The bedrock depth ranged approximately from 90 feet in the test hole NASA-10 to 150 feet in the Test Well NASA-7. Bedrock is reported to be limestone. (Reference 337)

Toxic Waste Disposal Area:

The soil at the Toxic Waste Disposal Area is classified as Dune land - Dona Ana complex (DU), which consists of active sand dunes, sandy loam,

and loamy fine sand (SP-SM or SM). The permeability of this soil is very rapid (6.3-20 inches per hour).

The nearest subsurface lithologic logs are from the Gregg test and production wells which are located approximately 6,750 feet northwest of the Toxic Waste Disposal Area. The driller's log for the Gregg production well shows predominantly sand and caliche in the 0 to 130 foot interval. From 130 to 220 feet depth, sand with some silt and trace clay and caliche were noted. An alternating layer of sand and clay was noted between 220 to 510 feet depths. From 510 feet to 1,010 feet (bottom of hole), clay is the primary material. (Reference 337)

Acid Neutralization Area:

The soil at the acid neutralization pit is Dune land - Dona Ana Complex (DU), which consists of active sand dunes, sandy loam, and loamy fine sand (SP-SM or SM). The permeability of this soil is reported to be in the range of 6.3 to 20 inches per hour. (Reference 337)

Test well T-14 is located about 5,500 feet north of the acid neutralization pit. Stratigraphic data from Test Well T-14 has been used to describe the subsurface material beneath the pit. Bolson deposits were noted to be alternating sand and clay through 0-360 feet. The presence of clay layers will impede vertical downward movement of water. The subsurface material at the pit is anticipated to be similar to Test Well T-14 although stratigraphic unit thicknesses may vary. (Reference 337)

3.4 Ground Water

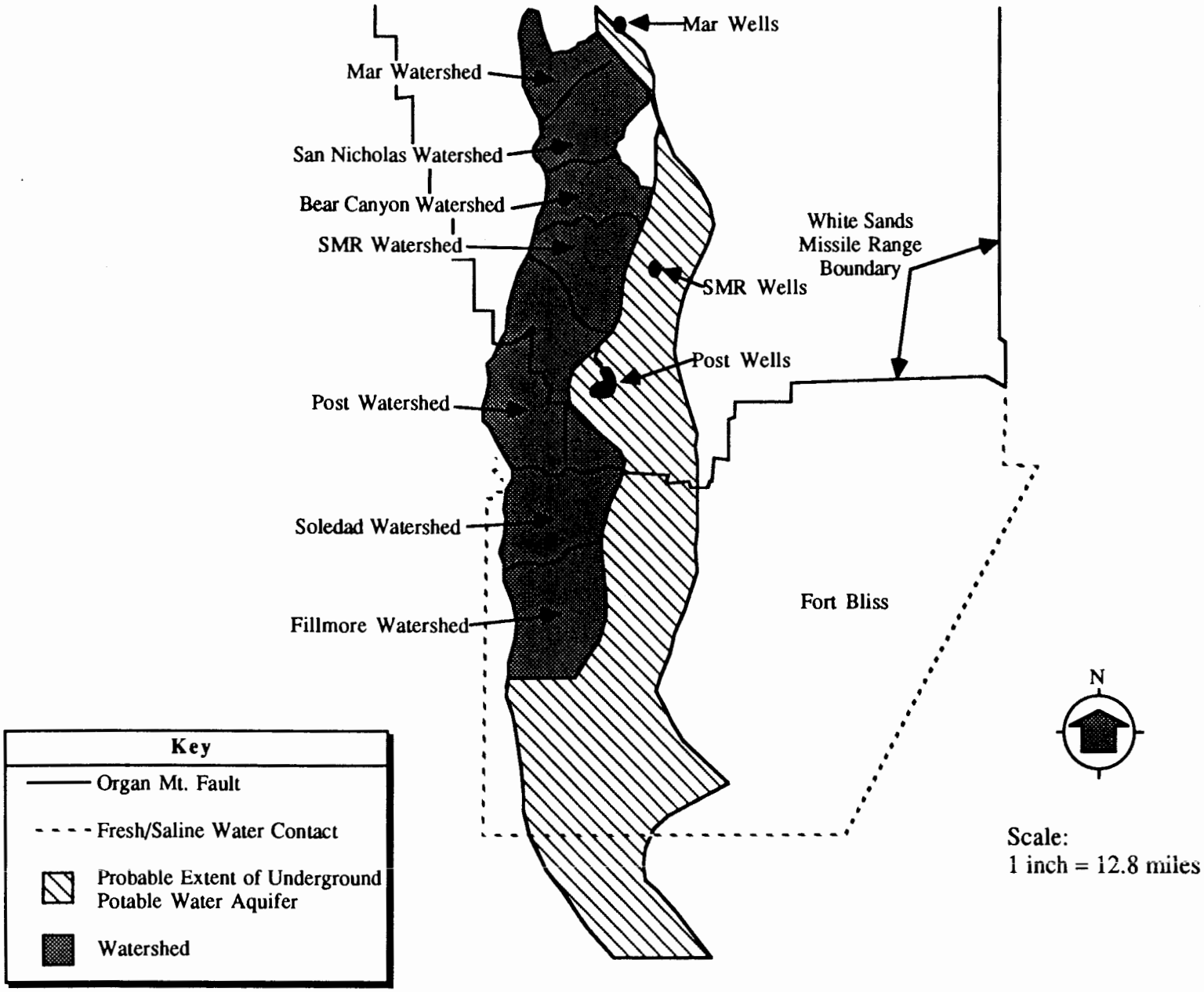
The source of potable water for WSMR is from ground water in the alluvial aprons. Due to the enormous size of the installation, each area has its own distribution system. The central portion of the Tularosa Basin, east of the Post Headquarters, contains saline water. Of particular significance to the ground water resources of the Main Post area is the

reentrant or indentation of a large alluvial apron into the Organ Mountains. Seemingly, this reentrant has entrapped a large quantity of fresh water along the mountain front. Hydrologic conditions at the WSMR site is shown in Figure 3.1 which indicates the location of wells and their corresponding watershed boundaries. (Reference 16) Location of water supply wells, test wells, observation wells and boreholes in the Post Headquarters and adjacent areas are shown in Figure 3.2. Well depths, depth to ground water and hydrogeologic characteristics of the aquifer are included in Tables 3.1 through 3.3.

Alluvial-fan deposits characteristically have large ranges in hydraulic conductivity both laterally and vertically because of the effect of variations in sorting and grain size. The capability of freshwater saturated alluvial-fan aquifers in the Tularosa Basin to transmit water varies from place to place as indicated by the large range of hydraulic conductivity (values from one to more than 300 feet per day). This large range primarily is controlled by the heterogeneous deposition of clay, silt, sand, and gravel typical of alluvial-fan deposits, and by the degree of sediment sorting. The sand percentage of alluvial-fan deposits penetrated by wells in the Tularosa Basin ranges from about 12 to more than 95 percent (Table 3.3). The transmissivity of a total saturated thickness of 500 feet of alluvial-fan deposits could range from about 70 $ft.^2$/day where a minimum percentage of sand occurs and where sand units are very fine grained, to more than 140,000 $ft.^2$/day where maximum percentages of coarse-grained sediments occur. (Reference 340)

Test wells T-15 through T-18 were drilled in the Soleded Canyon alluvial-fan deposits of WSMR and Fort Bliss to evaluate the freshwater-resource potential. Location of wells, total thickness of sand layers, transmissivity, and hydraulic conductivity for T-16 and T-17 wells are listed in Table 3.3. Total thickness of saturated permeable layers were 96 and 61 feet respectively. High hydraulic conductivity (50 to 60 feet/day) of soils indicate that contaminants, if present, can rapidly spread in the aquifer because of the withdrawal of water from the aquifer. (Reference 340)

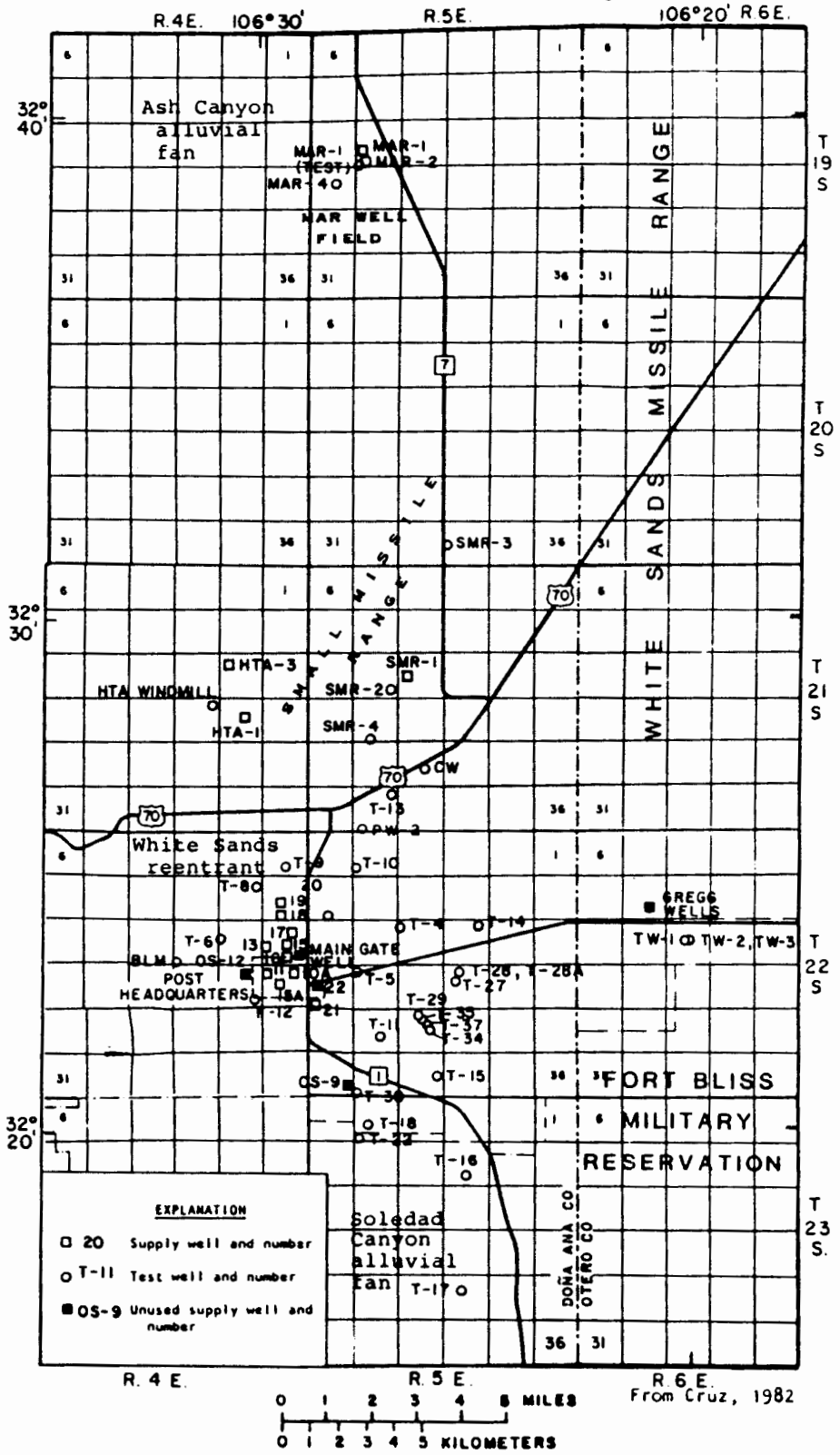
Figure 3.1 Hydrolic Conditions at White Sands Missile Range



Source: Reference 16

1614/05 st

Figure 3.2
Location of Wells at White Sands Missile Range Post Headquarters and Adjacent Areas



Source: Reference 340

1614/02 ck

Table 3.1

Water Supply Well Locations, Well Depths
and Depth to Ground Water

Well Name	Location No.	Ground Elevation (ft, MSL)	Well Depth (feet)	Depth to Ground water (feet)
10A	22S.4E.24.212a	4273	805	436.49
11	22S.4E.24.112	4333	500	365
13	22S.4E.13.311	4330	534	299.61
15	22S.4E.13.424	4261	820	433.97
16	22S.4E.13.432	4270	890	467.00
17	22S.4E.13.241	4260	900	469.75
18	22S.4E.12.434	4264	800	450.93
19	22S.4E.12.414	4294	800	460.96
20	22S.5E.19.414	4354	842	389.07
21	22S.5E.19.323	4207	700	360.19
22	22S.5E.19.414	4217	733	389.07
HTA-1	21S.4E.23.233	5018	250	64.07
SMR-1	21S.5E.16.132	4171	600	295.79
MAR-1	19S.5E.17.331	4132	550	223.29
MAR-2	19S.5E.17.334	4138	650	220.92
SRC-1	6S.3E.05.232	--	-	208.80
SRC-2	6S.3E.05.234	--	-	212.65

Source: Reference 341

Table 3.2

Depth to Water in Test and Observation Wells
White Sands Missile Range

Well Name	Location No.	Ground Elevation (ft, MSL)	Well Depth (feet)	Depth to Ground water (feet)
T-4	22S.5E.16.111	--	-	226.57
T-5	22S.5E.20.111	--	-	276.52
T-6	22S.4E.14.133	--	-	198.04
T-7	22S.5E.07.342	--	-	375.04
T-8	22S.4E.11.224	--	-	582.91
T-9	22S.4E.01.431	--	-	384.98
T-10	22S.5E.03.313	--	-	272.32
T-11	22S.5E.29.412	--	-	272.78
T-12	22S.5E.32.222	--	-	212.79
T-14	22S.5E.14.221	--	-	132.13
T-15	22S.5E.33.244	--	-	179.63
T-16	23S.5E.16.413	3980	927	184.94
T-17	23S.5E.27.142	4020	112	242.43
T-18	23S.5E.05.321	--	500	238.63
T-21	22S.5E.30.122	--	500	315
T-22	23S.5E.15.332	--	1,120	197
T-23	23S.5E.15.332	--	860	-
T-25	22S.4E.24.144	--	945	438
T-27	22S.05E 22.141	--	263	163
T-29	22S.5E.28.122	--	300	148
T-30	22S.5E.32.334	--	340	213
TW-1	22S.06E.16.233	4031.81	300	229

Table 3.2 (Cont.)

Depth to Water in Test and Observation Wells
White Sands Missile Range

Well Name	Location No.	Ground Elevation (ft, MSL)	Well Depth (feet)	Depth to Ground water (feet)
TW-2	22S.06E.16.234	4038.22	300	235.46
TW-3	22S.06E.16.234A	4037.19	300	232.42
OS-9	22S.5E.31.424	--	243.89	-
OS-12	22S.4E.23.214	--	232.74	-
Gregg	22S.6E.08.414	--	1,010	-
HTA	21S.4E.22.222	--	-	41.88
SMR-2	21S.5E.17.424	--	-	320.25
SMR-3	21S.5E.34.133	--	-	295.47
SMR-4	21S.5E.20.344	--	-	288.18
MAR-1	19S.5E.17.333	--	-	221.29
MAR-4	19S.5E.19.231	--	-	303.10
NW30	17S.4E.02.211	--	-	212.65
Murray	8S.5E.32.334	--	-	177.38
Luceno Ranch	19S.5E.22.334	--	-	153.52

Source: Adopted from References 342, 345

Table 3.3.--Well record information, transmissivity estimates, and hydraulic conductivity estimates of water-bearing zones in basin fill deposits, Tularosa Basin

Well Name	Location Number	Transmissivity (T) (feet squared per day)	Production Interval (feet)	Total Thickness (feet)	Percent Sand	Hydraulic Conductivity (K) (feet per day)
MAR-4	19.5.19.231	39,400	436-740	130	95	320
MAR SW-1	19.5.17.331	840-1,340	230-550	320	12	35
MAR SW-2	19.5.17.334	600-1,036	227-650	423	12	21
SMR-3	20.5.34.133	46,900	330-900	200	85	276
SMR-1	21.5.16.132	1,053	286-473	128	49	17
SMR-2	21.5.17.424	2,670	295-715	400	17	39
SMR-3	21.5.20.344	13,400	470-570	100	--	134#
T-13	21.5.32.222	804	285-702	110	91	8.0
T-8	22.4.11.224	160	574-1040	160	?	1.0
SW-20	22.4.12.214	79,000	462-838	376	--	210#
SW-19	22.4.12.414	10,700	400-800	400	45	59
SW-18	22.4.12.434	632	400-800	400	24	6.6
SW-17	22.4.13.241	4,020	436-886	300	--	13#
SW-13	22.4.13.311	670	3730534	84	--	8.0#
SW-14	22.4.13.411	1,070	370-810	250	48	8.9
SW-15	22.4.13.424	3,790	350-820	270	55	25
SW-16	22.4.13.432	4,420	370-886	340	68	19
SW-12	22.4.23.214	670	330-560	145	--	4.6#
T-12	22.4.23.444	182	1430-1810	190	82*	1.2

Table 3.3. (cont.)--Well record information, transmissivity estimates, and hydraulic conductivity estimates of water-bearing zones in basin fill deposits, Tularosa Basin

Well Name	Location Number	Transmissivity (T) (feet squared per day)	Production Interval (feet)	Total Thickness (feet)	Percent Sand	Hydraulic Conductivity (K) (feet per day)
SW-11	22.4.24.112	335	380-490	110	64	4.8
SW-10	22.4.24.212	8,170	264-494	230	--	36#
SW-10A	22.4.24.212a	15,300	405-805	400	32	120
Main Gate	22.4.24.222	2,360	388-438	50	--	47#
T-10	22.5.3.313	1,862	370-545	85	89	24
T-7	22.5.7.342	2,134	326-966	200	16	52
SW-22	22.5.19.414	4,560	459-725	276	12	84
SW-21	22.5.19.323	1,660	455-690	235	14	48
T-11	22.5.29.412	1,698	306-760	206	60	14
Gregg SW	22.6.8.414a	2,620	265-465	145	--	18#
T-16	23.5.10.413	4,790	310-700	100	96	50
T-17	23.5.27.142	2,380	440-544	66	61	60

Values of K calculated only for sand units within production interval, except values denoted by #, which represents K from the entire production interval.
(*) denotes percent sand from the upper part of the production interval only.
(e) indicates T estimated from specific capacity data.

Source: Adapted from Reference 340

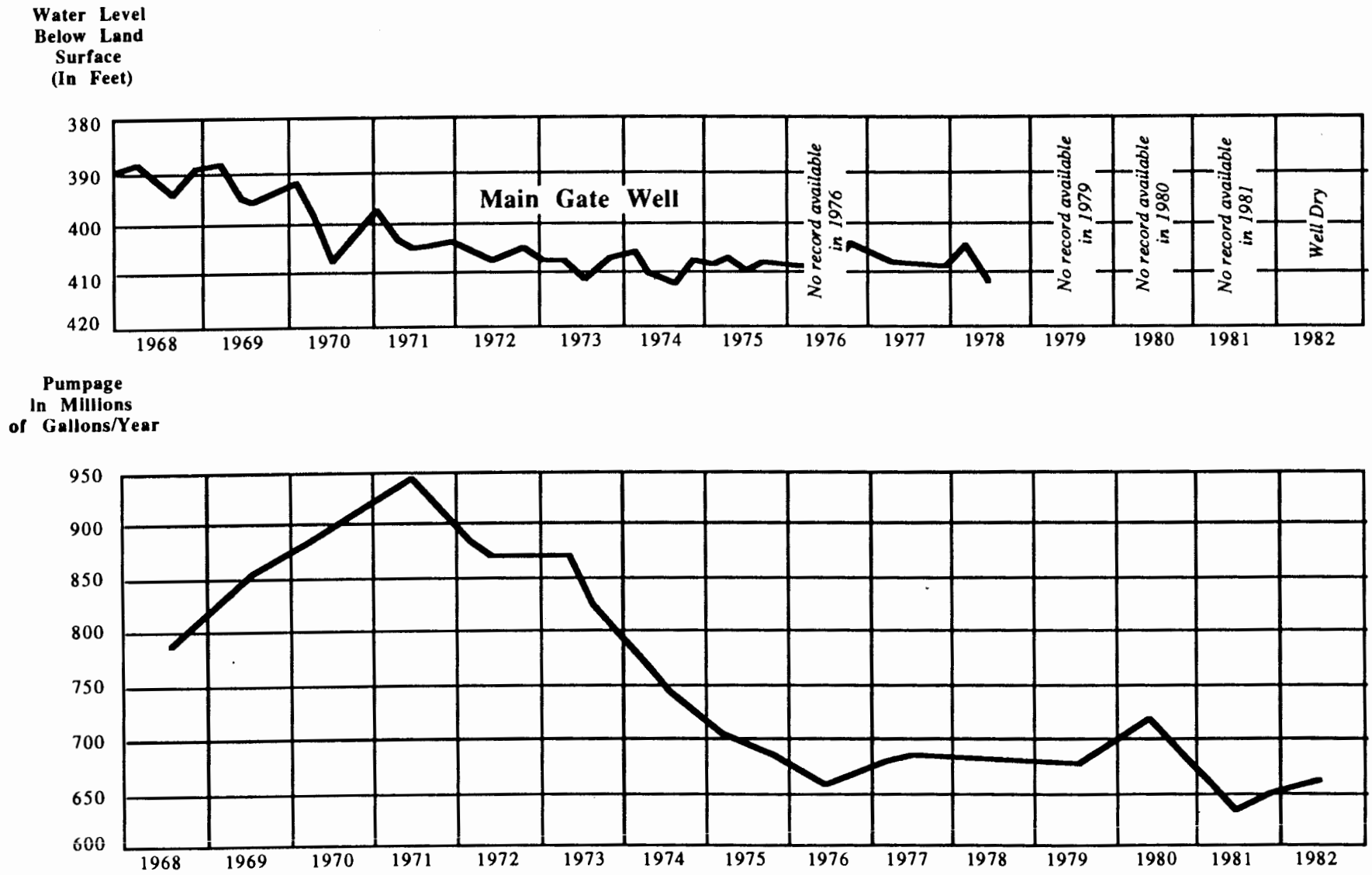
Fourteen wells (Refer to first 14 wells in Table 3.1) supply water for the WSMR Post Headquarters area. The hydrogeologic data for these wells are presented in Table 3.3. The average hydraulic conductivity of value for the sand units in these wells range from 12 feet/day in well T-12 to at least 210 feet/day in well 20. The range of hydraulic conductivity values in the Post Headquarters area indicates thick sand units may range in texture from fine to coarse sand. The large range in values of hydraulic conductivity probably can be attributed in part to the lateral heterogeneity of the lithology and grain size of the sediments comprising the alluvial deposits. (Reference 340)

Yearly pumpage of water from the supply wells and water level fluctuations in the Main Gate well are shown in Figure 3.3. Between 1968 and 1971, water pumpage increased from 793 million gallons to 939 million gallons followed with a rapid decline in pumpage to about 700 million gallons in 1982. The pumping of water between 1968 and 1982 has caused a drawdown of about 20 feet in the Main Gate well. The total drawdown caused by pumping of wells has been determined to be 75 feet between 1945 and 1982. (Reference 341) In general, regional ground water movement is toward the east-southeast. However, ground water flow direction may be altered locally because of pumping of water supply wells in the area. (Reference 299)

Small Missile Range (SMR) wells SMR-1 through SMR-4 were drilled in alluvial fan deposits north of the White Sands reentrant (Refer to Figure 3.3) to evaluate the freshwater supply for WSMR facility. The hydrogeologic characteristics of these wells are listed in Table 3.3. Aquifer test yielded to hydraulic conductivity values ranging from 17 feet/day in well SMR-1 to 276 feet/day in well SMR-3. These hydraulic conductivity values confirm a variation in the lateral and vertical distribution of alluvial fan deposits. These values, however, indicate that contaminants, if present in the aquifer, may spread rapidly.

Multifunction Army Radar (MAR) area lies about 11 miles north of the SMR wells (Refer to Figure 3.2). The hydrogeologic characteristics of the

Figure 3.3
Yearly Pumpage in the Post Headquarters Well Field, 1968-82, and Water Level Fluctuations in the Main Gate Well



Source: Reference 341

1614/04 ck

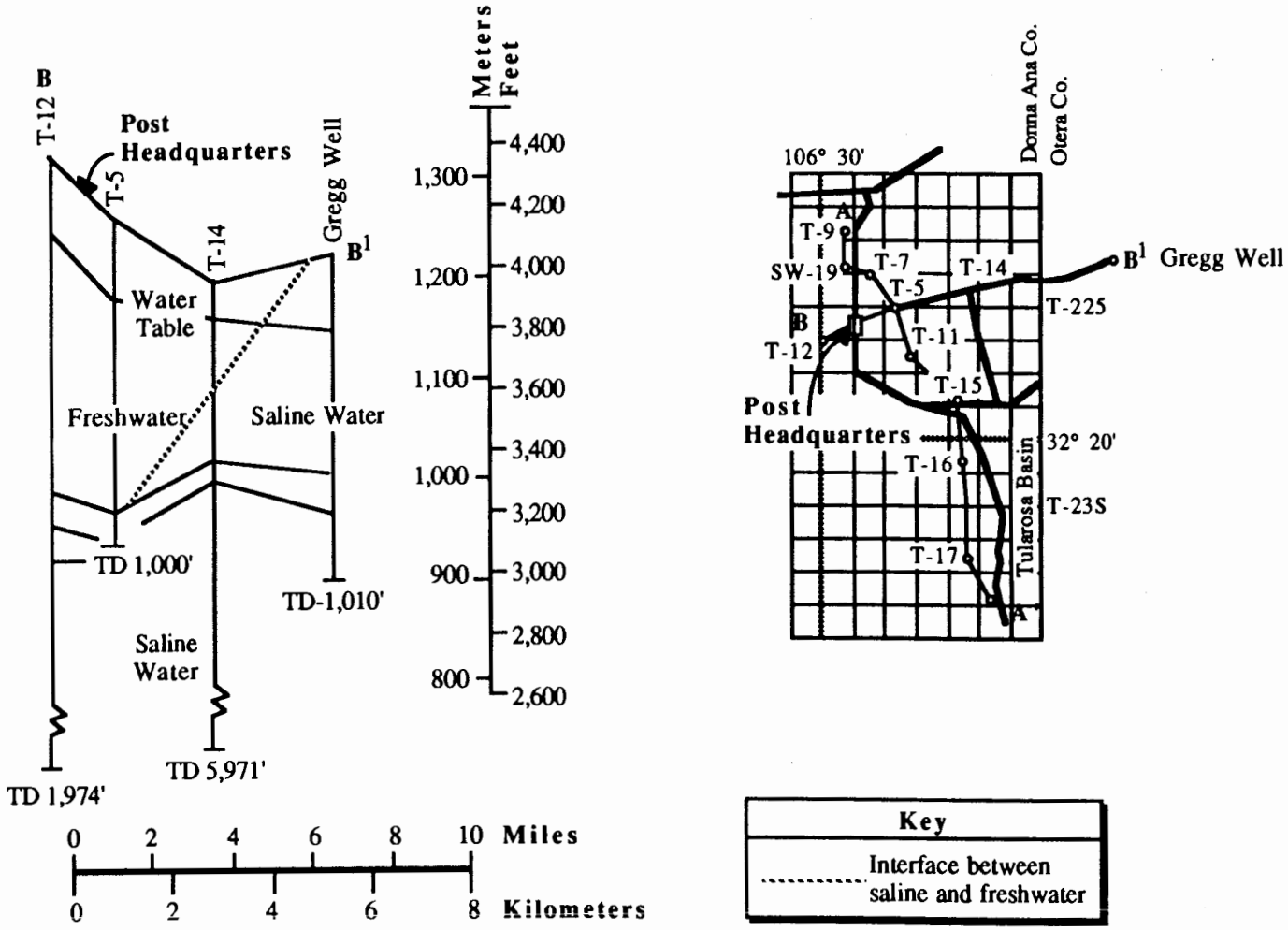
permeable alluvial fan deposits is listed in Table 3.3 to MAR SW-1 and SW-2 wells and MAR-4 test well. The hydraulic conductivity is estimated to range from 21 to 320 feet/day which is typical of alluvial fan deposits. (References 340).

Well NW-30 was drilled in alluvial fan deposits about 15 miles north of the MAR site well field. An aquifer test indicated that the average hydraulic conductivity of the water-bearing formation was 16 feet/day. (Reference 340)

Few wells have been drilled in the south-central part of the Tularosa Basin. Gregg Test Well and Gregg Supply Well and Test Well T-14 provide lithologic and water chemistry data. Numerous recent wells TW-1, TW-2, and TW-3, T-27, T-28 and T-29 also provide ground water data, which are listed in Table 3-1 through 3-3. Ground water was encountered at about the average 240 feet below the ground surface in Test Well TW-1 through TW-3. The average hydraulic conductivity of permeable sand units within the Gregg Site Supply well is over 18 feet/day, assuming that a percentage of the total thickness of the production zone consists of clay. (Reference 340) Because of the saline water in the south central part of the Tularosa Basin, the hydrogeologic character of the aquifer is not mapped in detail. Figure 3.4 shows the interface of between saline and fresh water. The water near the interface is slightly saline to very saline, and the remaining basin fill deposits, which compose most of the basin are saturated with brine containing dissolved solids greater than 35,000 mg/l.

Ground water in the vicinity of the WSMR Post Headquarters is moderately hard, but of good quality (Refer to Table 3.4). Water supply wells north and east of the Post Headquarters derive their water from the alluvial aquifer. Dissolved solids in ground water increase with distance eastward from the mountain front, reflecting the increased residence time of water moving from the mountain front toward the center of the Tularosa Basin. (Reference 299)

Figure 3.4
Cross Section of Hydrologic Units at White Sands Missile Range



Vertical Exaggeration x 50

Datum is Sea Level

Note: Distance is measured along section
Source: Reference 196

1614/03 ck

A ground-water monitoring evaluation at the NASA test facility, indicated nitrate contamination in the 300 to 400 areas of the site where rocket engine testing occurs. The 600 area that includes two evaporation ponds has shown elevated levels of selenium, coliform, and chromium. (Reference 104) Although these locations are not on the WSMR, they do indicate that ground water in the general area may be affected by site operations.

3.5 Receptor Information

The WSMR consists of parts of Otero, Lincoln, Dona Ana, Sierra, and Socorro Counties. No towns are within the area. Las Cruces, New Mexico, is approximately 26 miles west of the Post Headquarters Area and El Paso, Texas is 45 miles south.

The population at risk are those people who live and work on the WSMR site or live in the close proximity of the WSMR. Because population around the WSMR is negligible, the people living and working on the range site may be potentially affected. Water supply wells on site are used to meet the potable water needs. Since these wells are screened in a permeable alluvial fan aquifer, a potential for receiving water by ingestion by the receptors exists. It must be noted, however, that the potable water is about 200 feet below the ground surface and the contaminants must travel through the vadoze zone before they can spread in the uppermost aquifer.

There is sparse tree coverage, except on the upper mountain slopes. Low cover is found over most of the range area and is native to the desert. (Reference 16) The wildlife is typical for desert area. In addition to big horn sheep, several animal and plant species are especially adaptable to life in the gypsum dunes. The White Sands pupfish, unique to this area, is being considered for inclusion on the state endangered or threatened list. Two plants found on WSMR are on the Federal Endangered Species List. (Reference 16)

TABLE 3.4 MAJOR CHEMICAL CONSTITUENT ANALYSES OF WATER FROM SELECTED SUPPLY WELLS, POST HEADQUARTERS AREA, 1985

[u/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; deg C, degrees Celsius]

Well number	Location	Date of sample	Specific conductance lab (u/cm)	pH, lab (standard units)	Nitrogen, NO_2+NO_3 dissolved (mg/L as N)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium, dissolved (mg/L as Na)	Sodium-adsorption ratio	Percent sodium	Potassium, dissolved (mg/L as K)
SW-10A	22S.4E.24.212a	09-09-85	352	8.1	1.8	35	8.0	23	.9	29	1.9
SW-11	22S.4E.24.112	09-09-85	627	7.9	8.1	69	17	29	.8	20	2.7
SW-15A	22S.4E.24.144	09-09-85	359	8.2	.65	34	6.0	28	1	35	2.0
SW-16	22S.4E.13.432	09-09-85	458	8.2	4.1	48	11	26	.9	25	2.2
SW-19	22S.4E.12.414	09-09-85	378	8.2	1.3	41	8.0	23	.9	27	2.0
SW-22	22S.5E.19.141	09-09-85	362	8.2	.85	34	5.1	33	1	40	1.9

Well number	Date of sample	Chloride, dissolved (mg/L as Cl)	Sulfate, dissolved (mg/L as SO_4)	Fluoride, dissolved (mg/L as F)	Silica, dis solved (mg/L as SiO_2)	Solids, sum of constituents dissolved (mg/L)	Solids, residue at 180 deg C, dissolved (mg/L)	Hardness (mg/L solved $CaCO_3$)	Hardness, noncarbonate (mg/L as $CaCO_3$)	Alkalinity, lab (mg/L as $CaCO_3$)
SW-10A	09-09-85	19	49	.30	44	230	235	120	35	86
SW-11	09-09-85	24	120	.40	44	480	425	240	119	124
SW-15A	09-09-85	8.5	42	.40	36	220	233	110	12	98
SW-16	09-09-85	27	56	.30	42	270	299	170	67	98
SW-19	09-09-85	11	34	.10	41	230	251	140	18	118
SW-22	09-09-85	11	52	.40	33	230	237	110	4	102

Source: Reference 299

4.0 RELEASE PATHWAYS

This section provides an overview of the potential for release of hazardous constituents to the various environmental media. This potential is based on the combination of waste characteristics, facility characteristics, and environmental setting.

4.1 Air Pathway

WSMR uses few volatile organic substances both in number, quantity and frequency. Small quantities of volatile organics are released during waste evaporation treatment. Release of particulates from site operations is minimal. Unknown quantities of releases to the air do occur during open detonation and open burning of unexploded and exploded ordnances. Therefore, a moderate potential for direct contaminant releases to the air currently exists.

4.2 Surface Water Pathways

WSMR has no continuous running surface water near site operations. The storm water drainage system may act as a pathway during severe precipitation events. The stormwater drainage system provides a moderate potential pathway for contaminants to enter the environment if located near the surface discharge zones of treated wastes and those land based units which have no release controls.

4.3 Soil Pathways

The highly permeable soils may act as a pathway for releases from the units mentioned under surface water pathways and from the site neutralization pit and landfills. The potential for release via this pathway is therefore considered to be high.

4.4 Ground Water

The saturated zone and aquifer are found at relatively great depths beneath ground level. However, the permeable soil could allow contaminant transport to and by the ground water. Therefore the ground water is considered to have a moderate potential for transport and release.

5.0 DESCRIPTIONS OF SOLID WASTE MANAGEMENT UNITS

This section presents detailed descriptions of each Solid Waste Management Unit (SWMU) identified during the PR/VSI. These descriptions encompass unit description, dates of operation, wastes managed, release controls, history of releases and release potential to soil/ground water, surface water, and air plus the potential to generate subsurface gas.

5.1 SWMU No. 1 - Floor Drain System (Photo: 1-1)

5.1.1 Information Summary

Unit Description: The floor drain system is located in the Visual Information Building No. 1621. The drains were covered by an approximately one foot by one foot metal grate in a concrete floor. The grates were located near the photoprocessors and the bleach/fixer collection containers (SWMU Nos. 2-6). The size and material of construction of the underfloor drains are unknown. The drain system is connected to the Sewage Treatment Plant (STP) (SWMU Nos. 66-84). The lines from the building to the STP are vitrified clay and concrete. (References 16, 356)

Dates of Operation: The Visual Information Building No. 1621 was built in 1958. (Reference 358)

Wastes Managed: The drain system has received prehardener, neutralizer, developer, bleach, fixer and stabilizer waste residues which contained low concentrations of chromium, metallic cyanides and silver. Since 1985 photo chemical substitutions have been made eliminating the use of metallic cyanides. (References 186, 356)

Release Controls: The metal grates and drains are under roof and connected to the STP. The grates are located in a concrete floor.

History of Releases: During the VSI the drain grates appeared to be rusted and discolored. Suspected releases to the Playa Lake (SWMU No. 85) of cyanide-bearing waste via the STP have been documented. Upsets of the STP have been attributed to metals originating from the photo labs. (References 16, 362)

5.1.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be low. The low volume of waste received and the disposition of the waste via vitrified clay and concrete pipes to the STP supports the release potential conclusion.

- Surface Water: The release potential to surface water is considered to be moderate. The type of waste residues received and the disposition of the waste to the STP supports the release potential conclusion.

- Air: The release potential to air is considered to be low. The low volatility of the waste, the low concentration of the bleach/fixer chemicals in the waste, the low volume of waste received and the disposition of the waste to the STP supports the release potential conclusion.

- Subsurface Gas: The release potential to subsurface gas is considered to be low. The low concentration of the bleach/fixer chemicals in the waste, the low volume of waste received and the disposition of the waste via vitrified clay and concrete pipes to the STP supports the release potential conclusion.

5.2 SWMU Nos. 2-6 Bleach and Fixer Collection Systems (5) (Photo: 1-1)

5.2.1 Information Summary

Unit Description: Five bleach and fixer collection containers are utilized at the Visual Information Building 1621 which is located in the southern section of the Main Post. Building 1621 is situated at the northwest corner of the intersection between Headquarters Avenue and Raritan Avenue. The collection containers receive liquid waste fixer and bleach from both black/white and color photoprocessing equipment.

Approximately 30 gallons per month of waste is generated. The waste is directed into the containers via clear, small diameter flexible tubes which connect the photoprocessing equipment to the containers. The length of tubing is approximately four feet. Each container lid has an opening slightly larger than the tube. The containers are white plastic, labelled "Bleach" or "Fixer," and have a ten gallon capacity. When filled, they are removed and replaced by new containers. The containers rest on the concrete floor. According to personnel at the area, past practices included filling and taping the containers placing them in three legged metal stands, and storing them in the area until removed by the DRMO for off-site treatment and disposal. At the time of the VSI, there were two containers awaiting pick-up by the DRMO for off-site treatment and disposal. In the future, according to facility personnel, all bleach and fixer waste liquids will be managed at the photoprocessing area for silver recovery. The containers will be emptied into a Silver Recovery Unit (see SWMU No. 7 for a description) that is situated in the same area of Building 1621. The treated liquid residues will be sent to the Hazardous Waste Storage Facility for further treatment in the Evaporation Tank (SWMU No. 90). (References 16, 356)

Dates of Operation: The containers have been used from approximately the mid-1970s to the present. (Reference 356)

Wastes Managed: The containers receive liquid waste fixer and bleach which contain silver. (Reference 356)

Release Controls: The floor in the photoprocessing area is concrete. Floor drains (SWMU No. 1) are located at the photoprocessing equipment where the containers are used. The Floor Drains are connected to the Sewage Treatment Plant (SWMU Nos. 66-84). (Reference 356)

History of Releases: There is no release history for this unit.

5.2.2 Release Potential

- Soil/Ground Water: There is a low release potential to soil and ground water since a concrete floor and floor drains are present where the containers are used and stored.

- Surface Water: There is a low release potential to surface water since the unit is enclosed and any potential spills would be directed to the Sewage Treatment Plant (SWMU Nos. 66-84) via the Floor Drains (SWMU No. 1).

- Air: There is a low release potential to air since the wastes have minimal exposure to the atmosphere and the waste contains a relatively low concentration of volatile constituents.

- Subsurface Gas Generation: There is no potential for the generation of subsurface gas due to the type of wastes managed and the design of the unit which consists of a concrete floor with drains.

5.3 SWMU No. 7 - Silver Recovery Unit Tailing Tank (Photo: 1-2)

5.3.1 Information Summary

Unit Description: The automatic silver recovery unit model number 1MG/ARU-11 by Photo Products is located in Building 1621. Silver is removed from the waste by being electroplated out onto an internal drum. The silver is physically removed from the drum into a plastic container (tailing tank). The recovered silver is shipped off-site. The processed liquids are collected in the tailing tank. According to WSMR personnel, these liquids will be shipped to the Sewage Treatment Plant (SWMU Nos. 66-84) for further processing. Approximately 30 gallons/month of waste is processed through this unit. (References 16, 356)

Dates of Operation: This unit went into operation about March 1988. (Reference 356)

Wastes Managed: Waste bleach and fixer containing silver is processed by this unit. (Reference 356)

Release Controls: The unit is enclosed and is on a concrete floor. (Reference 356)

History of Releases: There is no known history of release. The unit appeared to be well maintained during the VSI. (Reference 356).

5.3.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be low. The design (containerized, concrete floor) and location (under roof) of this unit along with the low quantity of waste processed support the release potential conclusion.

- Surface Water: The release potential to surface water is considered to be low. The design and location of this unit along with the low quantity of waste to be processed support the release potential conclusion.

- Air: The release potential to air is considered to be low. The low volatility of the waste constituents, the design and location of this unit along with the low quantity of waste processed support the release potential conclusion.

- Subsurface Gas: The potential for generation of subsurface gas is considered to be low. The design and location of this unit along with the low quantity of waste processed support the release potential conclusion.

5.4 SWMU Nos. 8-9 - Waste Oil Tank and Sump (Photos: 1-3, -4, -5)

5.4.1 Information Summary

Unit Description: The waste oil tank and sump are located in the Maintenance Area on the Main Post. The waste oil tank and sump are located approximately 300 feet east of Building 1794. The sump is located within a paved, bermed area that is also used for product drum storage. The waste oil tank is an underground steel tank with a 5,000 gallon capacity. Waste oil enters the tank via the waste oil sump. The sump is a prism-shaped metal box which stands on four legs. The trough of the sump is approximately two feet from the surface. The sump is open at the top and partially covered by a metal grate to prevent debris from clogging the drain. A flexible hose connects the sump and the tank. The volume of waste oil managed by the tank and sump varies since it receives waste oil generated from all WSMR waste oil collection points. The tank is pumped on an as needed basis. Pumping of the tank may occur twice or less in one month. The waste oil tank is periodically pumped by a contractor and taken off-site. The collected grit is placed in metal 55-gallon drums and disposed of as refuse. (Reference 356)

Dates of Operation: The waste oil tank and sump have been operational approximately since the 1950's. The waste oil tank was replaced with a new tank in approximately 1963. (Reference 356)

Wastes Managed: The waste oil tank and sumps receive waste oil and other fluids routinely drained from vehicles. The tank receives waste oil generated at the Heavy Equipment Maintenance Area (Building 1753), and the Vehicle Maintenance Shop (Building 1794) as well as from collection points at remote locations such as Oscura Range Center and Stallion Range Center. (Reference 356)

Release Controls: The sump is located on a bermed, concrete pad with a drain approximately three feet from the sump. There are no release controls associated with the tank. The level is checked several times each week. (Reference 356)

History of Release: There is no release history for these units. During the VSI, the ground surface around the tank was lightly stained. (Reference 356)

5.4.2 Release Potential

- Soil/Ground Water: There is a moderate release potential to the soil due to the location (underground) and unprotected steel tank construction. A minimal release potential to ground water exists due to the paved areas minimizing infiltration, the great depth of the water table and the arid climate.

- Surface Water: There is low release potential to surface water due to the bermed, concrete containment area for the sump and the underground location of the tank.

- Air: There is a low release potential to air since the wastes managed are not highly volatile and are exposed to the air for only short periods of time. Also the tank is underground and covered.

- Subsurface Gas: There is a low potential for the generation of subsurface gas due to the petroleum, oil and lubricant (POL) type of wastes managed and the steel construction of the unit.

5.5 SWMU No. 10 - Vehicle Wash Pad and Drains (Photos: 1-6, -7)

5.5.1 Information Summary

Unit Description: The Vehicle Wash Pad is located in the Main Post Area east of Building 1794, the Waste Oil Tank (SWMU No. 8), and the Product Drum Storage Area and west of Building 1778. The unit is used to steam clean vehicles operated at WSMR. The Vehicle Wash Pad is a concrete pad approximately 30 feet by 30 feet. A metal grate-covered drain surrounds the entire wash pad. The drain is approximately two feet wide and two feet deep and constructed of concrete. The peripheral drain has no outlet and is sloped to a Sump and Oil/Water Separator (SWMU No. 11). The drain is cleaned out several times a year and the waste is pumped into the Waste Oil Tank (SWMU No. 8). A covered sump is located in the

northwest corner of the wash pad. The sump receives rinse water from vehicle washing and is connected to the Sewage Treatment Plant (SWMU Nos. 66-84). The vehicle wash pad is utilized and cleaned on an as-needed basis. Rinse waters are piped to the Sewage Treatment Plant, while oil and debris collected in the sump and peripheral drains are removed to the Waste Oil Tank. (Reference 356)

Period of Operation: The vehicle wash pad was reported to have been installed in the mid 1950s and is currently operational. (Reference 356)

Waste Managed: The wash pad and peripheral drain receive oil and other debris washed from vehicles. The wash pad is used for cleaning approximately 50 trucks per week. (Reference 356)

Release Controls: The release controls for the unit are comprised of concrete construction, a sump and oil/water separator to trap oil and debris prior to inflow to Sewage Treatment Plant, and a peripheral drain to prevent rinse water from flowing off the concrete pad onto surrounding soil. There are no automatic level controls. (Reference 356)

Release History: There is no documented past release from this unit. There were no signs of a release evident at the time of the VSI. (Reference 356)

5.5.2 Release Potential

- Soil/Ground Water: There is a low release potential to soil surrounding the unit from water spraying off the pad and possible overflow of peripheral drains overflowing. There is a low release potential to ground water due to the depth of ground water and the low release potential to soil.

- Surface Water: There is a low release potential to surface water due to the distance of the nearest surface water and the release controls (concrete construction with a sump) present.

- Air: There is a low release potential to air due to the low volatility of the dilute petroleum, oil and lubricant (POL) type of wastes managed.

- Subsurface Gas Generation: There is no potential for the generation of subsurface gas due to the dilute POL type of wastes managed and design (concrete construction) of the unit.

5.6 SWMU No. 11 - Sump and Oil/Water Separator Pad (Photos: 1-6,-7)

5.6.1 Information Summary

Unit Description: The separator, which acts as both a sump and oil/water separator, is located in the northwest corner of the Vehicle Wash Pad and Drain (SWMU No. 10). The separator has a capacity of approximately 500 gallons, is constructed of concrete and covered by a metal plate. The separator receives rinse water, waste oil and debris from the pad and drain. The separation of water, oil and debris is accomplished by gravity. The water is piped to the Sewage Treatment Plant (SWMU Nos. 66-84) and the oil and debris are periodically cleaned out and sent to the waste oil storage tank (Reference 356)

Dates of Operation: The separator was reported to have been installed in the mid 1950s and is currently operational. (Reference 356)

Wastes Managed: The separator receives rinse water, waste oil and debris from vehicle washing. Approximately 50 trucks per week are washed. (Reference 356)

Release Controls: The unit is constructed of concrete and the area surrounding the separator is paved with asphalt. There are no automatic level controls or secondary containment. Liquid wastes flows by gravity from the drain to the sump. (Reference 356)

History of Releases: There is no documented past release from this unit. There was no evidence of a release during the VSI. (Reference 356)

5.6.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be low. The concrete construction of this unit, the pavement surrounding the unit and the dilute type of waste managed supports the above conclusion.

- Surface Water: The release potential to surface water is considered to be low. The concrete construction of this unit, the pavement surrounding the unit and the dilute type of waste managed supports the above conclusion.

- Air: The release potential to air is considered to be low. The non-volatile type of waste managed in this unit supports the above conclusion.

- Subsurface Gas: The release potential to subsurface gas is considered to be low. The concrete construction of this unit, the pavement surrounding the unit and the non-volatile type of waste managed supports the above conclusion.

5.7 SWMU No. 12 - Vehicle Wash Ramp and Drains (Photos: 1-8, -9)

5.7.1 Information Summary

Unit Description: The Vehicle Wash Ramp and Drains are located in the Maintenance Area of the Main Post east of the Maintenance Shop, Waste Oil Tank (SWMU No. 8), and the Vehicle Wash Pad and Drains (SWMU No. 10). Building 1778 is immediately west of the raised Vehicle Wash Ramp. The unit is used to steam clean vehicles operated at WSMR. The Vehicle Wash Ramp consists of a concrete pad approximately 40 feet long and 15 feet wide with an open metal work ramp located above the concrete pad. A drain is located in the center of the pad with a Sump (SWMU No. 13) at the south end of the drain. The drain is constructed of concrete and

covered with a metal grate. The ramp reaches a maximum height of eight feet above the surrounding grade. (Reference 356)

Dates of Operation: The unit has been active from approximately the mid 1950s to the present. (Reference 356)

Waste Managed: The vehicle washing generates rinse water which may contain oil and other petroleum products. Rinse water enters the drain, collects in the sump, and is piped to the Sewage Treatment Plant (SWMU Nos. 66-84). The waste oil and debris are periodically cleaned out and pumped into the Waste Oil Tank (SWMU No. 8). (Reference 356)

Release Controls: The release controls for the unit are the concrete pad, the drain and the sump. The area surrounding this unit is paved with asphalt. There are no automatic level controls or secondary containment. The waste liquids flow by gravity to the Sump (SWMU No. 13). (Reference 356)

Release History: There is no documented release history for the unit. There was no visual evidence of a release was noted during the VSI. (Reference 356)

5.7.2 Release Potential

- Soil/Ground Water: There is a low release potential to the soil and ground water due to the sloping of the concrete pad toward the drain located in the center of the unit. However, due to the elevation of vehicles washed above-ground, there is a potential for rinse water to contact soil surrounding the unit due to overspraying. There is a low release potential to ground water due to the small volume of waste in rinse water that may contact the surrounding soil, the depth to ground water, and the paved area surrounding this unit.

- Surface Water: There is a low release potential to surface water since a drain and sump collects rinse water, the high

evaporation rate at the facility, and the distance to the nearest surface water body.

- Air: There is a low release potential to the air due to the non-volatile type of waste managed.

- Subsurface Gas: There is no potential for the generation of subsurface gas due to the non-volatile type wastes managed at the unit and the design (concrete construction) of the unit.

5.8 SWMU No. 13 - Sump and Oil/Water Separator Ramp (Photos: 1-8, -9)

5.8.1 Information Summary

Unit Description: The separator, which acts as both a sump and oil/water separator is located in the south end of the Vehicle Wash Ramp and Drain (SWMU No. 12). The separator has a capacity of approximately 200 gallons, is constructed of concrete and covered by a metal grate. The separator receives water, waste oil and debris from the concrete pad and drain. The separation of water, waste oil and debris is accomplished by gravity. The water is piped to the Sewage Treatment Plant (SWMUs Nos. 66-87) and the oil and debris are periodically cleaned out and sent to the waste oil storage tank (SWMU No. 7). (Reference 356)

Dates Of Operation: The separator may have been installed in the mid-1950s and is currently operational. (Reference 356)

Wastes Managed: The separator receives rinse water, waste oil and debris from vehicle washing. (Reference 356)

Release Controls: The unit is constructed of concrete and the area surrounding the separator is paved with asphalt. There are no automatic level controls. Liquids are pumped to and from this unit. (Reference 356)

History of Release: There are no documented past releases from this unit. There was no evidence of a release during the VSI. (Reference 356)

5.8.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be low. The concrete construction of this unit, the pavement surrounding the unit and the dilute type of waste managed support the above conclusion.

- Surface Water: The release potential to surface water is considered to be low. The concrete construction of this unit, the pavement surrounding the unit and the dilute type of waste managed support the above conclusion.

- Air: The release potential to air is considered to be low. The non-volatile type of waste managed in this unit supports the above conclusion.

- Subsurface Gas: The release potential to subsurface gas is considered to be low. The concrete construction of this unit, the pavement surrounding the unit and the non-volatile type of waste managed support the above conclusion.

5.9 SWMU Nos. 14-15 - Used Battery Accumulation Areas (2) (Photo: 1-10)

5.9.1 Information Summary

Unit Description: A Used Battery Accumulation Area I (SWMU No. 14) is located south of the Battery Shop (Building 1776) in the Maintenance Area on the Main Post. The Used Battery Accumulation Area I is an open-air storage location which consists of several pallets upon which used batteries are placed. The batteries are stacked on one another to a height of less than four feet. The pallets rest on an asphalt paving which is continuous in the area. Used batteries are collected approximately once per year by an off-site contractor. Previous

collection and storage practices of used batteries is unknown. Used batteries are also accumulated immediately south of the Battery Shop at Used Battery Accumulation Area II (SWMU No. 15) which is approximately 200 feet due north of the Used Battery Accumulation Area I. Used batteries here are also stored on pallets and were stacked to a maximum height of three feet at the time of the VSI. (Reference 356)

Dates of Operation: The date of initial start up is unknown. The areas are presently in use. (Reference 356)

Waste Managed: Various types of used vehicle batteries are stored in the unit. Approximately 40,000 pounds of batteries are collected annually. Used batteries discarded facility-wide are brought to the unit. The batteries contain acid and lead. The batteries are not currently drained on site. (Reference 356)

Release Controls: The pallets on which the batteries rest and the asphalt surface serve as release controls. There are no curbs or sumps for secondary containment. (Reference 356)

Release History: Reportedly, prior to approximately October 1986, management practices allowed draining of battery acid down a system which overflowed to the STP (SWMU Nos. 66-84). According to a NMEID inspection in October 1986, acid from five or six batteries a day were dumped down a drain into an unknown tank that overflowed into the STP. (Reference 240) No evidence of a release at the currently used accumulation areas was apparent during the VSI. (Reference 356)

5.9.2 Release Potential

- Soil/Ground Water: There is a moderate release potential to soil and ground water. The asphalt underlying the unit retards the penetration of spilled or leaked battery acid into the soil and ground water. Since the units are not enclosed or bermed, run-off to drainage ditches may occur.

- Surface Water: There is a moderate release potential to surface water. Drainage run-off from the unit flows into nearby open Storm Drains (AOC Y) which flow toward the Playa Lake (SWMU No. 85) area.

- Air: There is a low release potential to air due to the low volatility of wastes managed and facility waste management practices (storage on pallets with asphalt paving).

- Subsurface Gas: There is no potential for the generation of subsurface gas at this unit due to the non-volatility of the wastes managed and the design of the unit.

5.10 SWMU No. 16 - Heavy Equipment Wash Pad and Drain (Photos: 1-11, -12)

5.10.1 Information Summary

Unit Description: The Heavy Equipment Wash Pad is located in the southern section of the Main Post, west of Building 1736. The Heavy Vehicle Maintenance shop is located west of the unit. The Vehicle Wash area is a 50 foot by 40 foot concrete pad which slopes to the center where a grate-covered drain is located. There is a six inch curb which rims only the south end of the concrete pad. The pad is entirely rimmed by gravel. Facility representatives were unable to determine if the drain is ever cleaned or pumped out. The drain flows into a drainage ditch located south of the unit. The drainage ditch eventually flows to the Playa Lake (SWMU No. 85) area about three miles southeast of the Main Post. (Reference 356)

Dates of Operation: The unit is currently active and has been active since approximately the 1960s. (Reference 356)

Waste Managed: Rinse water from vehicle washing contains various petroleum products and debris. The amount of waste generated at the unit is unknown. Approximately 25 to 30 trucks are washed on the pad weekly. (Reference 356)

Release Controls: The concrete pad and drain serve as release controls for the unit. The unit drains directly to the Stormwater Drainage System (AOC Y). (Reference 356)

Release History: There is no documented past release for the unit. Standing water containing black oil was seen in the stormwater drainage ditch where the unit discharged at the time of the VSI. Stained soil surrounded the discharge pipe from the drain where it entered the Stormwater Drainage Ditch (AOC Y). (Reference 356)

5.10.2 Release Potential

- Soil/Ground Water: Visible evidence of releases to soil were observed during the VSI from the unit's drainage system. There is a high release potential to soil. There is a moderate release potential to ground water due to the type of waste managed and limited amount of water available in the storm water drains for percolation (high evaporation rate).

- Surface Water: There is a high release potential to surface water since the rinse water from the vehicle wash pad leaves the unit untreated and drainage is toward the Playa Lake (SWMU No. 85). It is likely a majority of the rinse water would not reach the Playa Lake area due to high evaporation rates. However, the oil and other petroleum products carried in the rinse water would be deposited in the drainage ditches and may be transported to the Playa Lake area during storm events.

- Air: There is a low release potential to air due to the low volatility of the wastes managed.

- Subsurface Gas: There is low potential for the generation of subsurface gas due to the low volatility of the wastes managed.

5.11 SWMU No. 17 - Waste Underground Injection Pipe

5.11.1 Information Summary

Unit Description: The Injection Pipe is reported to be located at the southwest corner of Building 1753, the Heavy Equipment Maintenance Shop, on the Main Post Area. The dimensions, materials of construction and the depth of the pipe are unknown. The pipe was used to dispose of waste oils and degreasing solvents. This unit was not observed during the VSI. The information was obtained from the update to the Installation Assessment which concluded this unit to be of major concern and recommended soil sampling, ground water monitoring and contaminated soil removal. (Reference 352)

Dates of Operation: The dates of operation are unknown. This disposal practice was reportedly not in use during the VSI. (Reference 356)

Wastes Managed: Wastes received by this unit were reported to include unspecified solvents, petroleum, oils and lubricants. The amount of waste managed is unknown. (Reference 352)

Release Controls: There were no known release controls. (Reference 352)

History of Releases: The length of time and quantity of wastes received by this unit is unknown.

5.11.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be high. Due to the very purpose of this unit, a release to soil occurred. The actual release to ground water is not clear due to the unknown construction details and amount of waste disposed.

- Surface Water: The potential for generating of surface water is considered to be unknown due to the unknown construction details and amount of waste disposed.

- Air: The release potential to air is considered to be unknown due to the unknown construction details and amount of waste disposed.

- Subsurface Gas: The potential for generation of subsurface gas is considered to be unknown due to the unknown construction details and amount of waste disposed.

5.12 SWMU No. 18 - Waste Accumulation Area (Photo: 1-14)

5.12.1 Information Summary

Unit Description: The Waste Accumulation Area is located next to Building 1753 at the northwest corner. Building 1753 is in the south section of the Main Post at the northeast corner of the intersection of Headquarters Avenue and Raritan Avenue. At the time of the VSI, the accumulation area consisted of three 55-gallon steel drums, a 500-gallon mobile tanker and a make-shift strainer. The drums reportedly contain waste degreaser solvents, waste antifreeze or other waste POL. The strainer is used to remove debris from the collected waste oil prior to its being pumped to the mobile tanker. Periodically the tanker is offloaded at the Waste Oil Tank (SWMU No. 8). At the time of the VSI the mobile tanker was not being used because of a pump malfunction. The drums are periodically removed by the DRMO. The accumulation area has a gravel base. (Reference 356)

Dates of Operation: The accumulation area is currently active. The start-up date is unknown. (Reference 356)

Wastes Managed: Waste oil, degreasing solvents, PD680 solvent, antifreeze and other POL are managed in the area. Approximately 2,000 gallons of waste oil are generated per month. (Reference 356)

Release Controls: The containers are metal and except for the open top drum containing waste antifreeze and the strainer the units were closed at the time of the VSI. The area is not bermed. (Reference 356)

History of Releases: There are no documented releases in this area. Localized areas of heavily discolored gravel were noted at this unit during the VSI. (Reference 356)

5.12.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be high. The evidence of gravel discoloration indicates the soils have been contaminated. The release to ground water is dependent on the magnitude and duration of spillage. The Main Post Area potable water aquifer lies below this unit. (References 352, 357)

- Surface Water: The release potential to surface water is considered to be moderate. Since this unit is not bermed and is on gravel, run-off may transport contaminants to the stormwater drainage system (AOC Y).

- Air: The release potential to air is considered to be low, since the drums containing volatile compounds were closed, thus having minimal exposure to the atmosphere.

- Subsurface Gas: The potential for generation of subsurface gas is considered to be low. The closed steel drums and tanker supports the conclusion.

5.13 SWMU No. 19 - Steam Wash Pad and Drains (Photo: 1-15)

5.13.1 Information Summary

Unit Description: The Wash Pad is located north of Building 1753 and immediately north of Building 1752 in the southern part of the Post area. The Wash Pad is used primarily to steam clean heavy equipment operated at WSMR. The wash area is a concrete pad approximately 50 feet long and 15 feet wide. There are three drains spaced approximately 15 feet apart along the center of the pad. The pad slopes toward the drains to allow rinse water to flow into the drains. The rinse water flows via underground pipes to an oil/water separator (SWMU 20) located approximately 40 feet southeast of the pad. (Reference 356)

Dates of Operation: This unit has been in operation from approximately 1968 to the present. (Reference 356)

Waste Managed: The unit manages rinsate containing waste oil and other waste petroleum products and debris. (Reference 356)

Release Controls: The concrete pad sloping to drains discharging into an oil/water separator comprise the release controls for the unit. (Reference 356)

Release History: There is no previous release history for the unit. There was no evidence of a release noted during the VSI. (Reference 356)

5.13.2 Release Potential

- Soil/Ground Water: There is a low release potential to soil and ground water due to the presence of the sloping concrete pad and drains preventing direct release to soil.

- Surface Water: There is a low release potential to surface water because the wastes managed by the unit are controlled within piping systems and do not flow off the concrete pad.

- Air: There is no release potential to air due to the non-volatile wastes managed.

- Subsurface Gas: There is no potential for the generation of subsurface gas due to the non-volatile wastes managed and the concrete construction of the unit.

5.14 SWMU No. 20 - Oil/Water Separator (Photo: 1-16)

5.14.1 Information Summary

Unit Description: The Separator is located northeast of Buildings 1752 and 1753 on the Main Post Area. It is constructed of concrete, is vented and covered by a metal plate. The separator has a capacity of approximately 500 gallons. The separator receives water and waste oil from the Steam Wash Pad and Drains (SWMU No. 19). The water is sent to the STP (SWMU Nos. 66-84). The oil is removed one or two times per month. The oil is sent to the waste oil tanker in the Waste Accumulation Area (SWMU No. 18). (Reference 356)

Dates of Operation: This unit has operated for approximately five years. The current unit replaced an earlier version of the separator which was considered to be too small. (Reference 356)

Wastes Managed: The separator receives waste oil and rinse water. (Reference 356)

Release Controls: The concrete construction and metal plate which covers this unit provide the release controls. No automatic level control or secondary containment are present. (Reference 356)

History of Releases: No documented releases were reported. During the VSI the area around this unit appeared to be uncontaminated. (Reference 356)

5.14.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be low. The concrete construction and non-

volatile type of waste managed in this unit support the conclusion.

- Surface Water: The release potential to surface water is considered to be low. The covered concrete construction and the non-volatile type of waste managed in this unit support the conclusion.

- Air: The release potential to air is considered to be low. The covered concrete construction and the non-volatile type of waste managed in this unit support the conclusion.

- Subsurface Gas: The potential for the generation of subsurface gas is considered to be low. The concrete construction design and the non-volatile type of waste managed in this unit support the conclusion.

5.15 SWMU No. 21 - Old Fire Fighting Training Area (Photo: 1-18)

5.15.1 Information Summary

Unit Description: The Old Fire Fighting Training Area is located at the southern end of the Main Post near the intersection of Headquarters Avenue and Raritan Avenue. The area is located off a dirt road approximately 250 feet south of Raritan Avenue. The unit is approximately 120 feet long and 30 feet wide. Currently at the area are several drums in cradles. Reportedly one drum was for gasoline and the other for oil storage. No other structures are present. The ground surface is sparsely vegetated by grasses. During its operation there was reportedly two unlined pits (80 feet by 30 feet and 10 feet by 10 feet) in which water, off-specification JP4 jet fuel, waste gasoline, diesel fuel, some lumber and waste oil were placed. This material was ignited and subsequently extinguished during training. Training was conducted approximately eight times per year. (Reference 356)

Dates of Operation: Fire fighting training was conducted at the unit until approximately 1982 (Reference 356).

Wastes Managed: The unit received off-specification JP4 fuel, waste oil, gasoline and diesel fuel. (Reference 356)

Release Controls: No release controls are associated with this unit. (Reference 356)

History of Releases: There is no documented history of release for this unit. At the time of the VSI, several heavily stained areas on the ground of greater than four feet in diameter were noted. (Reference 356)

5.15.2 Release Potential

- Soil/Ground Water: Currently there is stained surface soil at the unit and nearby the unit. The past release potential to soil is high. There is no on-going release potential to soil due to the inactive status of the unit. There is a moderate past release potential to ground water depending on the depth of ground water and amount of contamination. A low continuing release potential to ground water may exist depending on the extent of contamination of the soils.

- Surface Water: There is a moderate past release potential and a low current release potential to surface water suggested by the amount of soil staining, the type of waste managed, the low amount of annual precipitation the distance to a surface water body and the inactive status of the unit.

- Air: The past release potential to air was high due to the open buring of waste oil and jet fuel. The current release potential to air is low due to the inactive status of the unit.

- Subsurface Gas: There is a low potential for the past and present generation of subsurface gas at the unit based on the

reported operational practices of open buring which produced a non-volatile residue.

5.16 SWMU No. 22 - Abandoned Pit (Photo: 1-19)

5.16.1 Information Summary

Unit Description: The pit is located at the southern end of the Main Post near the intersection of Headquarters Avenue and Raritan Avenue. The area is located off a dirt road approximately 350 feet south of Raritan Avenue. The unit is approximately 25 feet by 50 feet. The area consists of gravel and dense, low shrubs which surround the unit. Stained gravel has been pushed up into a pile at the southern end of the pit. The exact purpose of the pit is unknown. However the unit is located about 100 feet south of the Old Firefighting Training Area (SWMU No. 21) suggesting some relationship to this unit.

Dates of Operation: The dates of operation are unknown. (Reference 356)

Wastes Managed: The exact waste types managed are unknown. The soil staining noted during the VSI appeared to be some type of petroleum material. (Reference 356)

Release Controls: There are no release controls. (Reference 356)

History of Releases: There is no documented release history for this unit. During the VSI, heavily stained soil and gravel was noted. The appearance and location of the unit suggests a petroleum-based residue is on the ground. (Reference 356)

5.16.2 Release Potential

- Soil/Ground Water: The soils are heavily stained. Therefore the past release potential to soil/ground water is considered to be high. The release to ground water is dependent on the

depth of ground water, the type of soils, the type of waste and the extent of contamination.

- Surface Water: The current release potential to surface water is considered to be moderate. The amount of soil contamination, the inactive status of the unit, the low annual precipitation and the distance to a surface water body supports this conclusion. The past release potential is unknown since the type and amount of waste is unknown.

- Air: The past release potential to the air is unknown since the type of waste is unknown. The current release potential to air is considered to be low. The inactive status of the unit supports this conclusion.

- Subsurface Gas: The past and present release potential to subsurface gas is considered to be unknown since the type of waste is unknown.

High Energy Laser Systems Test Facility (SWMU Nos. 23-39)

The High Energy Laser Systems Test Facility (HELSTF) provides a test facility for use by all military services of the Department of Defense. The HELSTF began operation in July 1982 to develop and test laser systems to be used as offensive and defensive weapons. The primary facilities for HELSTF are located at the MAR site which is approximately 22 miles south west of Alamogordo, NM, 13 miles southwest of the White Sands National Monument Headquarters, and 2.3 miles west of U.S. Highway 70. During high energy laser testing the laser beam is directed toward ground level facilities or aerial vehicles. Propellants, fuels, oxiders, toxic fluids and high pressure gases are routinely used. Hazardous wastes at HELSTF are generated by two major sources, the laser component cleaning facility and the laser mirror cooling system.

Prior to being assembled into the laser system, hardware components are cleaned through a series of washing steps at a cleaning facility.

Hardware components are also periodically recleaned after extensive use. The primary contaminants removed by the cleaning operations include dust and light grease or oil. The waste types generated include surfactants, acids, bases and solvents.

During a lasing operation, deionized water containing a corrosion inhibitor is circulated through the laser mirror cooling system. The corrosion inhibitor used in the process contains hexavalent chromium. Periodically the coolant is replenished by displacing the spent solution with fresh inhibitor. The spent solution is discharged at a rate of approximately 40 gallons per week and contains a chromium concentration of approximately 70 mg/l. Both waste sources are discharged to above-ground Chemical Waste Tanks (SWMU Nos. 31-32) where reduction by evaporation takes place. The cleaning facility waste is conveyed to the Chemical Waste Tanks via underground encased pipeline while the cooling water is transported by means of a tank truck.

Sanitary wastes generated at HELSTF are treated in lined Sanitary Treatment System impoundments. (SWMU Nos. 27-30) At various times WSMR has requested and received approval to discharge sanitary waste to an unlined lagoon and/or for use on road beds and/or as an application to vegetation. Large volumes of hot gases which are produced during the laser testing operation are treated through the scrubber/ejector system. The cooling water from the scrubber/ejector is then treated with lime. The resulting sludge is pumped to drying beds (SWMU Nos. 33-34). (References 9, 60, 209

5.17 SWMU No. 23-24 - Old Hazardous Waste Tanks (Photo: 1-21)

5.17.1 Information Summary

Unit Description: The above-ground tanks are located in the HELSTF area about 23 miles northeast of the Main Post. The tanks were originally used to accumulate hazardous waste generated by operation of the lasers at HELSTF. One tank (SWMU No. 23) is located on the eastern side of the Cleaning Facility Building. The tank has an approximate storage capacity

of 5,000 gallons. The tank is currently used to store cleaning reagents. The second tank (SWMU No. 24) which has a capacity of 2,500 gallons has been completely removed from service. Both are fiberglass-lined metal tanks. According to HFLSTF staff, the tanks were emptied and the waste transferred to the NASA/WSMR Lagoons. The NASA facility is located west of the Main Post Area and has an EPA ID No. NM8800019434. (References 71, 107, 356)

Dates of Operation: The tanks were used for hazardous waste accumulation from approximately 1981 to 1984. The 5,000-gallon tank (SWMU No. 23) is currently used for storage of cleaning reagents. The 2,500-gallon tank is completely inactive (References 71, 356)

Wastes Managed: The tanks previously received the following: phosphoric acid, sodium hydroxide, sodium carbonate, nitric acid, hydrofluoric acid, methyl ethyl ketone, isopropyl alcohol and deionized water. (Reference 107, 356)

Release Controls: The tanks are fiberglass-lined metal tanks. When used for hazardous waste accumulation the tanks were located on a curbed concrete pad. (Reference 356)

History of Releases: There is no release history reported for the tanks during their operation. During the VSI, no evidence of contamination was noted. (References 240 356)

5.17.2 Release Potential

- Soil/Ground Water: There is a low past release potential to soil and ground water since both tanks are of metal construction and rested on a curbed concrete pad. There is no current release potential since both tanks are inactive with respect to waste handling.

- Surface Water: There is a low past release potential to surface water since both tanks are of metal construction and

rested on a curbed concrete pad. There is no current release potential since both tanks are inactive with respect to waste handling.

- Air: There is a low past release potential to air since both tanks are of metal construction, contained non-volatile wastes and rested on a curbed concrete pad. This is no current release potential since the tanks are inactive with respect to waste handling.

- Subsurface Gas: There is a low past potential for the generation of subsurface gas since both tanks were of metal construction, contained non-volatile wastes and rested on a curbed concrete pad. There is no current potential since both tanks are inactive with respect to waste handling.

5.18 SWMU No. 25 - Waste Accumulation Area (Photo: 1-25)

5.18.1 Information Summary

Unit Description: The unit is located in the HELSTF area, northwest of the Cleaning Facility. The unit is approximately 30 feet by 15 feet. The Cleaning Facility area including the accumulation area is surrounded by a chain link fence. The area is located on a paved surface (asphalt) and drums are stored on pallets. The accumulation area is open to the elements. There were three 55-gallon drums in the area at the time of the VSI. There is no secondary containment. Wastes are reportedly stored for less than 90 days. (Reference 356)

Dates of Operation: The accumulation area has been operative since about 1984 and is currently active. HELSTF personnel stated that a hazardous waste accumulation area would soon be constructed and operational near the Sanitary Treatment Systems (SWMU Nos. 27-30). (References 356, 357)

Wastes Managed: The accumulation area receives waste generated at the site. The spent degreasing solvent, 1,1,1 - trichloroethane from the

cleaning facility, is drummed and accumulated along with waste oils. (Reference 209, 240, 356)

Release Controls: The paved and fenced area with the drums on pallets serves as the only release controls for the unit. The waste is contained in metal 55-gallon drums. (Reference 356)

History of Release: The unit has no documented release history. Open, bulging and rusty drums were noted during a NMEID RCRA inspection. During the VSI, the area appeared to be well managed. (References 240, 356)

5.18.2 Release Potential

- Soil/Ground water: There is a low release potential to soil and ground water since the waste is stored in metal drums on pallets in a paved area.

- Surface Water: There is a low release potential to surface water due to the distance of the nearest surface water body and since the waste is stored in metal drums on pallets in a paved area.

- Air: There is a low release potential to the air since the waste is stored in closed metal drums.

- Subsurface Gas: There is a low potential for the generation of subsurface gas because the waste is stored above-ground in closed metal drums in a paved area.

5.19 SWMU No. 26 - Vapor Recovery Unit (Photo: 1-26)

5.19.1 Information Summary

Unit Description: The Vapor Recovery Unit is located on the south side of the Cleaning Facility Building S26131 at HELSTF. The recovery unit

services the cleaning baths (Photos: 1-22, -23) located in the gross cleaning room. The unit is constructed of plate metal, fiberglass and plexiglass. The vapors are scrubbed by water. The spent water is sent to the Chemical Waste Tanks (SWMU Nos. 31-32). The scrubbed air is vented to the atmosphere. (Reference 356)

Dates of Operation: The unit is currently in operation. The date of start up is reported to be about 1984. (Reference 356)

Waste Managed: The unit scrubs vapor from the gross cleaning room. The vapors include sodium hydroxide, phosphoric acid, methyl ethyl ketone and isopropyl alcohol. (Reference 356)

Release Controls: The unit is outside and sits on an uncurbed concrete pad in an asphalt paved area. Scrubbed vapors are vented to the atmosphere. (Reference 356)

History of Releases: No releases have been documented. During the VSI the unit appeared to be well maintained. (Reference 356)

5.19.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be low. The materials of construction, the maintenance and the location of this above-ground unit on a concrete pad in a paved area support the release potential conclusion.

- Surface Water: The release potential to surface water is considered to be low. The materials of construction, the maintenance and the location of this above-ground unit on a concrete pad in a paved area support the release potential conclusion.

- Air: The release potential to air is considered to be unknown. since removal efficiency for this unit is unknown.

- Subsurface Gas: There is no potential for the generation of subsurface gas based on the above-ground design and types of waste managed.

5.20 SWMU Nos. 27-30 - Sanitary Treatment Impoundments (Photos: 1- 28, -29, -33)

5.20.1 Information Summary

Unit Description: Four large sanitary treatment impoundments are located on the east side of HELSTF. Each pond has an approximate capacity of one million gallons. The ponds are hypalon-lined. They are aerated by subsurface injection aeration pumps. The pump motors are located above the liquid surface supported by a floatation device. The waste water is sequentially treated in each impoundment numbered Ponds 1-4. The biological treatment is sustained by aeration and made effective by long residence time (greater than a week). The liquid is spray evaporated in Pond 4 (SWMU No. 30). Sludge is removed to a landfill. The units receive HELSTF sanitary waste and surface run-off. Facility personnel were unsure whether the analytical laboratory chemical waste poured down laboratory drains are directed to the sanitary system or to the Chemical Waste Tanks (SWMU Nos. 31-32). These units recieved the liquid waste from a chrominum containing liquid spill around June 1986. The chromium concentration waste reported to be 1.6 ppm. On occasion the supernatant from the Fluorspar Tanks (SWMU Nos. 33-34) has been pumped to these units. (Reference 187, 230, 356)

Dates of Operation: The lined impoundments are in operation and are less than 10 years old. Two unlined sewage lagoons with earthen berms built in 1962 superceded the current lagoon system. The unlined lagoons were demolished and replaced by the current impoundments in the same location. (References 9, 356)

Waste Managed: The sanitary waste and surface run-off currently generated at HELSTF are treated in these units. A chemical analysis of

impoundment No. 2 (SWMU No. 28) in 1984 revealed a chromium concentration of 0.06 mg/l which exceeds Federal primary drinking water standards and suggests the presence of hazardous chemical constituents. These units have receive other chromium containing waste in 1986. Supernatant from the Fluorspar Tanks are pumped to these units. (References 6, 7, 9, 63, 93, 95, 99, 136, 173, 186, 230, 267, 269, 356)

Release Controls: The current impoundments are lined with hypalon. The original impoundments were unlined and had earthen berms.

History of Releases: There are no known documented releases. During the VSI a freeboard of more than two feet was noted and overspray from the evaporation spray unit was observed. (Reference 356)

5.20.2 Release Potential

- Soil/Ground Water: The current release potential to soil/ground water is considered to be low. The hypalon-lined design of the unit, the high evaporation rates and the depth to ground water support this conclusion. Past release potential to soils was high since the waste was placed in unlined impoundments. In certain cases the waste was applied to a roadway while under construction and used to water vegetation. Past release potential to ground water was moderate due to the depth to ground water and the high evaporation rates.

- Surface Water: The past and present release potential to surface water is considered to be low. The bermed design of the unit, the high evaporation rates and the relative distance to the nearest surface water body support this conclusion.

- Air: The past and present release potential to air is considered to be high. The spray evaporation unit is designed to volatilize the wastes.

- Subsurface Gas: The past and present potential for generation of subsurface gas is considered to be low. The lined design of the current units, the high evaporation rates and the low concentration of hazardous constituents support this conclusion.

5.21 SWMU Nos. 31-32 - Chemical Waste Tanks (2) (Photos: 1-30, -31, -35)

5.21.1 Information Summary

Unit Description: These RCRA-regulated tanks are located at the HELSTF area in the southwest section of WSMR. HELSTF is approximately 23 miles northeast of the Main Post on WSMR Secondary Road No. 264. Located nearby are the HELSTF Sanitary Treatment Systems (SWMU Nos. 27-30) and Fluorspar Tanks (SWMU Nos. 33-34). The Chemical Waste Tanks are identical, located side-by-side, above-grade and are constructed of reinforced concrete. The tanks are lined with industrial grade 45 mil hypalon. (Note: Reference 189 states the thickness is 30 mil). Inside dimensions of each tank are 37 feet by 74 feet, eight inches by seven feet deep, sloping to seven feet, six inches in the center. Maintaining a freeboard of two feet, the tank capacity is approximately 108,200 gallons. The tanks are open to the atmosphere. Bird netting covers both tanks. One tank has been used since its construction the other has remained inactive. The tank system was designed to be capable of storing six months of waste. The tanks contain six inches of sand ballast which will remain in the tanks until closure of the unit.

Solar evaporation and concentration of wastes from the laser mirror cooling system and cleaning facility occurs in this tank.

Waste from the laser mirror cooling system is generated when deionized water containing a corrosion inhibitor is circulated through the laser cooling system during laser operations. Fresh coolant is periodically added to the system, displacing about 40 gallons of cooling solution per week. The wastewater is brought to the tank by a tank truck.

Waste generated at the cleaning facility reaches the tanks via an underground encased pipeline. (References 189, 209, 356)

Dates of Operation: The tanks have been in operation since approximately late 1984 and are currently active. To date, only one tank (SWMU No. 31) has received waste. (Reference 356)

Wastes Managed: The chemical waste tanks receive wastewater generated by the operation of the laser mirror cooling system which contains hexavalent chromium at an approximate concentration of 70 mg/l. (Reference 209) Cooling water contains the following chemicals: zinc sulfate, a silicate salt, potassium hydroxide, an organic phosphorate, a carboxylic acid, an aromatic heterocyclic mercaptan, and a chromate salt. Solutions received from the cleaning facility contain: phosphoric acid, sodium hydroxide, sodium carbonate, methyl ethyl ketone, isopropyl alcohol, toluene, formic acid, methylene chloride, nitric acid and hydrofluoric acid. (References 66, 349, 356)

Release Controls: The tanks are constructed of reinforced concrete. The tanks have a leak detection system. There are ground-water monitoring wells located at the tank's four corners. There are no automatic level controls or secondary containment. (Reference 356)

History of Releases: There is no release history for the tanks. The units appeared to be well maintained during the VSI. (References 26, 356)

5.21.2 Release Potential

- Soil/Ground Water: There is a low release potential to soil and ground water due to the double liner and leak detection systems.

- Surface Water: There is a low release potential to surface water due to the double liner system and the lack of surface water within a mile of the units.

- Air: There is a high release potential to the atmosphere by design. Volatile hazardous constituents may be present in the waste stream. There are no release controls associated with the unit to prevent or retard evaporation of wastes.

- Subsurface Gas: There is no potential for the generation of subsurface gas due to the double liner system, leak detection system, above-ground construction and the high evaporation rates.

5.22 SWMU No. 33-34 - Fluorspar Tanks (2) (Photos: 1-32)

5.22.1 Information Summary

Unit Description: The fluorspar tanks are located in the HELSTF area in the southwestern section of WSMR. The two side-by-side tanks, which are about 30 feet by 60 feet by two to four feet deep, receive fluorspar from the Laser System Pressure Recovery System (PRS). During lasing operations, effluents produced by combustion of the fuel and oxidizer must be removed from the laser cavity as they are produced. The PRS then treats the combustion products to remove the hydrogen fluoride (HF) and deuterium fluoride (DF) and discharges the exhaust gas to the atmosphere. The removal efficiency is approximately 90%. The emission control scrubber uses a solution of sodium hydroxide (NaOH) to react with the HF and DF to form sodium fluoride (NaF). The solution is then treated with lime to form fluorspar (calcium fluoride - CaF_2). The fluorspar is than pumped via a four-inch PVC sludge line from the PRS to the Fluorspar Tanks. The tanks act as drying beds for the fluorspar sludge. The dried fluorspar is periodically removed for off-site disposal. The tanks are below grade level, are made of concrete and have a capacity sufficient to contain the fluorspar produced during a period of one year. Approximately 900 pounds per week (dry weight basis) is produced. The tanks have two accessible sloped entrances suitable for use by a front-end loader for removal of dry solids. The tanks have no secondary containment. (References 9, 66, 356)

Dates of Operation: The fluorspar tanks have been receiving fluorspar since about 1984 and are currently active.

Wastes Managed: The tanks receive fluorspar from the laser system Pressure Recovery System at a rate of approximately 900 dry pounds per week. The sludge is assumed to have a relatively high pH. (References 66, 356)

Release Controls: The tanks are constructed of concrete and have ready access for waste removal by heavy equipment. The area is surrounded by a chain link fence. (Reference 356)

History of Release: During an NMEID inspection on 11/1/85 evidence of tank overtopping was indicated. Dried sludge was noted on the ground surrounding the tanks during the VSI. (Reference 186, 356, 357)

5.22.2 Release Potential

- Soil/Ground Water: There is a high release potential to soil since evidence of spillage has been observed and documented. The release potential to ground water is considered low due to the relatively low solubility of fluorspar, the high evaporation rates and the depth to ground water.

- Surface Water: There is a moderate release potential to surface water due to the lack of secondary containment of the unit and the distance to nearby surface water bodies.

- Air: There is a low potential for release due to the non-volatile nature of the waste managed. Water is evaporated to allow sludge drying.

- Subsurface Gas: There is no potential for the generation of subsurface gas due to the concrete design of the unit and the non-volatile wastes managed.

5.23 SWMUs No. 35-36 - Ethylene Glycol Tanks (2)

5.23.1 Information Summary

Unit Description: The Ethylene Glycol Tanks are located at the HELSTF in the southwestern section of WSMR. At the time of the VSI, one of the tanks was located immediately west of the Chemical Waste Tanks (SWMU Nos. 31-32). The other ethylene glycol tank was located south of Sanitary Treatment System (SWMU No. 30) where the facility plans to establish a hazardous waste accumulation area. The steel tanks are approximately five feet long, four feet tall and four feet wide. The tanks were filled when the compressor system at the HELSTF developed some problems and the ethylene glycol had to be removed. This was stated to be a one time, emergency occurrence, according to HELSTF personnel. The ethylene will reportedly be disposed of off-site. (Reference 356)

Dates of Operation: The ethylene glycol tanks have been in use since early 1988 and were still in use at the time of the VSI. (Reference 356)

Wastes Managed: The tanks received waste ethylene glycol drained from the HELSTF compressor system on an one-time emergency basis.

Release Controls: The tanks are constructed of steel. There are no release controls associated with the unit.

History of Release: There is no history of release for the tanks.

5.23.2 Release Potential

- Soil/Ground Water: There is a low release potential to soil/ground water since this a one-time occurrence and the waste is stored in steel tanks.

- Surface Water: There is a low release potential to surface water since the waste is stored in steel tanks.

- Air: There is a low release potential to air since ethylene glycol is non-volatile and non-hazardous.

- Subsurface Gas: There is no potential for the generation of subsurface gas due to the non-volatile waste managed and the steel tank units storing the waste.

5.24 SWMU No. 37 - Waste Oil Accumulation Area at Building 26121 (HELSTF) (Photos: 1-36)

5.24.1 Information Summary

Unit Description: The waste oil accumulation area is located in Building 26121 at HELSTF. The waste is collected in drums prior to pick up and delivered to the Waste Oil Tank (SWMU No. 8). The drums are under a roof and stored on a concrete pad. At the time of the VSI two drums were observed. (Reference 356)

Dates of Operation: Building 26121 was built in 1963. Waste oil has been collected here since at least 1982. (Reference 356)

Wastes Managed: Waste oil from HELSTF vehicles and equipment are managed at this unit. (Reference 356)

Release Controls: The oil is stored in steel drums under roof and on a concrete pad. (References, 356, 357)

History of Release: There are no documented releases. The area appeared to be well maintained during the VSI. (Reference 356)

5.24.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be low. The design of the unit and relatively small amount of waste generated support this conclusion.

- Surface Water: The release potential to surface water is considered to be low. The design of the unit and relatively small amount of waste generated support this conclusion.

- Air: The release potential to air is considered to be low. The design of the unit, the non-volatile waste managed and relatively small amount of waste generated support this conclusion.

- Subsurface Gas: The release potential to subsurface gas is considered to be low. The low volatility of the waste, the design of the unit and relatively small amount of waste generated support this conclusion.

5.25 SWMU No. 38-39 - Construction Landfills (HELSTF) (Photos: 1-37, -38)

5.25.1 Information Summary

Unit Description: The HELSTF Construction Landfills are located east of the main HELSTF area in the southwestern section of WSMR. At the time of the VSI, there were two unlined trenches currently being used for the disposal of construction debris. Both trenches are approximately 300 feet long and 50 feet wide and reportedly eight feet deep. One trench is oriented approximately southwest to northeast and the other trench is oriented approximately east to west. Construction debris is visible in both trenches. Observations made during the VSI indicated there are no run-on/off controls. The entrance gate had a lock and permission for entrance to the landfill was required. (References 211, 356)

Dates of Operation: The landfill has been receiving waste from approximately the early 1960s to the present. (Reference 356)

Wastes Managed: The landfill receives construction debris from work performed in the HELSTF area. The waste included wood, piping material, paper and insulation. Based on a spill report from June 1986 some

chromium contaminated soil was placed in the landfill. (References 211, 230, 356)

Release Controls: Other than access control there are no release controls associated with these units. (Reference 356)

History of Release: There is no release history for this unit. Construction debris and other forms of refuse were noted to be uncovered during the VSI. (Reference 356, 357)

5.25.2 Release Potential

- Soil/Ground Water: The release potential of this unit to soil/ground water is unknown. This unit primarily receives construction debris. However, there is documented evidence of hazardous waste constituent disposal. A lack of detailed inventory control and an uncertainty of past management practice in this unlined unit supports the release potential conclusion.

- Surface Water: The release potential of this unit to surface water is unknown. This unit primarily receives construction debris. However, there is documented evidence of hazardous waste constituent disposal. A lack of detailed inventory control and the uncertainty of past management practice in this unlined unit supports the release potential conclusion.

- Air: The release potential of this unit to air is unknown. This unit primarily receives construction debris. However, there is documented evidence of hazardous waste constituent disposal. A lack of detailed inventory control and an uncertainty of past management practice in this unlined unit supports the release potential conclusion.

- Subsurface Gas: The release potential of this unit to subsurface gas is unknown. This unit primarily receives

construction debris. However, there is documented evidence of hazardous waste constituent disposal. A lack of detailed inventory control and the uncertainty of past management practice in this unlined unit supports the release potential conclusion.

5.26 SWMU No. 40 - Waste Oil Accumulation Drum

5.26.1 Information Summary

Unit Description: This unit is located at the OSCURA Range near building 9000. This range is operated by the U.S. Air Force. The single drum is a closed-top 55-gallon metal container. The drum is under roof. When the drum is full it is taken to the Holloman Air Force Base for final disposition. The waste oil comes from range vehicle maintenance. (Reference 356)

Dates of Operation: The unit is currently in operation. The start up date is unknown. (Reference 356)

Waste Managed: The waste managed is waste oil collected from range vehicle maintenance activities. A drum is filled up approximately once every six months. (Reference 356)

Release Controls: The closed-topped steel drum and roof cover provide the release controls.

History of Release: There are no known documented releases. The area appeared to be properly maintained during the VSI. (Reference 356)

5.26.2 Release Potential

- Soil/Ground Water: The release potential to soil/ground water is considered to be low. The unit design, amount of waste and type of waste managed support the this conclusion.

- Surface Water: The release potential to surface water is considered to be low. The unit design, amount of waste and type of waste managed support the above conclusion.

- Air: The release potential to air is considered to be low. The unit design, amount of waste and type of waste managed support the above conclusion.

- Subsurface Gas: The release potential to subsurface gas is considered to be low. The unit design, amount of waste and type of waste managed support the above conclusion.

Detonation/Burn Operations (SWMU Nos. 41-46, 54-60)

Demilitarization at WSMR involves destruction of missile debris containing explosives or other hazardous materials and the destruction of unserviceable ammunition and explosives. If possible, the debris is stripped of hazardous material during normal recovery operations. The hazardous material is then destroyed by detonation or burning at the impact site, or transported to a demolition ground (SWMU Nos. 41-46, 50-56) for later destruction.

These disposal techniques are not used for radioactive material. Any material with radioactive contamination is transported to an offpost site licensed by the Nuclear Regulatory Commission (NRC) for disposal of radioisotopes. (Reference 16)

5.27 SWMU No. 41-46 Oscura Detonation/Burn Field Disposal Pits (6) (Photos: 1-39, -40)

5.27.1 Information Summary

Unit Description: The RCRA-regulated Oscura Pits are located north of the Air Force-operated Oscura Range Center in the central portion of WSMR. The pits are used for the disposal of practice bombs after all spotting charges are detonated. The total area of the pits is

approximately 1,000 by 1,000 feet. At the time of the VSI, three pits were open. The pits are trench-like with approximate dimensions of 50 feet by 15 feet and reportedly 12 feet deep. Individual pits vary in size from 20 by 50 by ten feet to 30 by 75 by ten feet layers of waste. One of the open pits is currently active, three pits are covered. The covered pits are distinguishable since they are mounded dirt features with scant vegetation and are denoted by danger signs. The active disposal pit is a large, graded dirt area with several pieces of metal on the surface. The approximate dimensions of the detonation area are 200 feet by 300 feet. According to Oscura personnel, EOD personnel are at the site every 60 days to inspect the used practice bombs and detonate any spotting charges which were not detonated upon hitting the ground. Explosives are placed in a pit, then detonated and burned. After burning, the debris is covered with four inches of fill. The disposal operation is conducted in a progressive manner of layering until the pit is filled, at which time a new pit is dug. At least five units were utilized for burial after detonation.

Previous waste management procedure at the units varied from the present procedure. The practice bombs were collected, placed into a pit, burned and the residue was buried in place. (Reference 186, 211, 349, 354, 356)

Dates of Operation: The initial start up date for these units is unknown. One pit is currently active. (Reference 356)

Wastes Managed: The munitions disposal pits receive practice bombs which are currently constructed of steel and concrete and may have a flare or chemical to discharge smoke. The scrap metal is removed by the Air Force and taken to HAFB. Practice bombs in this area commonly contained white phosphorous. Approximately 200 tons per year of explosives are detonated, burned and buried at WSMR. (Reference 107, 354, 356)

Release Controls: Other than the soil cover provided subsequent to detonation and burning there are no release controls. (Reference 356)

History of Release: Soil sampling conducted at this unit and at Red Rio (SWMU Nos. 54-58) in 1983 reported no hazardous constituents with the exception of explosives RDX and 2,4-DNT in concentrations ranging from 0-4.7 ug/g. Details on sampling methodology and analysis were not provided. At the time of the VSI, approximately 50 pieces of metal less than five inches long were laying on the surface of the detonation area. Additional soil sampling apparently conducted in 1986 according to EP Toxicity Protocol reported barium concentrations at 2.4 ppm. (Reference 349, 356)

5.27.2 Release Potential

- Soil/Ground Water: There is a high release potential to soils since the pits are unlined and the past management procedures are unknown. The release potential to ground water is moderate due to the depth to ground water, high evaporation rates and the practice of detonation and burning which significantly reduces contaminant concentrations.

- Surface Water: There is a low present release potential to surface water since the waste is covered with soil and the large distance to the nearest surface water body. The past release potential is unknown since the management practices are unknown.

- Air: There is a high release potential to air during detonation and burning. Once the waste is covered with soil there is a low release potential.

- Subsurface Gas: There is a low potential for the generation of subsurface gas due to the non-volatile nature of the residues managed by the unit and the porous soil type at the unit.

5.28 SWMU No. 47-49 - North Oscura Landfills (3) (Photos: 1-41,-42, -43,-44)

5.28.1 Information Summary

Unit Description: The landfills are located on a mountain in the northern section of WSMR. The area is located approximately 300 yards off the road on a dirt road in a clearing. At the time of the VSI, there were two open trenches. The smaller of the two open trenches (SWMU No. 47) is closest to the dirt road and orientated approximately east-west. The approximate dimensions of the smaller trench are 40 feet by 50 feet and five feet deep, and is rimmed by a barbed-wire fence. Debris visible in the trench included glass and plastic bottles, rubber tubing, aluminum cans, wood and waste paper. The second open trench (SWMU No. 48) is located farther from the dirt road in an area which is above the surrounding grade with little vegetation and disturbed soil. The trench is oriented north-south and its dimensions are approximately 120 feet long, five feet wide, and six feet deep. Material visible in the trench included glass and plastic bottles, rubber tubing, aluminum cans, wood and waste paper. A mound of dirt approximately ten feet high is situated at the north end of the larger open trench. The north-south soil covered trench (SWMU No. 49) is bordered on the west side by pine trees. The number of other trenches in the area is uncertain. Located north of the landfills amongst the pine trees was some scattered debris including rusted out, 55-gallon drums. (Reference 356, 357)

Dates of Operation: The start up date for the landfills is unknown and they are currently active. (Reference 356)

Wastes Managed: The unit receives waste generated at the North Oscura Range Camp. The camp has little activity at this time and waste generation appears to be minimal. Most of the exposed waste was refuse. However the existence of rusted out, 55-gallon drums in the general area and the unknown past management practices indicates the full range of wastes managed is unknown. (Reference 356)

Release Controls: There are no release controls associated with the trenches which contain exposed waste as observed during the VSI. (Reference 356)

History of Release: There is no release history for this unit. Waste was exposed and debris was scattered about the general area.

5.28.2 Release Potential

- Soil Ground Water: The release potential to soil and ground water is unknown since the exact inventory of waste disposed is unknown.

- Surface Water: The release potential to surface water is unknown since the exact inventory of waste disposed is unknown.

- Air: The release potential to air is unknown since the exact inventory of waste disposed is unknown.

- Subsurface Gas: The potential of subsurface gas generation is unknown since the exact inventory of waste disposed is unknown.

5.29 SWMU No. 50-54 Red Rio Munitions Disposal Areas (5) (also known as Red Rover)

Due to the distance of these units from the Post Area and other SWMUs and time constraints during the VSI, these units were not visited during the VSI. Similar units, the Oscura Detonation/Burn Field and Disposals Pits (SWMU Nos. 41-46) were inspected. The Oscura Range Detonation areas are discussed in Sections 5.27.

5.29.1 Information Summary

Unit Description: These RCRA-regulated disposal areas are located in the northern section of WSMR, off an unnamed dirt road. The units are located approximately halfway between Hunters Lodge and Red Canyon Range Camp in the Chupadera Mesa Area. Reportedly, the units received dummy projectiles dropped during practice at the Red Rio Range (also known as Red Rover) Range. The projectiles were collected and brought to the

unit. A pile of the projectiles would be placed in an open pit, detonated and burned. The residue was buried with four inches of fill and a new pit would be excavated. (Reference 349) The dimensions of the Red Rio Range Explosive Detonation/Pit area are 1,000 feet by 1,000 feet. Individual burial pits reportedly may vary in size from 20 feet by 50 feet by ten feet to 30 feet by 75 feet by ten feet including layers of earth between the waste. (Reference 211) Reportedly at least five pits were created and covered at Red Rio Ranges. (Reference 211, 349, 356)

Dates of Operation: The units are currently active and the date of start up is unknown.

Wastes Managed: The munitions disposal pits receive practice bombs which are currently constructed of steel and concrete and may have a flare or chemical to discharge smoke. The scrap metal is removed by the Air Force and taken to HAFB. Practice bombs in this area commonly contained white phosphorous. Approximately 200 tons per year of explosives are detonated, burned and buried at WSMR. (Reference 107, 354, 356)

Release Controls: Other than the soil cover provided subsequent to detonation and burning there are no release controls. (Reference 356)

History of Release: Soil sampling conducted at this unit and the Oscura Munitions Disposal Pits indicated the presence of RDX and 2,4-DNT at a concentration of 0-4.7 ug/g. The precise locations and other sampling information were not available. Additional soil sampling, apparently performed in 1986, were analyzed according to EP Toxicity Protocol and reported Barium concentrations at 5.2 ppm. (Reference 211, 349, 356)

5.29.2 Release Potential

- Soil Ground Water: There is a high release potential to soils since the pits are unlined and the past management procedures are unknown. The release potential to ground water is moderate due to the depth to ground water, high evaporation rates and

the practice of detonation and burning which significantly reduces contaminant concentrations.

- Surface Water: There is a low present release potential to surface water since the waste is covered with soil and the large distance to the nearest surface water body. The past release potential is unknown since the management practices are unknown.

- Air: There is a high release potential to air during detonation and burning. Once the waste is covered with soil there is a low release potential.

- Subsurface Gas: There is a low potential for the generation of subsurface gas due to the non-volatile nature of the residues managed by the unit and the porous soil type at the unit.

Hazardous Test Area (SWMU Nos. 55, 56)

The Hazardous Test Area (HTA) is located about ten miles due northwest of the main Post Area and consists of approximately 9,400 acres. This area, located in the protected bowl formed by the surrounding San Andres Mountains, is used for several missions and functions. The ElectroMagnetic Radiation Effects (EMRE) Lab, located in this area, performs high frequency radiation tests and evaluation of effects on missile systems, parts, components, and related equipment. Certain hazardous vibrator and drop tests on explosive missile component parts are also performed in this area. In addition, a corner of this area is used for the demolition of explosive residue and material waste (SWMU Nos. 59, 60). (Reference 16)

5.30 SWMU No. 55 - Burn Pan Hazardous Test Area (Photos: 1-45)

5.30.1 Information Summary

Unit Description: The RCRA-regulated (Subpart X) burn pan is located in the Hazard Test Area, which is approximately ten miles northwest of the Main Post. The HTA Detonation Pit (SWMU No. 56) is east of this unit. The burn pan is constructed of steel with approximate dimensions of ten feet long, five feet wide and three feet tall. The burn pan body is attached to wheels which are mounted on a track. This burn pan is a replacement unit and has not been used. At least one other burn pan was previously located at the HTA. The previous burn pan was constructed from an old rocket engine and was used to burn small arms munitions and flares. (Reference 189, 356)

Dates of Operation: The date of operation of the old burn pans is unknown. The current pan has not been put into use and will not be used until a Part B permit is received. (Reference 356)

Wastes Managed: Dunnage soaked with diesel was added to the pan in the past to ensure complete combustion of all materials. Small arms, munitions and flares were open burned. (Reference 107, 356)

Release Controls: The metal pan provides containment for the burning operation. (Reference 356)

History of Release: There is no release history for the unit. During the VSI the general area appeared to be well maintained. (Reference 356)

5.30.2 Release Potential

- Soil/Ground Water: In the past there was a low release potential to soil and ground water since the materials were contained while burned. There is presently no release since the unit is inactive.

- Surface Water: In the past there was a low release potential to surface water since the materials were contained while burned. There is presently no release since the unit is inactive.

- Air: In the past there was a high release potential to air during burning operations. There is presently no release since the unit is inactive.

- Subsurface Gas: In the past there was a low for generating subsurface gas since the remaining residues after burning are considered not to be volatile. There is presently no release since the unit is inactive.

5.31 SWMU No. 56 - Detonation Pit (HTA) (Photos: 1-46, 47)

5.31.1 Information Summary

Unit Description: The Detonation Pit, a RCRA-regulated unit (Subpart X), is located in the southern section of WSMR approximately ten miles northwest of the Main Post. Range Road 280 leads into and through the unit. The unit is excavated in native soil and is roughly circular in shape with a diameter of approximately 400 feet. Dimensions of the area provided in the 1988 Part A Application are 200 feet by 200 feet with Range Road 280 bisecting the unit. According to WSMR personnel familiar with the unit, the pit is used approximately every two weeks for the detonation of explosives which did not explode on impact during testing. Soil is mounded over the explosives and then tamped prior to detonation. The average weight of the unexploded solid fuel rocket motors, bombs and other high explosives to be detonated is 5,000 pounds or less. Previous detonations at the pit were done by excavating a ring pit. The explosives were placed a three foot deep ring in the center of the pit along with diesel or propellant and high explosive charge. The pit area is used two times per month, although it has a capacity to be used once a week. At the time of the VSI, the soil was noted to be badly stained in several areas and small pieces (one or two inches) of metal fragments were lying on the surface. (Reference 107, 349, 356, 357)

Dates of Operation: The unit has been active since at least 1968 and is currently active. (Reference 356)

Wastes Managed: The detonation pit receives unexploded test bombs, solid fuel rocket motars and other high explosives, guided missiles and submunitions retrieved from testing sites at WSMR. Scrap iron (shrapnel and fragments) is retrieved for metal value.

History of Release: There is no release history for the unit. However, stained soil was noted during the VSI. Twelve soil samples collected in 1986 in the detonation area were composited and analyzed using EP Toxicity protocol. At a concentration of 15.0 ppm, barium was the only metal reported. (Reference 211, 356)

5.31.2 Release Potential

- Soil/Ground Water: There is a high release potential to soil due to the lack of release controls. All potentially hazardous material is allowed direct contact with the soil. There is a moderate release potential to ground water due to the proximity of the area to the foothills of the Organ Mountains. A higher water table exists at the rim of the basin.

- Surface Water: There is a moderate release potential to surface water due to the possibility of increased surface runoff in the area due to the proximity of the Organ Mountains.

- Air: There is a moderate release potential to the air since the materials to be detonated are covered with soil prior to detonation.

- Subsurface Gas: There is a low potential for the generation of subsurface gas due to the non-volatile residue remaining upon detonation.

5.32 SWMU No. 57-60 - Burial Areas (Tula Peak Pit) (Photo: 1-52, 54-57)

5.32.1 Information Summary

Unit Description: The Tula Peak Burial Area is located near the boundary between Holloman Air Force Base and WSMR. Facility personnel were unable to determine the precise location with regard to Air Force or Army jurisdiction. The site was investigated by the VSI team as a result of aerial photography identification in an update to the Initial Installation Assessment. (Reference 352) The burial areas are located approximately one quarter mile east of Holloman Air Force Base Road 9, off an unmaintained dirt road. The burial pits are approximately 420 feet south of the unmaintained dirt road. There were four burial pits within 75 feet of each other. The southernmost pit (SWMU No. 57) contained weathered grenades and various sized metal fragments. The approximate dimensions of the pit are 20 feet long, 8 feet wide and 3 to 5 feet deep. Located at the north side of the pit southernmost is a rusted incinerator (SWMU No. 61). Approximately 65 feet west of the incinerator is another pit (SWMU No. 58) which contains metallic debris. The debris includes rocket booster pieces, large pieces of scrap metal and approximately three-inch diameter bomblets. This pit is approximately 15 feet wide, 30 feet long and four to five feet deep. North of the booster debris pit (SWMU No. 58) the ground surface was heavily strewn with three-inch diameter bomblets. Located approximately 40 feet north of the booster pit (SWMU No. 62) is another pit area (SWMU No. 59). This area consists of three long, narrow covered trenches. The trenches are approximately three to five feet wide, three feet or less of mounded soil defined the width of the trenches, and all were approximately 80 feet long. The soil over the trenches appeared disturbed and sparsely vegetated. Minor metallic debris was scattered around the trenches. East of the narrow trenches (SWMU No. 59) is another area containing pits (SWMU No. 60). Two roughly circular pits have diameters of eight feet and 12 feet and a maximum depth of four feet. Soil immediately south of the two pits was mounded and could be

the excavated material from the pits. These units are currently inactive but open. (Reference 352, 356)

Dates of Operation: The age of these units are unknown. It appeared that the units had not been in use for at least several years. (Reference 356)

Wastes Managed: It appears the area was used for detonation, burning, and final burial of the residue of grenades, and missile parts bomblets. Expected contaminants would include Lead, Cadmium, 2,4-Dinitrotoluene, 2,6-Dinitrotoluone, Hydrazine and Furfural. (Reference 356)

History of Release: The update to the Initial Installation Assessment - Reference 352 identifies these units. There was an abundance of old grenades, missile parts and bomblets scattered on the surface and in the pits. (Reference 352, 356)

5.32.2 Release Potential

- Soil/Ground Water: There is a high release potential to soil and ground water due to the absence of release controls.

- Surface Water: There is a moderate release potential to surface water since there are no run-on or run-off controls. The nearest surface water are the ponds located approximately 3,000 feet west of the burial sites.

- Air: The release potential to the air during detonation and burning was high. The present release potential is considered to be low.

- Subsurface Gas: There is low potential for the generation of subsurface gas due to the non-volatile residue waste managed and the permeable soil types at the unit.

5.33 SWMU No. 61 - Incinerator (Photos: 1-52, -53)

5.33.1 Information Summary

Unit Description: This unit was investigated by the VSI team as a result of aerial photograph identification in an update of the Initial Installation Assessment. (Reference 352) The incinerator is located at the east side of the Burial Areas (SWMU Nos. 57-60). The incinerator is barrel-shaped and stands on legs approximately two feet above ground surface. The incinerator is heavily rusted. Weathered grenades and bomblets were in the incinerator and littered over the ground surface. The unit is currently inactive and exposed to the weather elements. (Reference 352, 356)

Dates of Operation: The age of the unit is unknown. It appeared that the unit had not been in use for at least several years. (Reference 356)

Wastes Managed: It appears the area was used for incineration of grenades and bomblets. Expected contaminants would include Lead, Cadmium, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, Hydrazine and Furfural. (Reference 356)

Release Controls: The only release control was the containerization of the waste in the body of the unit during incineration.

History of Releases: There is no documented release history for the unit. There was an abundance of old grenades and bomblets scattered on the ground surface.

5.33.2 Release Potential

- Soil/Groundwater: The past release potential to soil/ground water is considered to be high as suggested by the amount of debris located on the ground in the immediate vicinity of this

unit. Since the unit is inactive the present release potential is minimal.

- Surface Water: The past release potential to surface water is considered to be moderate. There are no run-on or run-off controls. The nearest surface water is approximately one-half mile away. The present release potential is minimal since the unit is inactive.

- Air: The past release potential to air during unit operation is considered to be high. There is no present release potential since the unit is inactive.

- Subsurface Gas: The past potential of subsurface gas generation is considered to be low since the incinerated residue is not volatile. There is no present release potential since the unit is inactive.

5.34 SWMU No. 62 - Former Sewage Treatment Plant

5.34.1 Information Summary

Unit Description: This unit was a wastewater treatment plant reportedly located adjacent to the present horse stables. The plant was abandoned in 1958 when the new STP was constructed. The plant was reported to have consisted of an Imhoff Tank. A facility representative reported that effluent from the tank may have drained into a nearby ditch. The update to the Installation Assessment-Reference 352, reported that, "sewage plant effluent was discharged into a percolation ditch east of the Main Post Area". No information was available on the management of sludges from the unit. The VSI team visited the reported site of the former sewage treatment plant; however, no visible evidence remained. Facility representatives reported that the site has been regraded in the past. [Typical Imhoff Tanks consist of a two-story tank; sedimentation occurs in the lower story. Solids from the upper tank pass through slots into the lower tank for digestion. Scum accumulates on the surface in the

upper tank, and gas produced in the digestion process is vented to the atmosphere.] No further information is available on the Imhoff Tank utilized at WSMR or the operational procedures. The update to the Installation Assessment recommended an SI to "include as a minimum: Ground water sampling around the former STP percolation ditch for priority pollutants".(Reference 352, 353, 356)

Dates of Operation: The date of start up is unknown. Reportedly operations ceased in 1958.

Wastes Managed: This plant reportedly treated sewage wastes from the Post Area. Because there are no separate process sewer lines on the Post, this unit was also likely to receive any chemical wastes from tenant activities and support operations such as various photo and chemical labs. It is expected the wastes managed would have been similar to those handled by the active Sewage Treatment Plant (SWMU Nos. 66-84). Therefore such hazardous constituents as metals, cyanides and solvents would have been in the wastes.

Release Controls: No information was available regarding release controls at this unit.

History of Release: No history of release was reported, although effluent from the Imhoff Tank was reported to have discharged to a nearby ditch. No evidence of contamination was noted during the VSI. (Reference 356)

5.34.2 Release Potential

- Soil/Ground Water: The potential for past release to soil and ground water is high based on the reported discharge of effluent to a nearby drainage ditch There is no current release potential based on the dismantling of the unit nearly 30 years ago and the regrading of the vicinity.

- Surface Water: The potential for past release to surface water is high based on the reported discharge of effluent to a nearby drainage ditch. There is no current release potential based on the dismantling of the unit nearly 30 years ago and the regrading of the vicinity.

- Air: The potential for past release to air is unknown based on lack of information on operational procedures. There is no current release potential based on the dismantling of the unit nearly 30 years ago.

- Subsurface Gas: The potential for past generation of gases is unknown based on lack of information on operational procedures. There is no present potential for subsurface gas generation based on the dismantling of the unit.

5.35 SWMU Nos. 63-65 Former Sanitary Landfills in Post Area (Photos: 1-65,- 66)

5.35.1 Information Summary

Unit Description: Three former sanitary landfills were operated at various times in the Post Area prior to construction of the currently active landfill (SWMU No. 86). The original landfill, closed in 1948, is presently the site of WSMR Building 1678. (Reference 16) The second landfill, operated from 1948 until 1965, is the present site of Building 1747. (Reference 16) The third landfill, operated from 1965 until 1982, was closed because it overlies the fresh water aquifer utilized by WSMR, and because it was too close to the Nuclear Effects Laboratory. (Reference 352) All three landfills were located in the southeast area of the Post. No information was available on the operation and management of these units. The update to the Installation Assessment (Reference 352) concludes, "Available information relative to contaminants and contaminant sources indicates a potential for contaminant migration by subsurface waters" by these units. This same

report recommends, "Ground water sampling around the Main Post landfills for priority pollutants".

Dates of Operation: The exact start-up date of the original landfill could not be determined, but possibly coincides with the beginning of activities on WSMR in the early 1940s; the unit operated until 1948. The second landfill operated from 1948 until 1965. The third landfill operated from 1965 until 1982.

Wastes Managed: These units are described in the references as sanitary landfills. Details are not available on the types of waste which were managed, where the waste was generated, or the volumes of waste which were disposed. One reference states that only "inert materials" were disposed. These units were in operation prior to implementation of RCRA and prior to the operation of the Hazardous Waste Landfill (SWMU No. 91). The generation and management of wastes containing hazardous constituents prior to 1972 at WSMR is unknown. (Reference 16, 352)

Release Controls: No historical information was available on the design, construction and operating procedures used at these units.

Release History: No documentation of a release from any of these units was found in the file material. No visual evidence of a release was noted during the VSI. (Reference 356)

5.35.2 Release Potential

- Soil/Ground Water: The potential for past and present releases to soil and ground water is unknown based on the age of the units and the lack of information regarding the type of wastes received and the past waste management practices.

- Surface Water: The potential for past releases to surface water is unknown based on the age of the units and the lack of information regarding the types of wastes received and the past waste management practices. The potential for ongoing releases

to surface water from these units is low based on their inactivity and the distance to a surface water body.

- Air: The potential for past releases to air from these units is unknown based on the age of the units and the lack of information regarding the types of waste received and the past waste management practices. The potential for ongoing releases to air from these units is low based on the VSI and the current use of the land for other purposes.

- Subsurface Gas: The potential for past generation of subsurface gas is unknown based on the lack of information regarding the types of wastes which may have been managed in the past. The potential for ongoing generation of subsurface gas is low based on the age of the units.

Sewage Treatment Plant (STP)

SWMU Nos. 66 through 8' are located at the Sewage Treatment Plant which is located three miles southeast of the Post. The effluent from the STP discharges to a dry lake bed, called the Playa Lake, from which the effluent either evaporates or percolates into the surrounding soils. The STP is not currently regulated under a NPDES permit because the effluent does not discharge to a surface water body. Past waste management practices at WSMR have resulted in documented releases of hazardous constituents (metals, yanides, and toluene) to the STP. At least one incident caused the STP to be shut down for several days. Though current waste management practices at WSMR have emphasized proper disposal of laboratory chemicals and wastes from operational activities, no routine testing is done to ensure that hazardous constituents do not reach the STP. WSMR does not maintain a separate wastewater treatment system for process wastewaters. The STP receives wastewater from industrial sources such as the Photography Facility, boiler blowdown, deionizer regenerant brines, laboratories, paint spray booths, steam cleaning facilities, and vehicle washracks. Some of these units also discharge to the storm drain system. The potential exists for ongoing releases to the STP which are

unregulated under NPDES. For these reasons, the units at the STP have been treated as Solid Waste Management Units. (References 16, 46, 47, 48, 352, 356, 362)

5.36 SWMU No. 66 - Influent Sewer Line (STP) (Photo 2-2)

5.36.1 Information Summary

Unit Description: This unit is the underground sewer line which extends several miles from the Post Area to the STP. Facility representatives reported that the line is constructed of concrete or vitrified clay. The line is reported to be the original line installed in 1958 when the STP was constructed. (Reference 16)

Dates of Operation: 1958 to present.

Wastes Managed: This unit conveys sewage and wastewater from the Post Area to the STP.

Release Controls: No release controls were reported or observed. (Reference 356)

History of Release: No history of release has been reported.

5.36.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is high based on the age of the unit, the length of the pipeline and the likelihood of structural degradation.

- Surface Water: The potential for release to surface water is low based on the underground design of the unit.

- Air: The potential for release to air is low based on the underground design of the unit.

- Subsurface Gas: The potential for subsurface gas generation is moderate based on age of the unit and the possibility of leakage of raw waste from the sewer line.

5.37 SWMU No. 67 - Bar Screen/Grinder (STP) (Photo 2-1)

5.37.1 Information Summary

Unit Description: This unit is the first unit to receive wastes at the STP, and is located in the eastern end of the STP. It is a partially below-grade tank constructed of six-inch concrete. The estimated dimensions are six feet by ten feet, and three to five feet deep. The unit is equipped with a bar screen and grinder for the separation and grinding of large pieces of debris present in the influent. The waste stream is received from the Sewage Influent Pipe (SWMU No. 66) and is conveyed directly to the Grid Ditch (SWMU No. 70). Facility personnel reported that grab samples are analyzed only when strong odors are noted.

Dates of Operation: 1958 to present.

Wastes Managed: The STP receives sanitary wastewater from the Post area. These wastes include all domestic wastes, wastes from Post operations and tenants, and septic tank wastes transferred by truck from remote locations on the base. Facility personnel reported that toluene and heavy metals have been found in the waste stream in the past. (Reference 356)

Release Controls: No release controls were reported other than manual shut-off.

History of Release: No evidence of a release was observed or reported during the PR/VSI.

5.37.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the concrete construction of the unit.

- Surface Water: The potential for release to surface water is low based on the distance to the nearest perennial surface water body.

- Air: The potential for release to air is low based on the expected low concentration of volatile hazardous constituents.

- Subsurface Gas: There is no potential for subsurface gas generation based on the concrete construction of the unit.

5.38 SWMU No. 68-69 - North and South Primary Clarifiers (STP) (Photos 2-3)

5.38.1 Information Summary

Unit Description: These units are two circular, open-topped, concrete tanks located in the eastern portion of the STP. They are 35 feet in diameter, and approximately seven feet deep, with slightly below-grade construction. The reported operating capacity of the units is one million gallons/day. The purpose of the unit is for the gravity settlement of solids. Facility representatives reported no chemicals are added to facilitate settlement. Film is skimmed from the surface and pumped along with the bottom solids to the Primary Digester (SWMU No. 77). The effluent overflows a weir and is conveyed to Splitter Box 2 by an 18 inch vitrous clay pipe.

Dates of Operation: 1958 to present (Reference 16, 356)

Wastes Managed: This unit receives wastewater from the Grid Ditch/Splitter Box 1 (SWMU No. 70).

5.38.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the concrete construction of the unit and the reported routine inspection of the integrity of the unit conducted by the facility.

- Surface Water: The potential for release to surface water is low based on the observed operating conditions of the unit and absence of nearby perennial surface water.

- Air: The potential for release to air is low based on the expected low concentrations of volatile hazardous constituents.

- Subsurface Gas: There is no potential for subsurface gas generation based on the concrete construction of the unit and the reported routine inspection of the integrity of the unit conducted by the facility.

5.39 SWMU No. 70- Grid Ditch/Splitter Box 1 (STP) (Photo 2-3)

5.39.1 Information Summary

Unit Description: This unit is an extension of the Bar Screen/Grinder (SWMU No. 67) and is located in the eastern end of the STP. The Grid Ditch consists of two parallel channels, constructed of six inch concrete, approximately 30 feet long, two feet wide and three feet deep. The channels serve to slow the flow of the waste stream to facilitate the settlement of solids prior to the wastes flowing into the adjacent Splitter Box 1. The influent from the Bar Screen/Grinder is alternated between the two channels on a weekly basis. One channel conducts the waste stream while the other is closed off to allow for evaporation. The dried sediment is removed from the closed channel and trucked to the Sanitary Landfill (SWMU No. 86) for disposal. During the VSI, the wastewater was observed to be approximately six inches deep through the Grid Ditch. (Reference 356)

The Splitter Box 1 is a concrete sump which receives wastewater from the active channel of the Grid Ditch. The sump is covered with a metal grate. The estimated dimensions are eight feet by four feet by four feet. The splitter box is equipped with a manually controlled gate to divert wastes to one of the two Primary Clarifiers (SWMU Nos. 48 and 49). No visual evidence of cracks was observed in the unit at the time of the VSI.

Dates of Operation: 1958 to present. (Reference 356)

Wastes Managed: This unit receives wastewater from the Bar Screen/ Grinder and solids from the Secondary Clarifiers (SWMU Nos. 74 and 75) for recirculation.

Release Controls: The unit is equipped with a manually operated by-pass channel located on the south side of the bar screen.

History of Release: No history of release was observed or reported during the PR/VSI.

5.39.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on concrete construction of the unit.

- Surface Water: The potential for release to surface water is low based on the observed depth of wastes in the unit and the available capacity to avoid overflow.

- Air: The potential for release to air is low based on the expected low concentrations of volatile constituents in the waste stream.

- Subsurface Gas: There is no potential for subsurface gas generation based on the concrete, above-ground construction of the unit.

5.40 SWMU Nos. 71-72 - North and South Trickling Filters (STP) (Photos 2-7,-8)

5.40.1 Information Summary

Unit Description: This unit is a circular, inground concrete basin filled with rocks/crushed stone supporting a fixed-growth biological treatment system. Influent is sprayed over the stone by rotating radial arms; the spray may be adjusted for either two- or four-arm spray. The unit is 100 feet in diameter and six and one-half feet deep. Facility representatives stated the effluent is conveyed to Splitter Box 3 by pipes constructed of cast iron or vitrous clay. Periodically, the level of wastewater is elevated to completely cover the rocks in order to control flies. No evidence of release was observed during the VSI.

Dates of Operation: 1958 to present. (Reference 356)

Wastes Managed: This unit receives effluent from the Primary Clarifiers via Splitter Box 2.

Release Controls: No release controls other than manual shut-off were reported for this unit. Flow rate can vary due to the number of spray arms used to deliver the spray.

History of Release: No evidence of release was observed or reported during the VSI.

5.40.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on concrete construction of the unit.

- Surface Wate : The potential for release to surface water is low based on manual overflow controls and distance to surface water.

- Air: The potential for release to air is low based on reported dilute concentration of volatile wastes constituents.

- Subsurface Gas: There is no potential for subsurface gas generation based on the concrete construction of the unit.

5.41 SWMU No. 73 - Splitter Box 2 (STP) (Photo not provided)

5.41.1 Information Summary

Unit Description: This unit is a concrete, below ground sump which is used for the distribution of the wastewater. Splitter Box 2 receives effluent from both the North and South Primary Clarifiers (SWMU Nos. 68-69). The waste streams are combined and diverted by manually controlled gates to one of the two Trickling Filters (SWMU No. 71-72). The concrete appeared to be six inches thick; however, the integrity of the underground unit could not be determined during the VSI.

Dates of Operation: 1958 to present. (Reference 356)

Wastes Managed: This unit receives effluent from the North and South Primary Clarifiers (SWMU Nos. 68 and 69).

Release Controls: No release controls, except for manual shut-off valves were reported for this unit.

History of Release: No history of release was observed or reported during the VSI.

5.41.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water cannot be evaluated based on the unknown integrity of the unit.

- Surface Water: The potential for release to surface water is low based on below ground design of the unit and distance to surface water.

- Air: The potential for release to air is low based on below ground design of unit.

- Subsurface Gas: The potential for subsurface gas generation cannot be determined based on the unknown integrity of the unit, however it is likely to be low.

5.42 SWMUs Nos. 74-75- North and South Secondary Clarifiers (Photos 2-9,10)

5.42.1 Information Summary

Unit Description: These units are open-topped, below-grade concrete tanks used for the final clarification of the waste stream prior to discharge of the effluent to the Playa Lake (SWMU No. 85). These units are 35 feet in diameter and approximately 14 feet deep. The bottom of the tanks are cone shaped. At the time of the VSI, the tanks contained an estimated seven feet of wastewater. The effluent flows via Splitter Box 4 to two head gates. Since 1986, effluent has been discharged three miles east of the STP to the Playa Lake via a PVC pipeline. Prior to 1986, effluent discharged to the North and South Drainage Ditches (SWMU Nos. 82-83). Solids which settle in the Secondary Clarifiers are pumped via Splitter Box #1 (SWMU No. 70) back into the Primary Clarifiers (SWMU Nos. 68-69). (Reference 356)

Dates of Operation: 19 8 to present. (Reference 356)

Wastes Managed: This unit receives effluent from the Trickling Filters (SWMU Nos.71-72) via Splitter Box 3 (SWMU No. 76).

Release Controls: No release controls were reported other than the

manual flow control valves. Facility representatives reported that the integrity of the unit is inspected once per year. (Reference 356)

History of Releases: No evidence of a release was observed or reported during the VSI.

5.42.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the concrete construction of the unit and the reported routine inspection by the facility.

- Surface Water: The potential for release to surface water is low based on the observed wastewater level and the absence of surface waters in the vicinity.

- Air: The potential for release to air is low based on the likely low concentration of volatile or hazardous constituents in the waste stream.

- Subsurface Gas: There is no potential for subsurface gas generation based on the concrete construction of the unit and the reported routine inspection of the unit.

5.43 SWMU No. 76 - Splitter Box 3 (STP)

5.43.1 Information Summary

Unit Description: This unit is a concrete, below-grade sump which is used for the distribution of the wastewater effluent from the North and South Trickling Filters (SWMU Nos.71-72). The waste streams are combined and then diverted by manually controlled gates to one of the two secondary clarifiers. The concrete walls appeared to be six inches thick, however the integrity of the underground unit could not be determined during the VSI. (Reference 356)

Dates of Operation: 1958 to present. (Reference 356)

Wastes Managed: This unit receives wastewater effluent from the North and South Trickling Filters (SWMU Nos. 71-72).

Release Controls: No release controls, except for manual shut-off valves, were reported for this unit.

History of Release: No history of release was observed or reported during the VSI.

5.43.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water cannot be evaluated based on the unknown integrity of the unit.

- Surface Water: The potential for release to surface water is low based on below ground design of the unit.

- Air: The potential for release to air is low based on the below ground design of the unit.

- Subsurface Gas: The potential for subsurface gas generation cannot be evaluated based on the unknown integrity of the unit.

5.44 SWMU No. 77 - Primary Digester (STP)

5.44.1 Information Summary

Unit Description: This unit is the first of two anaerobic digesters which operate in series. The aboveground concrete tank is 35 feet in diameter, and is an estimated 26 feet in height. The estimated capacity is 180,000 gallons. The close topped unit receives solids from the North and South Secondary Clarifiers (SWMU Nos. 74-75). Sludges are conveyed by gravity flow to the Secondary Digester (SWMU No. 78). A side stream

of sludge is recirculated by four-inch pipes through the Boiler for heat exchange to facilitate the reaction. Methane produced in the Digester is mixed with natural gas and burned as fuel in the Boiler. Excess methane is vented through the Methane Flare (AOC F). (Reference 356)

Dates of Operation: 1958 to present.

Wastes Managed: This unit receives solids from the Primary Clarifiers (SWMU Nos. 68-69). Facility representatives reported that sludges are tested once a month for weight and percent water; however, no analyses for hazardous constituents are reported.

Release Controls: No release controls were reported.

History of Release: No evidence of release was reported or observed during the VSI.

5.44.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the aboveground concrete construction of the unit.

- Surface Water: The potential for release to surface water is low based on enclosed design of the unit.

- Air: The potential for release to air is low based on the enclosed design of the unit. However, the unit does vent to the nearby Methane Flare (AOC F).

- Subsurface Gas: There is no potential for subsurface gas generation based on the above-ground enclosed design of the unit.

5.45 SWMU No. 78 - Secondary Digester (STP)

5.45.1 Information Summary

Unit Description: This unit is the second of two anaerobic digesters which operate in series. The aboveground tank is 35 feet in diameter and is an estimated 26 feet in height. The lower 16 feet of the unit is lined with six-inch reinforced concrete for support. The enclosed unit receives solids from the Primary Digester (SWMU No. 77). Solids from this unit are discharged to the Sludge Beds (SWMU No. 79). Methane produced in the Digester is either conveyed to the boiler for mixture with natural gas for use as fuel, or to the Methane Flare (AOC F). (Reference 356)

Dates of Operation: 1958 to present.

Wastes Managed: This unit receives sludges from the Primary Digester.

Release Controls: No release controls were reported.

History of Release: No evidence of release was reported or observed during the VSI.

5.45.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the aboveground, concrete construction of the unit.

- Surface Water: The potential for release to surface water is low based on the enclosed design of the unit.

- Air: The potential for release to air is low, based on enclosed design of the unit. However, the unit does vent to the nearby Methane Flare (AOC F).

- Subsurface Gas: There is no potential for subsurface gas generation based on the aboveground, enclosed design of the unit.

5.46 SWMU No. 79 - Sludge Beds (Photos 2-15, -16)

5.46.1 Information Summary

Unit Description: This unit is a series of 11 parallel beds used for the drying of the STP sludge. The beds are separated by two-foot high concrete walls, and have sand bottoms. The unit is bounded on the north by a concrete distribution trough, (approximately two feet wide and two feet high) for the entire length of the beds. Each bed is estimated to be 15 to 20 feet wide and 50 feet long. The southern end of each bed is designed with an elevated concrete drive for unloading of the sludge from trucks. Sludge is deposited in the beds approximately once a month, and the dried sludge is cleaned out once a year. Facility representatives estimated that three to four cubic yards of sludge cake is removed from each cell each year. The cake is disposed of at the Sanitary Landfill (SWMU 86). A two-inch layer of dried sludge was observed in each of the beds at the time of the VSI. (Reference 356)

Dates of Operation: This unit was originally constructed in 1958. The unit was reconstructed after a flood washed the unit out in 1978.

Wastes Managed: This unit receives sludges from the two Primary Clarifiers (SWMU Nos. 68-69). Facility representatives were not aware of any analysis for hazardous constituents performed on the sludge or the soil bottoms of the beds.

Release Controls: The units are surrounded on three sides with two-foot high concrete walls. The fourth side is a loading ramp which slopes from grade level down into the unit approximately five feet.

History of Release: In 1978, flood water destroyed the Sludge Beds. The debris was removed and stored in the nearby Waste Pile (SWMU No. 80).

5.46.2 Release Potential

- o Soil/Ground Water: The potential for release to soil and ground water is high based on the probability of heavy metal constituents leaching into the soils.

- o Surface Water: The potential for past release to surface water is high based on reported flood waters infiltrating the unit in 1978. The potential for on going release to surface water is low based on the two-foot high containment walls and the absence of nearby perennial surface water.

- o Air: The potential for release to air is low based on the likely low concentration of volatile waste constituents.

- o Subsurface Gas: There is no potential for subsurface gas generation based on the application of the wastes directly on the ground for evaporation.

5.47 SWMU No. 80 - Waste Pile (STP) (Photo 2-17)

5.47.1 Information Summary

Unit Description: The unit is a soil/sludge waste pile located southeast of the Sludge Beds (SWMU No. 79). The estimated dimensions of the pile are 50 feet by 75 feet and ten feet high. The waste pile sits directly on the ground. The pile contains debris, sludge and excavated soils generated in the clean up of the Sludge Bed which was destroyed in the 1978 flood. Remains of the concrete form of the old bed along with the sludge were visible in the pile at the time of the VSI. Facility representatives reported that after the flood had washed out the bed, the resulting debris was stockpiled at this location. (Reference 356)

Dates of Operation: 1978 to present. (Reference 356)

Wastes Managed: This unit stores STP sludge, concrete debris and excavated soils from the cleanup of the old Sludge Bed. The STP sludge is likely to contain heavy metals.

Release Controls: No release controls were observed or reported at the time of the VSI.

History of Release: There is no documented history of release from this unit.

5.47.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is moderate to high based on the direct deposit of wastes on the soil and the exposure of the waste pile to wind and runoff.

- Surface Water: The potential for past release to surface water is low based on the distance to perennial surface waters.

- Air: The potential for release to air is low based on the likely absence of volatile constituents in the wastestream. There is a chance of particulate release from the waste pile due to its exposure to the wind.

- Subsurface Gas: There is no potential for subsurface gas generation based on storage of dried sludge and soils in the waste pile and the arid conditions in the area.

5.48 SWMU No. 81 - Boiler (STP) (Photo: 2-18)

5.48.1 Information Summary

Unit Description: This unit is an Envirox Boiler located inside the boiler house within the central portion of the STP. Sludge from the Primary Digester (SWMU No. 77) is circulated through four-inch pipes through the boiler for heating. The sludge remains in the enclosed pipe with no entry into the heating chamber. The heated sludge is returned to the Primary Digester. The boiler is fueled by a natural gas supplemented with methane from the Primary Digester. (Reference 356)

Dates of Operation: 1958 to present.

Wastes Managed: This unit serves to heat the sludges from the Primary Digester. Methane generated in the Digester is used as supplemental fuel for the boiler.

Release Controls: The wastes are contained within enclosed pipes. The boiler is housed within a corrugated steel building with a concrete floor.

History of Release: No history of release has been reported or observed for this unit.

5.48.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the location of the unit inside a building and the closed-loop recirculation of the wastes inside an enclosed pipe.

- Surface Water: The potential for release to surface water is low based on the location of the unit inside a building and the closed-loop recirculation of the wastes inside an enclosed pipe.

- Air: The potential for release to air is low based on the location of the unit inside a building and the closed-loop recirculation of the wastes inside an enclosed pipe.

- Subsurface Gas: The potential for subsurface gas generation based on the aboveground location of the unit inside a building.

5.49 SWMU Nos. 82-83 Former Drainage Ditches (2) (Photo 2-19)

5.49.1 Information Summary

Unit Description: These units are two natural soil ditches located east of the STP. Prior to construction of the effluent pipeline which now discharges to the Playa Lake, these units served as evaporation beds for effluent from the Secondary Clarifiers (SWMU Nos. 74-75) at the STP. The wastes were conveyed from the Splitter Box to two head gates, where the wastes were manually diverted to either of these two drainage ditches. The North Drainage Ditch (SWMU No. 82) was observed during the VSI. Facility representatives reported that the area has recently been regraded and has been excavated into what appears to be a dry impoundment approximately 600 feet by 600 feet by 12 feet deep. The facility representative was unable to state the intended purpose of the new impoundment. This area no longer receives effluent from the STP. The Southern Drainage Ditch (SWMU No. 83) was not accessible during the VSI due to poor road conditions. (Reference 356)

Dates of Operation: 1958 to 1986.

Wastes Managed: These units formerly received effluent from the Secondary Clarifiers at the STP. Effluent from the STP no longer discharges to this area.

Release Controls: No release controls were observed or reported.

History of Release: No documented history of release was observed or reported; however, the area has been significantly regraded since its use as a discharge/evaporation area was discontinued.

5.49.2 Release Potential

- Soil/Ground Water: The potential for past release to soil and ground water is high based on the discharge of STP effluent directly to the native soils. There is no ongoing release potential because the units no longer receive effluent from the STP.

- Surface Water: The potential for past release to surface water is low based on the absence of perennial surface water in the vicinity. There is no ongoing release potential because the units no longer receive effluent from the STP.

- Air: The potential for release to air is low based on the likelihood of significant quantities of volatile constituents remaining in the wastes after treatment. There is no ongoing release potential because the units no longer receive effluent from the STP.

- Subsurface Gas: There is no potential for subsurface gas generation. The effluent was discharged to the surface for evaporation. The concentration of biodegradable hazardous constituents was likely to be low.

5.50 SWMU No. 84 - Effluent Pipeline (STP)

5.50.1 Information Summary

Unit Description: This unit is an underground PVC pipeline which carries treated effluent from the STP to the Playa Lake (SWMU No. 85). The pipeline extends a distance of approximately three miles. The exact

discharge point into the Playa Lake could not be located at the time of the VSI. (Reference 356)

Dates of Operation: The unit reportedly was constructed in 1986 when discharge to the Playa Lake began.

Wastes Managed: This unit conveys treated effluent from the STP to the Playa Lake.

Release Controls: No release controls were reported.

History of Release: No history of release was observed or reported.

5.50.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the relatively new installation of the PVC piping.

- Surface Water: The potential for release to surface water is low based on the below ground location of the unit and the absence of perennial surface water in the area.

- Air: The potential for release to air is low based on the enclosed, underground design of the unit.

- Subsurface Gas: The potential for subsurface gas generation is low based on the relatively new construction of the pipeline and likely low concentrations of gas-generating constituents in the treated effluent.

5.51 SWMU No. 85 - Playa Lake (Photo 2-24, -25)

5.51.1 Information Summary

Unit Description: The unit is a dry lake bed which is located approximately three miles east of the STP. Effluent from the STP is discharged to the Playa via the Effluent Pipeline (SWMU No. 84). The estimated dimensions of the Playa are 1000 feet by 1000 feet. At the time of the VSI the water level appeared to be very shallow (six to eight inches deep) and the area heavily vegetated with reeds and grasses. An inspection box for the pipeline was observed near the western edge of the Playa. (Reference 356)

Dates of Operation: The unit has received STP effluent since 1986. (Reference 356)

Wastes Managed: Effluent from the STP is discharged to this unit by the Effluent Pipeline from the north and south clarifiers. Chemical analysis of the effluent was not available, although facility representatives reported that the effluent is tested routinely for BOD and COD. Low concentrations of some priority pollutants are likely to be present in the effluent. (Reference 16)

Release Controls: No release controls were observed for this unit.

History of Release: No history of release was observed or reported for this unit during the PI/VSI.

5.51.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is moderate based on the likely presence of some hazardous constituents in the effluent which is discharged to the unlined Playa.

- Surface Water: The potential for release to surface water is low based on the distance from the unit to perennial surface water.

- Air: The potential for release to air is low based on the expected low concentration of volatile constituents in the treated effluent.

- Subsurface Gas: The potential for subsurface gas generation is low based on the unlined nature of the Playa and expected low concentration of gas-generating constituents in the treated effluent.

5.52 SWMU No. 86 - Sanitary Landfill (Photos: 2-20, -21)

5.52.1 Information Summary

Unit Description: This landfill is located approximately two miles east of the Post area, about 400 feet south of Watertown Road. The unit covers an area of approximately 60 acres (Reference 42) and is surrounded by an eight-foot chain link fence. The active disposal cell is excavated to an approximate depth of 20 feet. Waste collected from the Post area is transported to the landfill and placed in the active cell. Reference 42 states that the waste is covered daily. The cell is backfilled with soil as the cell is filled. This unit is located in the former outfall area of the Sewage Treatment Plant, and partially overlies the fresh water aquifer used by WSMR. (Reference 352)

Dates of Operation: WSMR filed an application for registration of the unit with the New Mexico EID in March 1982. A Certificate of Registration was issued by NMEID in April 1982. The expected life of the unit is 50 years. The unit is currently active. (Reference 42)

Wastes Managed: According to the facility personnel accompanying the VSI field team, the sanitary landfill receives only domestic garbage from the Post housing area. According to the Application for Registration (Reference 42), the sanitary landfill was to be used for the disposal of "residential refuse, light industrial waste, construction debris, and dead animals." According to Reference 247, the unit may also have received approximately 3,000 linear feet of asbestos pipe insulation

which had been removed from Buildings 384 and 129 during an asbestos abatement project in 1986.

Release Controls: Run-on/run-off are diverted naturally by the surrounding terrain. A perimeter fence is in place to prevent debris blowing from the area. Management practices of covering or backfilling the cells appears to control wind dispersal of debris; however, some loose debris was noted to the north of the unit.

Release History: There is no record of any past release from this unit, and there is no documentation that any hazardous waste or hazardous constituents have ever been placed in this unit. During the VSI, there was no visual indication that any hazardous wastes had been managed in the unit, and no visual evidence that any releases had occurred.

5.52.2 Release Potential

- Soil/Ground Water: There is a low potential for release to the soil or ground water from this unit. No hazardous wastes or hazardous constituents are known or suspected to be present in the unit. The estimated depth to ground water is 240 feet. (Reference 42)

- Surface Water: There is a low potential for release to surface waters from this unit. There are no surface water bodies in the immediate vicinity of this unit. The unit is not known to manage hazardous waste or hazardous constituents.

- Air: There is a low potential for release to the air from this unit. There is no indication that any hazardous waste or hazardous constituents have been managed in the unit. Waste management practices appear to be adequate to control run-on, run-off, animal incursion, and wind dispersal of the refuse.

- Subsurface Gas: There is a moderate potential for the generation of subsurface gas from the gradual decomposition of

organic matter disposed. However, given the relatively slow rate of decomposition, the prevalent arid and windy conditions, and the porous nature of the soil cover, any methane generated as a result of organic decomposition is more likely to dissipate rather than to build-up in the subsurface.

5.53 SWMU No. 87 - Construction Landfill (Photos: 2-22,-23)

5.53.1 Information Summary

Unit Description: This unit is located approximately two miles east of the Post area just east of the sanitary landfill. The unit is approximately 300 feet long and 20 to 30 feet high. At the time of the VSI, concrete, asphalt and scrap metal were observed in the unit. A new cell was observed just north of the construction landfill, approximately 100 feet from the sanitary landfill. An area just east of the construction landfill is used as an accumulation area for scrap metal which is periodically transferred to the scrap yard on the Post. (Reference 352, 356)

Dates of Operation: The exact start-up date could not be confirmed from the file material or from WSMR DEHL personnel. It is assumed that operation of this unit began about the same time as the sanitary landfill in 1982.

Wastes Managed: This unit receives construction debris from various locations in the Post area.

Release Controls: No engineered release controls were observed during the VSI.

Release History: There is no record of a release from this unit. No visual evidence of a release was observed during the VSI.

5.53.2 Release Potential

- Soil/Ground Water: There is a low potential for release to the soil or ground water from this unit. No hazardous constituents are known or suspected to be present in this unit. The estimated depth to ground water is in excess of 200 feet in the area of this unit.

- Surface Water: There is a low potential for release to surface water from this unit. No surface water bodies are present in the immediate vicinity of this unit. There is no indication that hazardous wastes or hazardous constituents have been managed in this unit.

- Air: There is a low potential for release to the air from this unit due to the types of wastes managed. There is no indication that hazardous wastes or hazardous constituents have ever been managed in this unit.

- Subsurface Gas: There is a low potential for the generation of subsurface gas at this unit due to the types of waste managed and the waste management practices.

5.54 SWMU No. 88 - Container Storage Building Hazardous Waste Storage Facility (Photos: 2-27,-29,-30)

5.54.1 Information Summary

Unit Description: The Hazardous Waste Storage Facility (HWSF), Building S22895, is located about eight miles east of the Post on the south side of Range Road 2. The unit is a pre-fab metal building constructed on a concrete base. This building was constructed over a former evaporation pit which was used to evaporate spent photographic solutions. (Reference 53) The building is located within the same fenced area in which the Hazardous Waste Landfill (SWMU No. 91) is located. The building measures 55 feet by 32 feet by 18 feet and has a design capacity of 6,000 gallons, or approximately 100 drums. (Reference 53, 109) Drummed waste is stored on metal pallets within a curbed concrete floor inside the building. A

loading dock along the north side of the building was constructed over a former concrete evaporation pit which had been contaminated with PCBs. (Reference 30, 31) (The PCB contamination is explained under the unit description for the Former Evaporation Tank, SWMU No. 89.) The Container Storage Building is included in the 1988 Part B Permit Application (Reference 354) Along the south side of the building, another. Evaporation Basin (SWMU No. 90) is still in place. East of the building is a partially constructed concrete tank which was originally intended to be a replacement unit for the Acid Neutralization Pit (SWMU No. 101). However, facility representatives stated that construction of the new tank will not be completed as there is no longer a need for it.

Dates of Operation: The building was completed in October 1981, and has been in active use ever since.

Wastes Managed: Drummed waste that has been stored in the unit at various times includes degreasing solvents, cyanide-containing residues, PCB-contaminated photographic waste, and soil contaminated with methylene chloride (excavated after a spill at the Temperature Test Facility). PCB transformers and capacitors have also been stored in the unit on occasions when the unit was not being used for evaporation. (Reference 352)

Release Controls: The drum storage area inside the building is a curbed concrete pad. No other engineered release controls were observed at this unit.

History of Releases: There is no record of a release from the container storage building. During the VSI, no evidence of a release was observed.

5.54.2 Release Potential

- Soil/Ground Water: There is a low potential for release to soil or ground water at this unit. Wastes are stored on pallets in drums inside the building and within a curbed concrete pad.

- Surface Water: There is a low potential for release to surface waters from this unit. There are no surface water bodies in the immediate vicinity of the unit.

- Air: There is a low potential for release to the air at this unit. The wastes are stored in sealed containers inside the building.

- Subsurface Gas: There is low potential for the generation of subsurface gas at this unit. This is an above-ground unit.

5.55 SWMU No. 89 - Former Evaporation Tank (Photo: 2-26)

5.55.1 Information Summary

Unit Description: This unit is located adjacent to the Hazardous Waste Storage Facility Container Storage Building. This unit (Structure S22896) was formerly an open-topped concrete tank similar to SWMU No. 90, Evaporation Tank. Prior to 1981, the unit was used to evaporate liquid chemical wastes generated at the WSMR photo labs and other labs on the Post. When not being used for evaporation, the unit was sometimes used as a storage pad for damaged PCB transformers. During 1981, when PCB transformers were stored in the unit, a batch of corrosive photographic waste was added to the unit. As a result, PCBs leaked from the transformers and mixed with the corrosive photographic waste. Soil sampling around the unit indicated PCB contamination outside the unit. The clean-up and remediation were undertaken by WSMR with EPA Region 6 and NMEID oversight. The sludge and soils were removed, drummed, and buried in the Hazardous Waste Landfill. (Reference 352) The unit was then converted to a loading dock. (Reference 31, 32, 107, 189, 356) In 1981, the tank was converted to a loading dock by installing a reinforced concrete cap/seal over the structure. (Reference 32)

Dates of Operation: The exact date of construction could not be determined. Facility personnel estimated the unit to be approximately ten to 15 years old. The unit was used as an evaporation tank until 1981. Since 1981, the unit has been used as a loading dock.

Wastes Managed: The tank received approximately 3,000 pounds of spent photographic solutions about once per year. The wastes included potassium ferricyanide, potassium ferrocyanide, waste bleach solution, soil contaminated with methylene chloride (from a spill at the Temperature Test Facility), and containerized liquids contaminated with PCBs.

Release Controls: When used as an evaporation tank, the unit reportedly was a double-walled concrete tank. The inner tank was coated with a corrosion-resistant epoxy coating. (Reference 107, 189)

Release History: PCBs were released in 1981 when corrosive liquid waste was added to the tank which was being used as a storage pad for PCB transformers. Reports of the incident do not indicate that the unit was overtopped. (Reference 31, 32) It is assumed that the soil contamination resulted from a breach in the containment structure. During the VSI, no evidence of a release was observed. The unit has been converted to a loading dock.

5.55.2 Release Potential

- Soil/Ground Water: The potential for past releases from the former evaporation tank was high based on documented release of PCB-contaminated waste. The potential for ongoing releases is low based on EPA/NMEID-approved remedial action, and the subsequent conversion of the unit to a loading dock.

- Surface Water: The potential for past and ongoing releases from the former evaporation tank is low based on the absence of a nearby surface water body.

- Air: The potential for past releases to air from the former evaporation tank was high, since the unit was designed for evaporation. However, the expected concentration of volatile hazardous constituents is low. The potential for ongoing releases from the unit is low since the unit is no longer used as an evaporation unit.

- Subsurface Gas Generation: The potential for past and ongoing generation of subsurface gas is low based on the remedial action taken to remove contaminated soils.

5.56 SWMU No. 90 - Evaporation Tank (Photo: 2-32)

5.56.1 Information Summary

Unit Description: The unit is a shallow, open-top, double-walled concrete tank. A three-foot space between the inner and outer walls served as secondary containment for the inner tank. The outer walls are approximately six inches thick, and dimensions of the outer walls are approximately three feet high, 50 feet long, and 20 feet wide. The size of the inner tank is approximately 40 feet long, ten feet wide, and one foot deep. The tank was lined with a corrosion-resistant epoxy coating. The tank was formerly used as an evaporation basin for waste photographic solutions. When the tank was in use, a wire-mesh screen cover was placed over it to keep birds and animals out. PVC tubes have been installed at 45-degree angles along the south side of the unit. These were installed by the Corp of Engineers to allow access for soil sampling beneath the unit. The tubes reportedly extend to the centerline of the tank at a depth of approximately ten feet. (Reference 356) The tubes are capped. Soil sampling was recommended as a result of the Initial Installation Assessment (Reference 16), but according to the Update to the Initial Assessment Study (Reference 352), the sampling has not been done.

Dates of Operation: The exact start-up date could not be confirmed. Facility personnel estimated the age of the unit as ten to 15 years. The

unit has not been used since approximately 1981.

Wastes Managed: When used as an evaporation tank, the unit received waste approximately twice a year. The liquid waste remained in the tank as long as necessary to evaporate the liquid phase. The remaining sludge was then removed, drummed, and disposed in the Hazardous Waste Landfill (Reference 16), though no record of these wastes is mentioned in the Closure Plan for the HWLF. (Reference 355) The types of waste managed were generated predominantly at the photo labs and included aqueous solutions of potassium ferricyanide, potassium ferrocyanide, bleach solutions, developing baths and fixers, and waste from cyanide recycling equipment. When not being used for evaporation, the unit may have been used as a storage pad for transformers and capacitors containing PCBs.

Release Controls: The outer wall of the tank provided secondary containment for the inner tank.

History of Release: There is no record of a release from this unit. During the VSI, the unit was dry and empty. No structural damage was observed. The outer wall showed no indication of leaks or overtopping.

5.56.2 Release Potential

- Soil/Ground Water: There is a low potential for release to the soil or ground water at this unit. Secondary containment was in place, the unit is in good structural condition, and there is no evidence to indicate that spills or leaks occurred while the unit was in active use.

- Surface Water: There is a low potential for release to surface water from this unit. There are no surface water bodies in the immediate vicinity of this unit.

- Air: There is a low potential for release to the air from this unit. The purpose of the unit was to concentrate wastes by allowing the aqueous phase to evaporate, leaving the non-

volatile hazardous constituents as a sludge. File information does not indicate that volatile hazardous constituents may have been present in the waste stream.

- Subsurface Gas: There is a low potential for the generation of subsurface gas at this unit. This is an above-ground, open-topped tank. File information does not indicate that hazardous wastes may have been released, or may be present in the subsoils.

5.57 SWMU No. 91 - Hazardous Waste Landfill

5.57.1 Information Summary

Unit Description: The Hazardous Waste Landfill (HWLF) is located approximately eight miles east of the Post Area, on the south side of Range Road 2. The HWLF is located within the same fenced area in which the Hazardous Waste Storage Facility Container Storage Building (SWMU No. 88) is also located. The HWLF consists of six burial cells excavated into the natural soil. There is no indication that the unit was lined. A wide variety of chemicals, pesticides, and herbicides were disposed of in this unit. Some of these wastes are acutely toxic. The Closure Plan for the HWLF (Reference 355) states that each cell was excavated to a size of ten by ten by ten feet. The cells were constructed one at a time as needed over a nine year period. Each cell holds containerized waste. The Closure Plan describes a method of encapsulation (described below under Release Controls) which was used for overpacking the waste prior to burial. Each cell is covered with a concrete pad and is marked with an anodized aluminum sign describing the contents of the cell by chemical name and quantity. It is not clear from the Closure Plan whether the earlier cells were constructed to the same specifications as described for the later cells, nor whether the encapsulation procedure was the same as described for the later cells. The 1979 Initial Installation Assessment states only that the wastes were double-containerized prior to burial. The last cell was constructed in 1981. No waste has been placed in the unit since that time. This unit was

sometimes referred to as the Toxic Chemical Disposal Site in the references. (Reference 352) This unit is included in the 1988 Part B Permit Application. (Reference 354)

Dates of Operation: The first cell was constructed in April 1972 and the last cell was constructed in October 1981. (Reference 355) The Closure Plan for the unit dated April 1988, submitted to NMEID and to EPA, proposes to close the unit with the wastes in place. This Closure Plan is currently being evaluated by EPA Region 6.

Wastes Managed: The unit received a variety of toxic chemical waste which included pesticides, herbicides, and small quantity laboratory chemicals. The contents of each cell are listed in the Closure Plan for the unit, and are also marked on the outside of each cell.

Release Controls: The Closure Plan for the Hazardous Waste Landfill (April 1988) describes and documents the following encapsulation procedure used in 1981 to prepare the sixth cell. It is not documented that the same procedure was used for cells constructed prior to 1981. The waste is buried in overpacked drums. Within each drum, smaller containers of waste were packed within PVC tubes and were surrounded with an absorbent material perlite). The PVC tubes were sealed, placed inside the drums, and the void spaces inside the drums were filled with concrete. The drums were then sealed and placed in the burial cell. It is not stated in the Closure Plan whether the cells were backfilled or not. Each cell is covered with a concrete slab.

History of Release: There is no record of any past release from this unit. During the VSI, no visual evidence of a release was observed.

5.57.2 Release Potential

- Soil/Ground Water: Assuming that WSMR can demonstrate that the encapsulation method used is adequate and that the earlier cells were constructed and managed as described for the later cells, there is a low potential for release to soil or ground

water from this unit. WSMR has been granted a waiver of the ground water monitoring requirements for this unit. (Reference 203)

- Surface Water: There is a low potential for release to surface water from this unit. There are no surface water bodies in the immediate vicinity of the unit. The wastes are immobilized, containerized, and buried.

- Air: There is a low potential for release to air from this unit. The wastes are immobilized, containerized, and buried.

- Subsurface Gas: There is low potential for the generation of subsurface gas from biodegradation because the wastes are encapsulated and containerized. However, the encapsulation procedures should be evaluated thoroughly to assure that no incompatible wastes were disposed in the same container and that the wastes are compatible with the inner encapsulating and absorbing materials.

5.58 SWMU Nos. 92-100 Evaporation/Neutralization Pits (9) (Photos: 2-35,-36,-37)

5.58.1 Information Summary

Unit Description: Nine earthen pits are located at the Liquid Propellant Storage Area (LPSA). The LPSA is located about two miles east of the Post, on Range Road 21[illegible]. Each pit provides secondary containment for a specific product storage area. The unlined pits are typically about 20 feet in diameter and ten feet deep. The pit associated with the nitric acid (IRFNA) tanks has been used occasionally to neutralize nitric acid spills. This pit was covered with a layer of lime. In the event of a spill during routine pumping operations, the acid would be flushed to the pit with water and would be neutralized by the lime as it percolated through the lime layer. Other pits are associated with the POL storage

area and the liquid propellant storage area. The update to the Installation Assessment (Reference 352) concluded those units to be of a major concern. A recommendation was made to perform, "soil sampling around the LRSA for priority pollutants". (Reference 16, 352, 356)

Dates of Operation: The pits were constructed in 1958 and are still in use.

Wastes Managed: In the event of a spill in any of the storage areas, each pit would collect spilled material from the adjacent storage area. Materials in storage include Inhibited Red Fuming Nitric Acid (IRFNA), Petroleum/Oil/Lubricants (POL), and liquid propellants such as monomethyl hydrazine (MMH), unsymmetrical dimethyl hydrazine (UDMH) and ammonia.

Release Controls: The pits served as secondary containment for the storage areas. No engineered release controls were associated with the pits.

History of Release: In 1987, 12 to 15 gallons of IRFNA were spilled while filling drums from a storage tank. The spill was flushed to the containment pit, diluted, and neutralized. (Reference 301) In 1975, 19 liters of UDMH were reported spilled. In 1956, a spill of 3,420 liters of Red Fuming Nitric Acid was reported. (Reference 16)

5.58.2 Release Potential

- Soil/Ground Water: There is a high potential for release to soil and ground water because the pits are unlined.

- Surface Water: There is a low potential for release to surface waters based on the distance to the nearest surface water body.

- Air: There is moderate potential for release to air due to the variety of materials which may be present in the storage tanks. Some highly volatile materials are presently stored at LPSA.

- Subsurface Gas: There is a moderate potential for the generation of subsurface gas based on the variety of material which have been stored (and potentially spilled) over the years.

5.59 SWMU No. 101 - Acid Neutralization Pit (Photo: 2-39)

5.59.1 Information Summary

Unit Description: The Acid Neutralization Pit was an unlined earthen surface impoundment about 100 feet long, 50 feet wide, and eight feet deep. The unit is located within a fenced compound about and three and one-half miles east of the Post on Range Road 210, 0.8 mile south of Range Road 2. The design capacity of the unit was about 3100 gallons per day. (Reference 107, 109, 356) The pit was used to neutralize spent acids used in certain rocket fuels. The typical practice was to layer the pit with lime and then to fill the pit with diluted acid. The acid was neutralized as it percolated through the lime layer. This unit was clean closed in 1985 under a closure plan approved by the State of New Mexico Environmental Improvement Division. The area has been backfilled and graded. This unit has been reviewed under the IRP. The IRP Assessment recommends sampling to ensure clean closure. This is a RCRA-regulated unit. (Reference 107, 109, 352, 356)

Dates of Operation: The unit was used from 1958 until 1980. (Reference 356)

Wastes Managed: Approximately 200 gallons per year of Red Fuming Nitric Acid was neutralized. (Reference 109)

Release Controls: There were no engineered release controls associated with this unit.

History of Release: There is no record of a release from this unit.

5.59.2 Release Potential

- Soil/Ground Water: There is currently a low potential for release to soil or ground water based on the closure of the unit. A high release potential existed during operation of the pit due to the type of waste handled, the treatment method (neutralization) and the unlined construction of the pit.

- Surface Water: There is presently a low potential for release to surface water due to the distance to the nearest surface water body. A high release potential existed during operation of the pit due to the type of waste handled, the treatment method (neutralization) and the unlined construction of the pit.

- Air: There is presently low potential for release to air because the unit is no longer operational. A high release potential existed during operation of the pit due to the type of waste handled, the treatment method (neutralization) and the unlined construction of the pit.

- Subsurface Gas: There is no potential for the generation of subsurface gas. During operation of the pit a high potential for the generation of subsurface gas existed due to the type of waste handled, the treatment method (neutralization) and the unlined construction of the pit.

5.60 SWMU 102 - Burn Pan (Photo: 2-38)

5.60.1 Information Summary

Unit Description: This is a rectangular steel box approximately seven feet long, three feet wide, and one foot deep. The unit was used until 1984 to burn spent rocket fuels such as furfural and aniline. The design capacity of the unit is about 200 gallons per day. (Reference 16) Facility personnel said that the average usage was about 300 gallons

as the closed Acid Neutralization pit. The Burn Pan is about 250 feet south of the former Acid Neutralization Pit. The Acid Neutralization/Burn Pan area is about three and one-half miles east of the Post on Range Road 210, about 0.8 mile south of Range Road 2. A Closure Plan for the Burn Pan has been approved by NMEID. (Reference 317) Completion of closure is expected by November 1988. This unit has been reviewed under the IRP. The IRP assessment recommends sampling to ensure clean closure. This is a RCRA-regulated unit. (References 16, 317, 352, 356)

Dates of Operation: The Burn Pan was in use until 1984.

Wastes Managed: Approximately 300 gallons per year of spent rocket fuels were disposed in the unit.

Release Controls: No release controls were reported for this unit.

History of Release: No record of a release is reported for this unit.

5.60.2 Release Potential

- Soil/Ground Water: The potential for past releases from this unit is moderate to high based on the lack of release controls and the type of waste managed. There is currently a low potential for release based on the closure of the unit.

- Surface Water: The potential for past and ongoing releases to surface waters is low based on the absence of a nearby surface water body.

- Air: The potential for past releases to air from this unit is unit is high based on the open burning operations conducted. The potential for ongoing releases is low based on the closure of the unit.

- Subsurface Gas Generation: The potential for subsurface gas generation from past operations is moderate based on the lack of release controls and the types of wastes managed. The potential for ongoing generation of subsurface gas is low based on the closure of the unit.

5.61 SWMU 103 - Scrap Metal Yard (Photos: 2-40A,-40B)

5.61.1 Information Summary

Unit Description: This is a fenced yard used for the storage of scrap metal which is eventually sold as scrap through the Defense Reutilization and Marketing Service. The fenced area is approximately 100 yards by 100 yards, and is unpaved. The ground surface is partially covered with gravel. The unit is located about four miles southeast of the Post. (Reference 356)

Dates of Operation: The unit has been in use since about 1958, and is still active.

Wastes Managed: Scrap metal is accumulated pending subsequent resale through the DRMS. No hazardous wastes are managed in this unit.

Release Controls: There are no engineered release controls associated with this unit. No hazardous wastes are managed in this unit.

History of Release: There is no record of a release from this unit. No hazardous wastes are managed in this unit.

5.61.2 Release Potential

- Soil/Ground Water: There is low potential for past or ongoing release to soil or ground water from this unit. No hazardous wastes are managed in the unit.

- Surface Water: There is low potential for past or ongoing releases to surface waters based on the absence of a nearby surface water body. No hazardous constituents are managed in the unit.

- Air: There is a low potential for past or ongoing releases to air from this unit. No hazardous wastes are managed in the unit.

- Subsurface Gas Generation: There is low potential for subsurface gas generation. No hazardous wastes are managed in this unit.

5.62 SWMU No. 104 - Old Evaporation Pond (TTF)

5.62.1 Information Summary

Unit Description: This unit is located at the Temperature Test Facility (TTF) approximately two and one-half miles east of the Post area. The purpose of the TTF is to test materials and components under simulated conditions of extreme temperature and humidity (e.g., freezing rain) and in corrosive atmospheres (e.g., salt fog). Methylene chloride and freons are used as refrigerants at TTF. Refrigerants are stored in underground tanks outside the TTF building. The tanks connect to the plant system and are part of a closed-loop system (Reference 268). The old evaporation pond was originally constructed to receive condensate from the test chambers, and non-contact water from defrosting coils and bleed valves in the water-cooled condensers. (Reference 338) The original evaporation pond was excavated into the natural sandy soil, and was approximately 70 feet wide and 150 feet long (surface area approximately 10,000 square feet.) During start-up of the TTF in 1984, a series of leaks in the refrigeration system resulted in a estimated 15,000 gallons of methylene chloride being released. Due to the high evaporation rate of methylene chloride, and the fact that some of the material was released directly to soils near the TTF building, it is not certain how much methylene chloride actually reached the evaporation pond. Methylene

chloride spilled within the TTF building was flushed via the floor drains to the pond. The methylene chloride subsequently eroded the PVC liner in the pond and leaked into the soil below the unit resulting in soil contamination. Operations at TTF shut-down while clean-up began and operational problems were corrected. Standing liquid in the pond was drummed and transferred to the Hazardous Waste Storage Facility (SWMU No. 88). The liner was removed and disposed of as a hazardous waste. None of the contaminated soil has been removed. Soil sampling has defined a zone of contamination 65 to 75 feet below the former evaporation pond. The lateral extent of the main plume extends 250 feet in the east-west direction and 200 feet in the north-south direction. A second plume is centered below the expansion tanks on the east side of the TTF building. The concentration of methylene chloride in the main plume is about 678 ppm. The concentration of methylene chloride in the second plume has been measured at 18 ppm. Both plumes are in the unsaturated zone.

Ground-water monitoring conducted at TTF has not detected significant methylene chloride in the ground water. A closure plan for this unit has been submitted to EPA Region 6 and to NMEID. (Reference 313) A new stainless steel tank (SWMU No. 105) has been installed to replace the old evaporation pond. (Reference 313, 352, 356)

Dates of Operation: The TTF was under construction from 1981 through 1984. During start-up activities at TTF in 1984, a release of methylene chloride occurred. The pond liner was removed and a tank was installed to handle wastewater. The pond has not received waste since 1984.

Wastes Managed: The unit was designed to manage wastewater, but due to a operational problems with the TTF refrigerant system, an estimated 15,000 gallons of methylene chloride was released to the evaporation pond in 1984. Subsequent liner failure resulted in release of methylene chloride to the surrounding soils and subsoils.

Release Controls: A PVC liner was the only release control associated with the former evaporation pond.

History of Release: A estimated 15,000 gallons of methylene chloride was released in 1984 due to liner failure. (Reference 151, 268, 273, 313, 356)

5.62.2 Release Potential

- Soil/Ground Water: The potential for past releases to soil and ground water from the former evaporation pond is high based on failure of the PVC liner and subsequent release of 15,000 gallons of methylene chloride to the alluvial fill beneath the unit. The contaminated soils have not been removed. A closure plan dated October 1987 proposes to close the unit as a landfill and to install a Vapor Extraction System. (Reference 313)

- Surface Water: The potential for release to surface water is low based on distance to nearest perennial surface water body.

- Air: The potential for past releases to air is high based on high volatility of methylene chloride. It is possible that a significant percentage of the methylene chloride evaporated before it reached the pond, or before the pond liner completely failed. The potential for ongoing releases to air is low because the contaminated soils are presently deep below the surface. Some air wells have been installed and may pose a potential pathway for releases to air. A proposed Vapor Extraction System to remove methylene chloride vapors from the contaminated soils may also result in air emissions if the extracted methylene chloride vapors are vented to the atmosphere.

- Subsurface Gas: The potential for subsurface gas generation is moderate based on susceptibility of methylene chloride to biodegradation.

5.63 SWMU No. 105 - New Evaporation Tank (TTF) (Photo: 2-43)

5.63.1 Information Summary

Unit Description: This unit was installed after the 1984 spill of methylene chloride at the TTF. This unit replaced the previous evaporation pond which had failed to contain the methylene chloride spill due to liner failure. The new tank is an open-topped, above-ground, double-walled stainless steel tank. It is 90 feet in diameter and four feet deep, with a capacity of 220,000 gallons. (Reference 314) Manual overflow controls maintain a minimum two-foot freeboard. At the time of the VSI, the tank contained only a few inches of water. The tank and ancillary equipment are cathodically protected. (Reference 356)

Dates of Operation: Construction was completed in 1987. The tank is currently in use. (Reference 314, 356)

Wastes Managed: The tank receives wastewater and condensate from the TTF. Low concentrations of methylene chloride may be present in the waste stream.

Release Controls: The unit is a double-walled, cathodically protected 304 stainless steel tank with a capacity of 220,000 gallons. A manual overflow control valve is installed. The tank is designed as an evaporation unit.

History of Release: There is no record of a release from this unit. During the VSI, no indication of a release was noted.

5.63.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on design and construction of the unit.

- Surface Water: The potential for release to surface water is low based on design and construction of the unit.

- Air: This is an evaporation unit. The potential for release to air is high based on design of the unit. Expected concentrations of volatile hazardous constituents are low.

- Subsurface Gas: There is low potential for subsurface gas generation. This is an above-ground stainless steel tank.

5.64 SWMU No. 106 - Discharge Pipe (TTF)

5.64.1 Information Summary

Unit Description: This is a six-inch cast iron pipe which drains wastewater and condensate from TTF to the Evaporation Tank (SWMU No. 105). The pipeline is approximately 300 feet long. The pipeline does not connect directly to the tank. The level of the tank is slightly below the lower end of the pipeline, which extends over the side wall of the tank. Liquid flowing from the pipe would freefall about four feet into the tank. (Reference 356)

Dates of Operation: The pipe was installed in 1987 and still in use.

Waste Managed: Wastewater/condensate collected in the drains and sumps inside the TTF process area and from the test chambers discharges to the Evaporation Tank via this pipe.

Release Controls: The pipe is constructed of cast iron. No other release controls were observed or reported.

History of Release: There is no record of a release from this unit. During the VSI, no evidence of a release was observed.

5.64.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the design and recent construction of the unit.

- Surface Water: The potential for release to surface water is low based on design and recent construction of the unit, and the distance to the nearest perennial surface water body.

- Air: The potential for release to air is moderate. The pipe is open on the lower end which empties into the Evaporation Tank. However, the concentration of volatile hazardous constituents in the waste stream is expected to be low.

- Subsurface Gas: There is no potential for subsurface gas generation. The pipeline is constructed of cast iron and is above-ground.

5.65 SWMU No. 107 - Storage Tank (TTF)

5.65.1 Information Summary

Unit Description: This steel tank was installed as an interim measure after the methylene chloride spill which breached the former Evaporation Pond (SWMU No. 104) and prior to construction of the new stainless steel Evaporation Tank (SWMU No. 105). Facility representatives were unable to confirm that the tank ever received any waste. The capacity of the tank is 25,000 gallons. The tank is located in the pit which was formerly the Evaporation Pond. (Reference 313, 356)

Dates of Operation: This tank was installed between 1984 and 1986; however, it is not clear that it has ever actually received waste.

Wastes Managed: The unit possibly received wastewater containing methylene chloride.

Release Controls: This is a closed steel tank. The cylindrical tank is horizontally mounted on a concrete pad inside a pit (the former Evaporation Pond).

History of Release: There is no record of a release from this unit. During the VSI, no evidence of a release was observed.

5.65.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on design and construction of the unit, and the type of waste which may have been managed.

- Surface Water: The potential for release to surface water is low based on construction of the unit and the distance to the nearest surface water body.

- Air: The potential for release to air is low. This is a closed tank constructed of steel. Expected concentrations of volatile hazardous constituents in the waste stream are low.

- Subsurface Gas: There is no potential for subsurface gas generation. This is an above-ground steel tank.

5.66 SWMU No. 108 - Vapor Extraction Wells

5.66.1 Information Summary

Unit Description: The Closure Plan (Reference 313) for the TTF former Evaporation Pit proposes installation of a Vapor Extraction System (VES) in conjunction with placement of the final cover at closure. The proposed VES would utilize existing air wells to enhance removal of methylene chloride vapors from the contaminated soils. The final design for the VES has not been developed. The preliminary design proposes using one of the existing air wells for the initial vacuum extraction well.

Dates of Operation: This is a proposed unit. The air wells are in place, but the vacuum system has not been installed.

Wastes Managed: The unit would remove methylene chloride vapors from the contaminated zone by vacuum extraction.

Release Controls: The proposed extraction wells would be connected to a vacuum extraction system. It is not clear from the preliminary design whether the intent is to recover any methylene chloride, or to simply vent the vapors to the atmosphere. (Reference 313)

History of Release: There is no record of a release from the existing air wells.

5.66.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water is low based on the design and present use of the unit. If the vacuum system is installed as proposed, precautions should be taken to prevent induction of water (e.g., rainfall run-off) into the air-induction wells.

- Surface Water: The potential for release to surface water is low based the design of the unit and the distance to the nearest surface water body.

- Air: The potential for release to air is high based on design of the unit. The preliminary design for the extraction system does not specify whether the intent is to recover the vapors or to simply vent the vapors to the atmosphere.

- Subsurface Gas: The potential for the generation of subsurface gas is low based on the design of the unit.

5.67 SWMU No. 109 - Drum Storage Area (Splash Pad) at TTF

5.67.1 Information Summary

Unit Description: During the closure and remediation of the former Evaporation Pond (SWMU No. 104), contaminated water and liner material were placed in 55-gallon drums for subsequent disposal. The drums were temporarily stored near the TTF building and were eventually transferred to the Hazardous Waste Storage Facility. At the time of the VSI, the concrete pad under the methylene chloride expansion tanks (overhead tanks) was being used to store drums of chemicals used at TTF. Some equipment is also mounted on the pad. The pad area is reportedly sometimes used to store drums of waste generated at TTF. Less than one drum of waste per month is reportedly generated at TTF. (Reference 356) This concrete pad was reportedly constructed over contaminated soil resulting from the initial spill of methylene chloride in 1984 (Reference 356).

Dates of Operation: The pad was installed after the 1984 methylene chloride spill, and is still in use.

Wastes Managed: This area is primarily an equipment pad; however, it is occasionally used for temporary storage of drummed wastes generated at TTF. Drummed waste could possibly contain methylene chloride and freons.

Release Controls: A concrete dike surrounds the pad. The pad slopes to a drain/sump which ties into the drain line and discharges to the New Evaporation Tank (SWMU No. 105).

History of Release: There is no record of a release from the existing concrete pad. However, this pad was reportedly constructed over contaminated soil resulting from a methylene chloride spill in 1984.

5.67.2 Release Potential

- Soil/Ground Water: The potential for release to soil and ground water from the present unit is low based on the installation of the concrete pad. However, the pad was reportedly constructed over contaminated soil resulting from a methylene chloride spill in 1984.

- Surface Water: The potential for release to surface water from the unit is low based on the design and construction of the unit, present waste management practices, and the distance to the nearest surface water body.

- Air: The potential for release to air is low based on the design of the unit and present waste management practices.

- Subsurface Gas: There is high potential for subsurface gas generation based on the existence of contaminated soil beneath the unit.

5.68 SWMU No. 110 - Methylene Chloride Catchment System (TTF) (Photos: 2-47, -48)

5.68.1 Information Summary

Unit Description: This unit consists of a series of 2.5-gallon safety cans which collect drips from pump seals. A piece of copper tubing runs from below the pump seals into each can. Methylene chloride collected in the cans is recycled into the refrigerant system. Each pump has its own collection can. The cans sit on a concrete floor inside the TTF building. (Reference 213, 356)

Dates of Operation: The catchment system was installed in 1985 and is still in use.

Wastes Managed: The units receive methylene chloride which is recycled into the refrigerant system.

Release Controls: The cans are constructed of galvanized steel. Methylene chloride drains into the cans via a copper tube. The cans sit on a concrete floor inside the TTF building.

History of Release: There is no documented evidence of release from this unit.

5.68.2 Release Potential

- Soil/Ground Water: The potential for release to soil/ground water is low based on the location of the unit inside a building, and the steel construction of the cans.

- Surface Water: There is low potential for release to surface water based on the location of the unit inside a building, the steel construction of the unit, and the distance to a surface water body.

- Air: There is low potential for release to air from the unit based on the location of the unit inside a building and the low volume of waste managed.

- Subsurface Gas: There is low potential for generation of subsurface gas based on the location of the unit inside a building.

5.69 SWMU Nos. 111-112 Methylene Chloride Separation System (TTF) (Photo: 2-45)

5.69.1 Information Summary

Unit Description: This unit was installed as an interim measure after the former Evaporation Pond (SWMU No. 104) was removed and prior to installation of the New Evaporation Tank (SWMU No. 105). This unit consists of two tanks which were formerly used to prevent possible methylene chloride spills from reaching the wastewater Storage Tank (SWMU No. 107). The first tank in the separation system is an in-ground 1000-gallon rectangular steel tank equipped with a baffle. Water containing methylene chloride was conveyed to the second tank, a horizontally mounted cylindrical 500-gallon in-ground steel tank. The 500-gallon tank could be pressurized to push out the contaminated wastewater to drums for subsequent disposal. (Reference 313, 356)

Dates of Operation: Early 1985 to late 1985.

Wastes Managed: The unit received wastewater from TTF which may have contained methylene chloride.

Release Controls: The tanks and ancillary piping are constructed of steel. No secondary containment was provided.

History of Releases: There is no record of a release from this unit.

5.69.2 Release Potential

- Soil/Ground Water: There is a low potential for release to soil or ground water based on the design and construction of the unit.

- Surface Water: There is low potential for release to surface water based on the design of the unit and the distance to a surface water body.

- Air: There is low potential for release to air based on the design and construction of the unit.

- Subsurface Gas: There is low potential for the generation of subsurface gas based on the design and construction of the unit.

5.70 SWMU No. 113 - Salt Water Evaporation Tanks (TTF) (Photo: 2-49)

5.70.1 Information Summary

Unit Description: Salt fog condensate from the TTF test chambers drains to two galvanized steel open-topped tanks each approximately ten feet in diameter and two feet deep. The tanks sit directly on the ground. Water evaporates from the tanks leaving crystallized sodium chloride in the tank. At the time of the VSI, there was less than 20 gallons of liquid in either tank. (Reference 356)

Dates of Operation: 1984 to present.

Wastes Managed: The tanks receive only salt water from the test chambers. No hazardous waste or hazardous constituents are managed in these tanks.

Release Controls: There were no release controls associated with these tanks. The tanks are constructed of galvanized steel and sit directly on the ground.

History of Releases: There is no record of a release from these tanks. No evidence of a release was noted during the VSI.

5.70.2 Release Potential

- Soil/Ground Water: The potential for release to soil/ground water is low based on the construction of the tanks and the non-hazardous constituents in the waste stream.

- Surface Water: There is low potential for release to surface water based on the construction of the tanks, the non-hazardous constituents in the waste stream, and the distance to a surface water body.

- Air: There is low potential for release to air since no volatile or hazardous constituents are present in the waste stream.

- Subsurface Gas: There is no potential for the generation of subsurface gas. The tanks are above-ground and receive only salt water.

5.71 SWMU No. 114 - Rhodes Canyon Landfill (Active) (Photos: 2-59, -60, -62)

5.71.1 Information Summary

Unit Description: The unit is the presently active sanitary landfill at Rhodes Canyon Range Center. It is approximately 360 feet by 480 feet in size. An eight-foot chain link perimeter fence surrounds the unit. The unit is located about 50 miles north of the Post near Rhodes Canyon Range Center about one mile west of Range Road 7 on Range Road 6. During the VSI, no active cells were observed. Vegetation covered most of the landfill, except on the north end which was graded and cleared. Some loose debris was noted within the fenced area. South of the fenced area

was a cleared disturbed area which was sparsely vegetated. This disturbed area was about 300 feet by 400 feet in size.

Dates of Operation: The exact date of construction could not be determined. The original Rhodes Canyon Landfill (SWMU No. 115) was closed in 1976. It is assumed that the present unit opened in 1976. The present landfill last received waste in September 1987, according to facility personnel. (Reference 356)

Wastes Managed: The unit receives office refuse and construction debris from support operations at Rhodes Canyon Range Center.

Release Controls: A daily soil cover was reportedly placed over the waste. No other engineered release controls were noted during the VSI.

History of Release: There is no record of a release from this unit. No visual indication of a release was noted during the VSI.

5.71.2 Release Potential

- Soil/Ground Water: There is low potential for release to soil/ground water from this unit based on the type of waste managed.

- Surface Water: There is low potential for release to surface water based on the type of waste managed and the distance to a surface water body.

- Air: There is low potential for release to air based on the type of waste managed and the waste management practices.

- Subsurface Gas: There is low potential for generation of subsurface gas due to the type of waste managed.

5.72 SWMU No. 115 - Inactive Rhodes Canyon Landfill (Photos: 2-54, -55, -56, -57, -58)

5.72.1 Information Summary

Unit Description: The area believed to be the original landfill is about 300 yards west of the current landfill (SWMU No. 114). This landfill was used for sanitary waste and missile debris. (Reference 16) The exact dimensions of the unit could not be discerned. Rubble and piles of debris were observed in the area. Several areas of disturbed soil were noted. (Reference 356)

Dates of Operation: The exact start-up date of this unit could not be determined. The unit ceased operation in 1976. (Reference 16)

Wastes Managed: The unit received sanitary waste from the Rhodes Canyon Range Center and missile debris from uprange impact areas. (Reference 16)

Release Controls: No engineered release controls were discernable during the VSI. It is assumed that waste management practices were similar to those used at other WSMR landfills in operation during the active life of this unit. Trenching and applying daily cover appears to have been the standard practice. (Reference 352)

History of Release: There is no record of a past release from this unit. There is no documentation that hazardous wastes were managed in this unit; however, there is little information on the specific wastes managed over the active life of the unit.

5.72.2 Release Potential

- Soil/Ground Water: There is low to moderate potential for past releases to soil/ground water from this unit based on the lack of documentation on the types of waste managed.

- Surface Water: There is low potential for release to surface water based on the distance to a surface water body.

- Air: There is low potential for on going releases to air from this unit based on the inactive status of the unit. The potential for past release is low to moderate based on the lack of information regarding past waste management practices.

- Subsurface Gas: There is low potential for ongoing generation of subsurface gas based on the age and inactive status of the unit and the dry permeable soil in the area.

5.73 SWMU Nos. 116 - 118 Subgrade Tanks at Rhodes Canyon (Photo: 2-63)

5.73.1 Information Summary

Unit Description: Three steel tanks are located southeast of the Rhodes Canyon Landfills on Range Road 6. The tanks are partially below grade and appeared to be empty and abandoned. The center tank was only slightly exposed above the surface and appeared to be in poor condition. The visible portion of the other tanks appeared to be in good condition. A hydrocarbon odor was noted near one tank. WSMR DEHL personnel did not know when the tanks might have been used or for what purpose. The estimated capacity of the tanks is about 2,500 gallons each. (Reference 356)

Dates of Operation: The dates of operation were not available from facility personnel or from file material. The tank appeared to be about 15 to 20 years old.

Wastes Managed: The tanks appeared to be empty at the time of the VSI. The previous contents of the tanks could not be confirmed. It is likely that the tanks were possibly used for fuel or oil storage.

Release Controls: No release controls were noted. The tanks were partially below grade.

History of Release: No documented evidence of a release was reported; however, a hydrocarbon odor was noted near the tanks.

5.73.2 Release Potential

- Soil/Ground Water: The potential for release is moderate based on the lack of release controls, the apparent age of the tanks, the in-ground location, and the unknown nature of the materials managed.

- Surface Water: The potential for release to surface water is low based on the absence of a nearby surface water body.

- Air: The potential for release to air is moderate based on the age of the tanks, the lack of release controls, the unknown nature of the materials managed, and the observed odor near the tanks.

- Subsurface Gas: The potential for generation of subsurface gas is moderate to high based on the in-ground location, the age of the tanks, the lack of release controls, and the unknown nature of the materials managed.

5.74 SWMU No. 119 - Stallion Range Landfill (Photos: 2-70, -71)

5.74.1 Information Summary

Unit Description: This unit is located at Stallion Range Center approximately 100 miles north of the Post in the NE section of WSMR. The active landfill is about 300 feet by 380 feet in size, and is surrounded by an eight-foot chain link fence. The cells are excavated to a size of approximately 60 feet wide by 100 feet long and sloped to depth of about 15 feet. Waste is collected in dumpsters and emptied into the active cell, where it is reportedly covered daily. Just north of the active landfill is the inactive Former Stallion Landfill (SWMU No. 120) which was closed when the current landfill opened four years ago. (Reference 16, 356)

Dates of Operation: The current landfill at Stallion Range has been in use since about 1984. (Reference 356)

Wastes Managed: The unit receives sanitary waste from the Stallion Range Center. (Reference 356)

Release Controls: Daily cover is applied as waste is placed in the unit.

History of Release: There is no record of a past release from this unit. There is no documentation that hazardous wastes have ever been managed in the unit. No visual evidence of a release was noted during the VSI.

5.74.2 Release Potential

- Soil/Ground Water: There is low potential for release based on the non-hazardous waste managed.

- Surface Water: There is low potential for release based on the non-hazardous waste managed and the absence of a nearby surface water body.

- Air: There is low potential for release based on the non-hazardous waste managed and the waste management practices.

- Subsurface Gas: There is low potential for generation of subsurface gas based on the nature of the waste managed.

5.75 SWMU No. 120 - Former Stallion Center Landfill (Photos: 2-72, -73, -74)

5.75.1 Information Summary

Unit Description: The unit was a sanitary landfill used for sanitary waste generated at Stallion Range Center from 1970 until 1984. The unit was the same size as the currently used Stallion landfill and was operated in the same manner. The unit is located adjacent to the current landfill (SWMU 119), and is not fenced. (Reference 356)

Dates of Operation: The unit was active from 1970 until 1984.

Wastes Managed: The unit received sanitary waste from Stallion Range Center.

Release Controls: Daily cover was reportedly applied as the waste was placed in the unit.

History of Release: There is no record of a past release from this unit. There is no indication that hazardous wastes were ever managed in the unit. No visual evidence of a release was noted during the VSI.

5.75.2 Release Potential

- Soil/Ground Water: There is low potential for release to soil and ground water based on the non-hazardous waste managed.

- Surface Water: There is low potential for release to surface

water based on the non-hazardous waste managed and the absence of a nearby surface water body.

- o Air: There is low potential for release to air based on the non-hazardous waste managed and the waste management practices.

- o Subsurface Gas: There is low potential for generation of subsurface gas based on the nature of the waste managed.

5.76 SWMU Nos. 121 - 123 Subgrade Tanks at Stallion Range (Photos: 2-80 thru 2-82)

5.76.1 Information Summary

Unit Description: These tanks are located north of the Stallion Range Center just west of the Stallion Gate security checkpoint. The three steel tanks are partially below grade. One of the tanks was severely collapsed. The visible portions of the other two tanks appeared to be in good condition. All three tanks appeared to be empty and abandoned. A tar-like odor was apparent on the downwind side of the tanks. A ground stain of a tar-like substance was evident on the ground on the north side of the tanks. The tar like patch was very dry, dark and cracked. It appeared to have been there a long time. Facility personnel were unable to identify the materials which may have been managed, or the dates of operation. (Reference 356)

Dates of Operation: Facility personnel were unable to provide information on these tanks. The tanks appear to be about 15 to 20 years old.

Wastes Managed: The tanks appeared to be empty at the time of the VSI. The previous contents of the tanks could not be confirmed.

Release Controls: No release controls were observed. The tanks are partially below ground.

History of Release: No documented release from these tanks was reported. During the VSI, a tar-like odor was noted, and a tar-like ground stain was observed near one of the tanks.

5.76.2 Release Potential

- Soil/Ground Water: The potential for release is moderate to high based on the lack of release controls, the apparent age and condition of the tanks, the in-ground location, the unknown nature of the materials managed, and the observed ground stain.

- Surface Water: The potential for release to surface water is low based on the absence of a nearby surface water body.

- Air: The potential for release is moderate based on the apparent age and condition of the tanks, the lack of release controls, the unknown nature of the materials managed, and the observed odor near the tanks.

- Subsurface Gas: The potential for generation of subsurface gas is moderate to high based on the in-ground location, the apparent age and condition of the tanks, the lack of release controls, and the unknown nature of the materials managed.

5.77 SWMU No. 124- Waste Oil Storage Tank (Photo: 2-78)

5.77.1 Information Summary

Unit Description: This unit is a portable 500-gallon closed steel tank sitting on concrete pavement. The tank is used for storage of waste oil generated at Stallion Range Center (SRC). The tank is transported to the WSMR Post for emptying as needed. Personnel at SRC stated that the tank was last emptied about 2 years ago. The tank was about three-quarters

full at the time of the VSI. The concrete around the tank was stained with oil. (Reference 356) The tank is located north of Building 34250 at Stallion Range Center.

Dates of Operation: The exact start-up date could not be determined. The tank is currently in use.

Wastes Managed: The unit is a satellite accumulation tank for waste oil generated at SRC. A maximum of 500 gallons is accumulated before the tank in transferred to the Post for emptying.

Release Controls: No release controls were reported. The tank is constructed of steel. The only release control observed was the concrete pavement on which the tank was located.

History of Release: There is no record of a past release from this unit. During the VSI, an oily stain was evident on the concrete around the tank.

5.77.2 Release Potential

- Soil/Ground Water: There is low potential for release to soil/ground water based on the non-hazardous waste managed.

- Surface Water: There is low potential for release to surface water based on the non-hazardous waste managed and the distance to a surface water body.

- Air: There is low potential for release to air based on the low volatility of the waste managed.

- Subsurface Gas Generation: There is no potential for the generation of subsurface gas based on the above-ground location of the tank.

5.78 SWMU No. 125 - Incinerator at Vet Clinic (Photo: 2-87)

5.78.1 Information Summary

Unit Description: This unit is a Stamco gas-fired incinerator which was formerly used to destroy clinical wastes generated at the Veterinary Clinic. The Vet Clinic is located in Building T-1834 on the Post. The overall size of the unit is approximately three feet by five feet by two feet. It is mounted on a six-inch concrete slab. The unit has not been used in about two years. (Reference 356) Waste which was formerly incinerated in this unit is now disposed in another incinerator at McAffee Clinic (SWMU No. 126).

Dates of Operation: The exact start-up date is not known. The unit has not been used in about two years.

Wastes Managed: The incinerator was formerly used to dispose of red bag waste and sharps generated at the Vet Clinic.

Release Controls: No engineered release controls were noted during the VSI.

History of Release: There is no record of a past release from this unit. There is no indication that hazardous wastes were ever managed in this unit.

5.78.2 Release Potential

- Soil/Ground Water: The potential for releases to soil/ground water is low based on the design and function of the unit, and the non-hazardous waste managed.

- Surface Water: The potential for releases to surface water is low based on the absence of a nearby surface water body.

- Air: The unit released to air by design. No release controls were observed or reported.

- Subsurface Gas: There is no potential for subsurface gas generation based on the above-ground location of the unit.

5.79 SWMU No. 126 - Incinerator at McAffee Clinic (Photos: 2-88, -89)

5.79.1 Information Summary

Unit Description: This unit is a double-hearth incinerator located in Building 530, McAffee Clinic, on the Post. This incinerator is used to dispose of the clinical waste (e.g., infectious waste, needles, syringes) generated at both McAffee and the Veterinary Clinic on the Post. The clinic burns about two bags of waste per night plus one container of syringes. Residue and ash from incineration is bagged and disposed in the Sanitary Landfill (SWMU No. 86) on the Post. (Reference 16, 356)

Dates of Operation: The start-up date is not known; the unit is still in use.

Wastes Managed: The unit receives only clinical waste generated in the McAffee Clinic and in the Veterinary Clinic. No hazardous wastes are managed in this unit.

Release Controls: There were no engineered release controls associated with this unit.

History of Release: There is no history of a release from this unit.

5.79.2 Release Potential

- Soil/Ground Water: The potential for releases to soil/ground water is low based on the design and function of the unit, and the non-hazardous waste managed.

- Surface Water: The potential for releases to surface water is low based on the absence of a nearby surface water body.

- Air: The unit releases to air by design. No release controls were observed or reported.

- Subsurface Gas: There is no potential for subsurface gas generation based on the above-ground location of the unit.

5.80 SWMU No. 127 - Autoclave at McAffee Clinic

5.80.1 Information Summary

Unit Description: The autoclave at McAffee Clinic is a laboratory-sized unit which uses high pressure steam at 121°C to sterilize clinical waste prior to disposal. After treatment, the solid waste is disposed in the WSMR Sanitary Landfill (SWMU No. 86) Condensate from the unit drains via sewer liner to the STP (SWMU Nos 66-84). (Reference 356)

Dates of Operation: The autoclave has been in use at McAffee clinic for about 10 years. (Reference 356)

Waste Managed: The Autoclave treats clinical laboratory waste from McAffee Health Clinic on the Post. This unit does not manage hazardous waste.

Release Controls: The unit is constructed of stainless steel, and is located on a bench-top inside the clinical laboratory at McAffee Clinic.

History of Release: There is no documentation indicating a release from this unit.

5.80.2 Release Potential

- Soil/Ground Water: There is low potential for release to soil and ground water based on its location inside a building.

- Surface Water: There is a low potential for release to surface water based on its location inside a building. There is no surface water body near the clinic.

- Air: There is a low potential for release to air. The unit is sealed under pressure during operation. The only effluent is stream condensate.

- Subsurface Gas: There is no potential for generation of subsurface gas. The unit is located inside a building.

5.81 SWMU No. 128 Silver Recovery System Tailings Tank

5.81.1 Information Summary

Unit Description: The Tailings Tank is the final tank in the commercial-sized silver recovery system in the basement of Building 1512 (Visual Information Building). The tank is a fiberglass tank with a capacity of about 40 gallons. Photographic fixer solution is recirculated through the silver recovery system where excess silver is recovered from solution by an electrolytic process. Overflow from the fixer bath accumulates in the Interface Tanks (i.e., holding tanks) then is pumped into the Recovery Tank where the silver is recovered. Metallic silver deposits onto cylinders in the Recovery Tank. Effluent from the Recovery Tank is then pumped to the Tailings Tank for removal of residual silver. The concentration of silver is reduced to less than 5 ppm before discharging the effluent to the sewer system. The effluent is analyzed prior to discharge. (Reference 356)

Dates of Operation: Building 1512 has housed the photographic labs since 1954. The silver recovery system is about 10 years old. (Reference 356, 350)

Wastes Managed: The unit receives fixer bath solution from photographic processing. Fixer bath solution contains silver.

Release Controls: The tank is constructed of fiberglass and is located in the basement of Building 1512. Flow into and out of the unit is via manually controlled pumps.

History of Release: There is no documentation of a release directly attributed to this unit. However, past releases to the STP of heavy metals and cyanides have been attributed to operations at the photographic laboratory. (Reference 362)

5.81.2 Release Potential

- Soil/Ground Water: There is low potential for release to soil/ground water from this unit based on its location inside a building and the fiberglass construction of the tank.

- Surface Water: There is low potential for release to surface water from this unit based on its location within a building and the absence of a surface water body in the vicinity.

- Air: There is low potential for release to air based on the absence of volatile hazardous constituents and the location within a building.

- Subsurface Gas: There is no potential for the generation of subsurface gas based on the location of the unit inside a building.

5.82 SWMU No. 129 Cyanide Treatment Unit (Ozone Unit)

5.82.1 Information Summary

Unit Description: This unit is located in Building 1512 (Visual Information Building). Prior to 1985, this unit was used to oxidize spent photographic bleacher solutions which contained ferrous cyanide. In 1985, ferrous cyanide was replaced by sodium persulfate in the bleaching process. The unit used an ozone treatment process to oxidize ferrous cyanide to ferrous cyanate prior to discharging the effluent to the STP. The ozone unit is currently used to oxidize hydroquinone and sodium thiocyanate prior to discharging the effluent to the STP. Prior to installation of the Cyanide Treatment Unit, wastes containing spent ferrous cyanide were stored in a 1,000 gallon plastic Storage Tank (SWMU No. 130) at Building 1512. Periodically, the spent ferrous cyanide solution was transferred to the Evaporation Pit (SWMU No. 90). Because ferrous cyanide is no longer used, the tank was relocated in 1985 to Building 1524 where it is used as a secondary Spill Containment Tank (SWMU No. 131) for an acetic acid storage area.

Dates of Operation: The exact age of the unit was not available from facility personnel or from available file material.

Wastes Managed: Prior to 1985, the unit received spent photographic solutions containing ferrous cyanide. The solution was treated to oxidize the ferrous cyanide to ferrous cyanate prior to discharge. Effluent drained via sewer lines to the STP. Since 1985, the unit has been used to oxidize solutions containing hydroquinone and sodium thiocyanate prior to discharge.

Release Controls: The unit is a closed system constructed of stainless steel. The unit is located inside the photographic processing area in Building 1512.

History of Release: There is no documentation of a release directly attributed to this unit. However, past releases of heavy metals and cyanides to the STP have been reported. These releases were generically attributed to the photographic laboratory. (Reference 362)

5.82.2 Release Potential

- Soil/Ground Water: The past and present release potential was and is low since the unit was located within a building and the effluent was discharge to the STP (SWMU Nos. 66-84) for further treatment.

- Surface Water: The past and present release potential was and is low since the unit was located within a building and the effluent was discharge to the STP (SWMU Nos. 66-84) for further treatment.

- Air: The past and present release potential was and is low since the waste treatment takes place in a unit designed to oxidize wastes under controlled conditions. The waste is non-volatile under the treatment conditions.

- Subsurface Gas: There is a low potential for subsurface gas generation both in the past and presently. The non-volatile nature of the waste under the treatment condition support this conclusion.

5.83 SWMU Nos. 130-131 Former Spent Developer Storage Tank/ Acetic Acid Spill Containment Tank

5.83.1 Information Summary

Unit Description: This unit is a cylindrical plastic tank with a capacity of 1,000 gallons. The tank is currently located outside of Building 1524 where it is used as a back-up secondary containment tank for the acetic acid storage area. Building 1524 is a warehouse. The acetic acid is stored in drums on pallets inside a diked concrete pad. A drain within the diked containment pad slopes to a drain line which connects to the Spill Containment Tank. Facility personnel stated that the tank is presently used on an emergency basis only and may never have received waste.

Prior to 1985, this tank was located outside Building 1512 where it was used to store spent ferrous cyanide solution from photographic processing. Periodically, the ferrous cyanide solution was removed from this tank and transferred to the Evaporation Tank (SWMU No. 90). The tank was mounted on a diked concrete pad outside the building.

Dates of Operation: The tank was used for several years at Building 1512 before being moved in 985 to Building 1524. The tank is still in use at Building 1524.

Wastes Managed: The tank currently sewer are back-up secondary containment for an acetic acid storage area. Previously, the tank was in another location and received spent photographic solutions.

Release Controls: There are no secondary release controls associated with the tanks at its present location or at its previous location.

History of Release: There is no documentation indicating release from this unit. No visual evidence of a release was observed during the VSI. (Reference 356)

5.83.2 Release Potential

- Soil/Ground Water: There is low potential for release at the present location. The tank is presently a back-up containment tank to be used only in case of emergencies. Potential for

past releases is low based on the observed condition of the tank and the release controls.

- o Surface Water: There is low potential for past or ongoing release to surface water based on the observed condition of the tank and the absence of a surface water body in the vicinity.

- o Air: There is low potential for past or ongoing release to air based on the absence of volatile constituents.

- o Subsurface Gas: There is no potential for the generation of subsurface gas based on the above-ground location of the tank, its observed good condition, and the lack of gas-generating constituents in the waste stream.

5.84 SWMU No. 132 - Waste Stabilization Pond

5.84.1 Information Summary

Unit Description: This surface impoundment is located near Orogrande Range Camp about 18 miles east of the Post on Range Road 2, in the extreme southeast corner of WSMR. The size of the impoundment is about 200 yards by 100 yards, and it is surrounded by a berm approximately six feet high and 18 feet wide. A slight sewer odor was noted near the impoundment. Outside the berm, the unit is surrounded by a barbed wire fence. A concrete drainage channel runs south to north the length of the unit on the east side, and empties into a large arroyo on the north end of the surface impoundment. Flow into the surface impoundment is on the east side via a 12-inch steel pipe which was traced to a cinderblock building across the dirt road from the impoundment. During the VSI, the water level in the impoundment was about six feet below the top of the berm. The berm is well-vegetated and in good condition. Reeds were growing in the impoundment. A piece of black plastic film was exposed near the base of the berm, indicating that the unit may be lined. On the north side of the impoundment there is a 12-inch overflow pipe through the berm leading to the arroyo. The overflow pipe is about five feet

above the water level in the impoundment, and about one foot from the top of the berm. The field team interviewed facility personnel from the Environmental Office and from the Facilities Engineering Office. None of the individuals interviewed could identify the source or type of waste placed in the impoundment. Personnel at the Environmental Office conjectured that the waste is very likely sanitary waste from Ft. Bliss. The impoundment is very near the boundary between WSMR and Ft. Bliss, but the impoundment is on WSMR property. (Reference 356)

Dates of Operation: No information on this unit was available from WSMR files or personnel.

Wastes Managed: The type and source of waste managed could not be conclusively determined. Indications are that the unit receives sanitary waste, possibly from Ft. Bliss, though the unit is located on WSMR property. (Reference 356)

Release Controls: The unit is bermed and may be lined. Run-on is diverted away from the unit by a concrete channel on the east side, and by a natural arroyo on the north side.

History of Release: No historical information is available on this unit.

5.84.2 Release Potential

- Soil/Ground Water: The potential for release to soil/ground water is unknown based on the unknown identity and source of the waste.

- Surface Water: The potential for release to surface water is unknown based on the unknown identity and source of the waste.

- Air: The potential for release to air is unknown based on the unknown source and composition of the waste stream.

- Subsurface Gas: The potential for generation of subsurface gas is unknown based on the unknown source and composition of the waste stream, and the unknown presence and condition of liner materials.

5.85 SWMU No. 133 - NOMTS Machine Shop Accumulation Area

5.85.1 Information Summary

Unit Description: The NOMTS Machine Shop is located on the Main Post. An accumulation area is located in the southern portion of the Machine Shop. At the time of the VSI seven drums were being stored in the area. One of the drums was in an overpack container. The drums rested directly on the floor. The floor in the building is concrete. According to NOMTS personnel, the drums were being stored in the building until the content of the drums is determined by the Army Laboratory. Apparently these drums contain waste generated by Navy operations on WSMR. The Navy cannot request the DRMO to remove the waste until a manifest detailing the contents is furnished. (Reference 356)

Dates of Operation: The accumulation area has been active since late 1987 and was active at the time of the VSI.

Wastes Managed: The accumulation area stores 55-gallon drums containing paint wastes, hydraulic fluids, and an unknown waste generated at NASA.

Release Controls: The concrete floor serves as the only release control for the accumulation area. There is a perimeter drain in the floor of the building but the drain is at least 29 feet from the drums.

History of Release: There is no release history for this unit and the floor area showed no signs of staining during the VSI.

5.85.2 Release Potential

- Soil/Ground Water: There is a moderate release potential to soil and ground water due to the absence of any release controls such as a drain, sump, or dike to prevent a drum failure from contaminating the area. However, the waste is contained in closed drums.

- Surface Water: Despite the lack of release controls, there is a minimal release potential to surface water due to the distance of the nearest surface water and the location of the accumulation area within the building.

- Air: There is a low release potential to air as the drums are all sealed.

- Subsurface Gas: There is no potential for the generation of subsurface gas due to the design of the unit. The drums are stored inside the building on a concrete floor.

5.86 SWMU No. 134 - NOMTS Outdoor Accumulation Area

5.86.1 Information Summary

Unit Description: The NOMTS Outdoor Accumulation Area is located on the east side of Building N197, the Machine Shop Oil Shed, on the Main Post. At the time of the VSI, three 55-gallon drums in overpack containers were stored here. The accumulation area is above-ground, open-topped concrete box that has the approximate dimensions of 3.5 feet tall, ten feet wide, and five feet wide.

Dates of Operation: The unit has been active since late 1987 and was active at the time of the VSI.

Wastes Managed: The accumulation area manages drummed waste. The composition of the waste in the drums was unknown at the time of the VSI.

Release Controls: The concrete container serves as the release control for the unit.

History of Release: There is no release history for this unit.

5.86.2 Release Potential

- Soil/Ground Water: There is a low release potential to soil and the ground water due to the overpacking on each of the drums stored at the unit and the concrete containment area.

- Surface Water: There is a low release potential to surface water due to the concrete containment structure.

- Air: There is a low release potential to air as the wastes are stored in sealed and overpack drums.

- Subsurface Gas: There is no potential for the generation of subsurface gas due to the design of the unit.

5.87 SWMU No. 135 - Paint Shop Accumulation Area

5.87.1 Information Summary

Unit Description: This unit is located outside of the Paint Shop (Building 1742). Drums of paint waste and waste solvent are stored on wooden pallets. The Accumulation Area is gravel covered and fenced.

Dates of Operation: The dates of operation could not be confirmed by facility personnel. The paint shop have been in operation for about 25 years. (Reference 356

Wastes Managed: The unit is a storage area for drums of waste paint and waste solvent.

Release Controls: Wastes were stored in drums. No secondary containment was observed.

History of Release: There is no documentation indicating a release from this unit. During the VSI, the gravel around the waste drums was stained with minor paint spills and drips.

5.87.2 Release Potential

- Soil/Ground Water: There is moderate to high release potential to soil/ground water based on the observed drips and ground stains in the area.

- Surface Water: There is low release potential to surface water based on the distance to a surface water body.

- Air: There is moderate release potential to air based on the volatile constituents present in the waste. However, the volume of waste managed in the area is small.

- Subsurface Gas: The potential for generation of subsurface gas is low based on the small volume of waste managed and the above-ground location of the unit.

5.88 SWMU No. 136 - Paint Shop Spray Booth

5.88.1 Information Summary

Unit Description: This unit is a Binks spray booth about five years old. It is located inside Building 1742. The unit is a water-cascade type spray booth used for airless and conventional spray painting. The spray booth dimensions are approximately 15 feet by ten feet by eight feet. During spray painting operations, a water-cascade curtain is activated to entrap overspray from paint operations. The effluent from the water-cascade flows via a sump (SWMU No. 137) to the STP. (Reference 356)

Dates of Operation: The spray booth has been in use for about five years. (Reference 356)

Wastes Managed: Wastewater from the spray booth contains particulates from paint overspray. Volatiles from paint solvents are vented through an exhaust duct to the atmosphere. The primary solvent utilized in the Paint Shop is PD-680, which contains no toxic or ignitable constituents.

Release Controls: A high velocity exhaust fan is activated when the spray booth is in use. The water cascade entraps particulate overspray from paint operations.

History of Release: There is no documentation indicating a release from the spray booth. During the VSI, no evidence of a release was observed.

5.88.2 Release Potential

- Soil/Ground Water: There is low potential for release to soil/ground water based on the location of the unit inside a building. Effluent from the water-cascade drains via a sump to the STP.

- Surface Water: There is low potential for release to surface water based on the location of the unit inside a building and the absence of a nearby surface water body. Effluent from the water-cascade drains via a sump to the STP.

- Air: There is a moderate potential for release to air based on the venting of exhaust fumes to the atmosphere.

- Subsurface Gas: There is no potential for generation of subsurface gas based on the indoor, above-ground location of the spray booth.

5.89 SWMU No. 137 - Paint Shop Sump (Photo: 1 72)

5.89.1 Information Summary

Unit Description: The Paint Shop Sump is located at the north end of Building 1742. The sump is approximately three feet by three feet by three feet and constructed of concrete. There is a metal cover on the sump that is flush with the surrounding grade. The ground surface surrounding the sump is paved with asphalt. The sump receives wastewater generated from the paint spray booth located inside Building 1742. The sump is connected via subsurface piping to the STP. Sludge from the sump is removed periodically and disposed as a hazardous waste. (Reference 356)

Dates of Operation: The sump has been in use since approximately 1968 and is currently active.

Wastes Managed: The sump receives wastewater generated by the paint spray booth. When in use, a water curtain in the spray booth is used to entrap overspray from the paint operations.

Release Controls: There are no release controls associated with the sump.

History of Release: There is no release history for the unit. During the VSI, paint drips and stains were observed on the ground around the sump and on the metal cover.

5.89.2 Release Potential

- Soil/Ground Water: There is a low release potential to soil and ground water due to the concrete construction of the unit and the asphalt surrounding the unit. However, effluent from this unit flows to the STP.

- Surface Water: There is a low release potential to surface water due to the below grade position of the unit.

- Air: There is a low release potential to air based on the expected low concentration of volatile constituents in the waste stream and the metal cover over the sump.

- Subsurface Gas: There is no potential for the generation of subsurface gas due to the nature of the wastes handled and the enclosed concrete design of the unit.

5.90 SWMU 138- Waste Accumulation Area - RATSCAT

5.90.1 Information Summary

Unit Description: The waste accumulation area is located at the RATSCAT site. This site is located approximately 35 miles north of the main Post area and 23 miles west of Alamagordo, NM. The accumulation area consists of metal drums containing waste hydraulic fluid, waste oil and paint waste. The area is in the open and is underlain by a curbed, concrete pad. This is not a RCRA-regulated unit.

Dates of Operation: This unit is currently in operation and has been in operation for at least three years.

Wastes Managed: The waste managed at this unit include waste hydraulic fluid, oil and paint from vehicle maintenance. Less than 350 gallons of petroleum waste and five gallons of paint waste are generated per year.

Release Controls: The release controls consist of grounded metal drums, a curbed concrete pad, and warning signs in both Spanish and English.

History of Release: There are no documented releases. This site was not visited during the VSI.

5.90.2 Release Potential

- Soil/Ground Water: The release potential to soil and ground water is considered to be low based on the reported design of the unit, the type waste and quantity of waste generated.

- Surface Water: The release potential to surface water is considered to be low based on the reported design of the unit, the type waste and quantity of waste generated, and the distance to surface water.

- Air: The release potential to air is considered to be low based on the reported good condition of the drums, the design of the unit, the type of waste and the quantity of waste generated.

- Subsurface Gas: The release potential to subsurface gas is considered to be low based on the reported design of the unit, the type of waste and the quantity of waste generated.

year is used. The pesticides include Draginon and Round-up. Reportedly the New Mexico Game and Fish Commission is monitoring pesticide and herbicide residue levels in ecologically sensitive areas at WSMR. To date no residue problems have been reported by the commission. (References 16, 352, 356)

6.4 AOC D: Drum Storage Area at STP (Photo: 2-12)

This area is a concrete pad used for the storage of lube oil and solvent. At the time of the VSI, four 55-gallon drums were stored horizontally on a wooden frame, with several additional drums stored on the concrete pad. The pad is approximately 30 feet long by 15 feet wide, with no secondary containment pad. A drip collection tub labeled "BUTTS" sat beneath the solvent drum to collect spills.

6.5 AOC E: Pesticide Storage Area (Post Area - Bldg. 1708) (Photos: 2-84A, -84B, -85, -86)

Building 1708 is used to store and mix pesticides. Storage is in commercially approved containers including one- and five-gallon cans, 30- and 55-gallon drums for liquids and three- to 50-pound plastic lined bags for dry materials. The storage and mixing area is a concrete slab which was modified in 1981 to provide a 4-inch deep concrete retaining basin to contain possible spills. The storage facility is within a controlled fenced area and securely locked. (Reference 356)

6.6 AOC F: Methane Vent (Flare) at STP (Photo: 2-14)

This unit is a steadily burning flare located approximately one hundred feet from the Secondary Digester (SWMU No. 78). The flare burns methane generated in the Primary and Secondary Digester. The gas is conveyed through an underground pipe. The flare is a metal pipe extending approximately ten feet above ground. The methane may carry additional contaminants.

6.7 AOC G: Brine (MeCl) Storage Tanks (TTF) (Photo: 2-46)

The methylene chloride storage tanks at TTF are pressurized, underground, stainless steel tanks insulated with urethane foam. The two tanks have a combined capacity of 46,000 gallons. The methylene chloride (called Brine at TTF) is stored cold and under pressure to minimize losses from volatilization. The tanks are reportedly inspected on a routine basis.

6.8 AOCs H-L: MeCl Expansion Tanks (TTF)

The five expansion tanks are mounted about 20 feet above ground level outside the TTF building. The expansion tanks are part of the TTF refrigerant system. Methylene chloride is used as a secondary refrigerant to control temperature in the test chambers. The expansion tanks are mounted above the Drum Storage Area/Splash Pad (SWMU No. 109). During start-up activities at TTF in 1984, leaky gaskets in the expansion tanks and other equipment resulted in a release of methylene chloride. As a result, soil beneath the expansion tanks was contaminated with methylene chloride. Soil sampling indicates concentrations of about 18 ppm methylene chloride (Reference 313) The Drum Storage Area/Splash Pad was installed over the contaminated soil.

6.9 AOC M: Exploded/Unexploded Low Level Radioactive Ordnances

The area discribed in this section were not visited during the VSI. All information was obtained from the Installation Assessment of WSMR, Reference 16.

Prior to and after the launching of missiles containing radioactive material, monitoring is conducted. Radioactive debris is recovered from impact areas, if possible.

Two Pershing missiles launched in June 1976 were determined to be unrecoverable. The impact sites are located east of MAR site. Monitoring has determined no significant radioactivity over background. (Reference 16)

An unrecoverable Athena missile is reported to have impacted in the west-central part of the range. (Reference 16) In 1979, the area was being monitored semi-annually. In January 1978, the levels at various locations around the impact site varied from 7 to 20 microroentgens per hour (uR/hr), background was reported to be 12 uR/hr. In July 1978, the levels varied from 8 to 22 uR/hr, and background was 8 uR/hr. (Reference 16, 356)

An Athena missile launched in 1970 impacted in the State of Chihauhau, Mexico. Sixty drums of soil were removed to bring the radiation dosage to 30 uR/hr. The drummed soil was stored at the Nuclear Effects Laboratory and in 1979, reportedly, the soil had reached background level radiation. (Reference 16) A munition containing depleted uranium reportedly impacted in the Co-Use Area in 1964 or 1965. It is reported that this munition was not recovered. (Reference 16)

The Trinity Site was the location of the first atomic explosion on July 16, 1945. The Trinity Site is monitored semi-annually. In October 1978, radiation of 0.15 to 1 70 uR/hr was recorded. The radiation activity dominantly comes from trinitite, which is formed by fused sand. The predominant isotope in trinitite is cesium-137 which has a half-life of 30 years. The Trinity Site is open to the public on a semi-annual basis for two days per year. (Reference 16, 356)

6.10 AOC N: Process Spills at HELSTF

The laser optics, which consist of mirrors made of molybdenum, are cooled during lasing operation using high pressure water. The water contains chromium to prevent corrosive bacterial growth. The recirculating cooling water is bled off and make-up water is periodically added to the cooling system.

On June 12, 1986, an operator error reportedly lead to the release of approximately 1750 gallons of cooling water containing hexavalent chromium. All soil having a chromium content greater than 5 ppm chromium was to be removed, drummed, and shipped off-site by DRMO. Documentation

on the extent of clean-up required was not available. (Reference 240) According to the spill report, some chromate contaminated soil was placed in the HELSTF Landfill (SWMUs 38-39). According to HELSTF personnel operational modifications have been made to minimize the potential for future releases. (Reference 240, 356)

Another spill reportedly occurred on an unknown date, probably in July 1986. The spill was chromate-containing liquid from a leaking drum. (Reference 246) Approximately 30 gallons were spilled. (Reference 227) No further information is available regarding clean-up activities.

Depth to ground water is 73-130 feet in the HELSTF area and has a high TDS. (References 240, 269) Soil in the area is a mixture of sand, silt and clay. Depth to bedrock is unknown but is probably greater than 1000 feet. (References 269, 350)

6.11 AOC O: Miscellaneous Areas Identified From Aerial Photographs

Potentially contaminated sites were identified from aerial photographs in the Update to the Initial Installation Assessment (UIIA). (Reference 352) Some of these sites were visited during the VSI to validate the conclusions in the UIIA. Sites which were determined to be SWMU or AOC are described in chapter 5.0 or in chapter 6.0. Other sites were commonly found to be disturbed areas that were used as borrow pits or were pits that were excavated to contain water as an emergency fire water source. One of the areas investigated in the field was discovered to be a widening of a drainage ditch. A surface impoundment identified in the Tula Peak area was actually two natural ponds. Another disturbed area was a sandy soil area with one or two rusted five-gallon containers. In general, the findings of this report confirm those in the UIIA. (Reference 356)

The miscellaneous sites visited as identified in the UIIA were:

- Site 3
- Site 11 (within impact zone) (Photo 1-61, -62)
- Site 12 (Photo 1-63)
- Site 13 (Photo 1-60)
- Site 17 near LC32 (Photo 1-68)
- Site 19
- Site 20 near LC34 (Photo 1-69)

Several sites independently identified from the aerial photographs by the VSI were visited to provide quality assurance of photographic interpretation. These sites were similar in description as sites 3, 11, 12, 13, 17, 19 and 20.

- Site near LC 38
- Pit near building 21572 (Photo 1-67)
- Tularosa Range Camp - Barrell Spring (Photos 1-48, -49, -50, -51)
- Flower Area - LC50 (Photo 1-59)

6.12 AOC P: Chemistry Lab Drains

The Chemistry lab, Building 1530 is located in the Main Post near the Post Headquarters. The drains are connected to the Sewage Treatment Plant (STP). In the past, waste lab chemicals and samples reportedly may have been disposed in the lab sinks. The current practice segregates the waste chemicals and samples for waste management. (Reference 356)

6.13 AOC Q: HELSTF Lab Drains

The HELSTF lab is located north of Building S26131. The lab performs various chemical analyses to support the HELSTF missions. It was reported that minor amounts of lab chemicals were and are flushed down the lab drains. It is believed the drains are connected by piping to the Chemical Waste Tanks (SWMU Nos. 31-32). Prior to the construction of the

chemical waste tanks the drains were either connected to the sanitary treatment ponds or the effluent was collected and transferred to the ponds. (Reference 356)

6.14 AOC R: Strafing Area - Oscura Range

The strafing area is located on the east and west side of Building 9000 at the Oscura Range. The areas are approximately 300 feet by 300 feet. Large targets are set up for jet aircraft gunner practice. The bullets, which may have tracers during night practice, may contain lead. An attempt is made approximately every 60 days to collect the bullets from the ground surface. This is accomplished by the use of magnets and raking. It is reported that the magnetic collection program is not completely effective. The success of the collection and any impacts on the environment are unknown. (Reference 356)

6.15 AOC S: Septic Tanks with Leach Fields

The septic tanks were not evaluated during the VSI. All information on the tanks were obtained from the Installation Assessment of WSMR. (Reference 16) Numerous septic tanks on the WSMR are drained to leach fields. As many as 60 septic tanks have been reported to be on the WSMR. Reportedly the sludge is periodically removed and discharged into the STP (SWMU Nos. 67-84). It is uncertain if any of the septic tanks have ever been contaminated with hazardous constituents. The direct discharge of the liquid wastes to the environment raises a concern over the potential impacts on the environment. (References 16, 356)

6.16 AOC T: Collection Lines to the Sewage Treatment Plant (STP)

Wastewater generated in the Main Post Area is collected in a sewer system composed of 57,363 meters of vitrified clay and concrete pipe ranging in size from 15 to 38 cm. The wastewater is collected in a 38 cm line and flows by gravity to the STP.

In the main post area, industrial wastewaters are primarily from the Photography Facility. Concentrated spent solutions (collected from holding tanks since 1974) are now transported to a toxic waste disposal area, evaporated, and the residue is drummed and buried. (Reference 24) Previously, the wastes were discharged into the sewer system; rinsewaters, however, continue to be discharged into the sewer system. These facilities were modernized in 1974 and an emphasis has been placed on recycling and reclamation (especially silver). (References 16, 352, 356)

Concentrated wastes from all Chemical Laboratories are collected in various containers and transported to the toxic waste disposal area for disposal (see above). These wastes are no longer discharged into the sewer system.

Other minor industrial sources discharging into the sewer system include boiler blowdown and deionizer regenerant brines, other laboratory wastes, paint spray booths, steam cleaning facilities, and vehicle washracks. Some of these also discharge into the storm drainage system. (Reference 16, 352, 356)

6.17 AOC U: Miscellaneous Spills

These spill areas were documented in the Installation Assessment of WSMR-Reference 16. Clean up activities were not discussed in this reference.

(1) Static Test Facility. (Reference 16) In 1956, a spillage of 4.5 kg of UDMH fuel was reported in the 225 kg test area.

(2) Fuel Loading Dock (Reference 16) The Fuel Loading Dock is located approximately 9 km east of the Headquarters Area on WSMR Route 2. It is reported that Red Fuming Nitric Acid leaked from a missile during a loading operations in 1956.

(3) Liquid Propellant Storage Area. (Reference 16) The Liquid Propellant Storage Area is located south of WSMR Route 2 and west of

WSMR Route 19. In 1975, 19 liters of unsymmetrical dimethyl hydrazine (UDMH) were spilled. In this area in 1956, faulty tank plumbing resulted in the release of approximately 3,420 liters of Red Fuming Nitric Acid. (Reference 16)

6.18 AOC V: HELSTF Pressure Recovery System (Photo 1-34)

The pressure recovery system removes fluoride-containing compounds from the gases generated by the deuterium fluoride chemical laser. The effluent gases pass through a scrubber device. The device contains plastic saddles. As the gases pass through the scrubber, a counter-current of dilute aqueous sodium hydroxide neutralizes the hydrogen fluoride. The removal efficiency for hydrogen fluoride is reported to be approximately 80 - 90%. The scrubber fluids are then treated with calcium hydroxide to produce fluorspar (CaF_2). The fluorspar is dryed in the fluorspar tanks (SWMU Nos. 33-34). Reportedly there are no applicable air permits for this unit. (Reference 354, 356)

6.19 AOC W: Rhodes Canyon Inactive Impoundment

A disturbed area was observed on the south side of Range Road 6 south of the Rhodes Canyon Landfill (SWMU No. 114), and west of the Subgrade Tanks (SWMU Nos. 116-118). The disturbed area had been identified as a possible former surface impoundment from observations made during the inspection of the adjacent landfills during the VSI. Facility personnel were unable to identify the possible function of the unit. At the time of the VSI, the disturbed area was not distinguishable as a surface impoundment. An old road bed or a possible berm was observed near the perimeter of the disturbed area.

6.20 AOC X: Rhodes Canyon Satellite Storage Area

A fenced and partially paved area was observed south of the Rhodes Canyon Landfill (SWMU No. 114) on Range Road 6. The products stored in this area were drums of lube oil and some transformers on wooden pallets. The transformer labels did not indicate that PCBs were present in the

dielectric fluid. No waste storage was observed in the area and no visual evidence of a release was noted during the VSI.

6.21 AOC Y: Stormwater Drainage Ditch

The stormwater drainage ditches at the Main Post area have been reported to receive or potentially receive waste by run-off from various operations and spills. (Refer to SWMU Nos. 10, 12, 14, 15, 16, 18, 19, 21, 22). The drainage ditch generally flows toward the Playa Lake area (SWMU No. 85). (Refrence 356)

6.22 AOC Z: Abandoned Underground Storage Tank (Photo: 1-17)

The tank is located at the southern end of the Main Post near the intersection of Headquarters Avenue and Raritan Avenue. The tank is situated just off a dirt road approximately 200 feet south of Raritan Avenue. The unit is constructed of steel and a portion of the tank is exposed above grade. The dimensions are approximately ten feet long with a four foot diameter. A vent protrudes about three fourths out of the ground on one end of the tank. The vent is approximately one foot in diameter. The dates of operation and the contents are unknown. Reportedly the tank may have contained gasoline. No documented release history exists. (Reference 356)

7.0 CONCLUSIONS AND SUGGESTIONS ACTIONS

This section will provide a summary of the conclusions and suggested actions developed for each of the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified in Sections 5.0 and 6.0. Additional and supplemental information will be included for the identified SWMUs and AOCs.

SWMU No. 1 Floor Drain System

Suggested Action: No further action is suggested at this time.

Reason: The routine spillage of photo processing materials appears not to be significant. Furthermore the spillage is diluted and treated via the Sewage Treatment Plant (SWMU Nos. 66-84).

Supplemental Information: Use of spill pans to minimize minor spills that reach the floor drain system may be warranted.

SWMU Nos. 2-6 Bleach and Fixer Collection System (5)

Suggested Action: No further action is suggested at this time.

Reason: Since the containers are under roof and on concrete floors with a drainage system, the potential for an environmental release is minimal.

SWMU No. 7 Silver Recovery Unit

Suggested Action: No further action is suggested at this time.

Reason: Since the unit is under roof and on a concrete floor with a drainage system, the potential for an environmental release is minimal.

SWMU Nos. 8-9 Waste Oil Tank & Sump

Suggested Action: No further action is suggested at this time.

Reason: Although the tank is underground and approximately 25 years old, the waste managed is not highly corrosive, volatile or water soluble. The area surrounding the unit is paved with either asphalt or concrete which minimizes spill releases to soils.

Supplemental Information: Due to the age of the tank a structural integrity test is suggested. A documented routine inspection and maintaining a mass balance log is also suggested.

SWMU No. 10 Vehicle Wash Pad and Drains

Suggested Action: No further action is suggested at this time.

Reason: The type and amount of waste managed, the concrete construction of the pad which slopes to concrete constructed drains and sump supports the suggested action. The area was noted to be well maintained during the VSI.

Supplemental Information: A documented routine inspection is suggested to insure unit integrity and cleanliness.

SWMU No. 11 Sump and Oil/Water Separator Pad

Suggested Action: No further action is suggested at this time.

Reason: The type and amount of waste managed, the concrete construction, metal plate protection and the well maintained appearance of the unit during the VSI support the suggested action.

Supplemental Information: A documented routine inspection is suggested to insure unit integrity and cleanliness.

SWMU No. 12 Vehicle Wash Ramp and Drains

Suggested Action: No further action is suggested at this time.

Reason: The type and amount of waste managed, the steel construction of the ramp, and the concrete construction of the pad which slopes to concrete support the suggested action. The area was noted to be well maintained during the VSI.

Supplemental Information: A documented routine inspection is suggested to insure the integrity and cleanliness of the unit.

SWMU No. 13 Sump and Oil/Water Separator Ramp

Suggested Action: No further action is suggested at this time.

Reason: The type and amount of waste managed, the concrete construction, metal grate protection and the well maintained appearance of the unit during the VSI support the suggested action.

Supplemental Information: A documented routine inspection is suggested to insure unit integrity and cleanliness.

SWMU Nos. 14-15 Used Battery Accumulation Areas (2)

Suggested Action: No further action is suggested at this time.

Reason: The used batteries are stored on an asphalt surface. No evidence of release to environmental media was apparent during the VSI.

Supplemental Information: Potential releases could be further minimized by placing the batteries under roof in a bermed area. Initiation of standard operating procedures to assure proper disposal of waste acids is suggested.

SWMU No. 16 Heavy Equipment Wash Pad and Drain

Suggested Action: An RFI is suggested for this unit.

Reason: The rinse water was directly discharged to the stormwater drainage system. At the time of the VSI, standing water containing black oil was observed in the stormwater ditch. Soil discoloration was noted surrounding the discharge pipe where it entered the stormwater drainage ditch during the VSI.

Supplemental Information: Soil sampling is suggested to characterize the nature and extent of No. 247 contamination.

SWMU No. 17 Waste Underground Injection Pipe

Suggested Action: An RFI is suggested for this unit.

Reason: The design of the unit, the amount and exact type of waste disposed, and the time frame of disposal are all unknown. However, the unit was reportedly used to discharge waste solvents, petroleum oils and lubricants. This unit is located over the Main Post potable water aquifer.

Supplemental Information: Soil sampling is suggested to characterize the nature and extent of contamination. This unit was not observed during the VSI. The information on this unit was obtained from the update to the Installation Assessment Reference 352. It is suggested RFI activities be coordinated with all IRP activities.

SWMU No. 18 Waste Accumulation Area

Suggested Action: An RFI is suggested for this unit.

Reason: The unit is on gravel covered ground and is open to the elements. Discolored gravel in the immediate area of the unit was observed during the VSI.

Supplemental Information: Soil sampling is suggested for this unit to determine the nature and extent of contamination. Improved housekeeping, recordkeeping, the installation of an effective liner, and construction of a berm would help minimize the potential for releases to the environment.

SWMU No. 19 Steam Wash Pad and Drains

Suggested Action: No further action is suggested at this time.

Reason: The type and amount of waste managed, the concrete construction of the pad which slopes to concrete constructed drains and an oil/water separator supports the suggested action. The area was noted to be well maintained during the VSI.

Supplemental Information: A documented routine inspection is suggested to insure unit integrity and cleanliness.

SWMU No. 20 Oil/Water Separator

Suggested Action: No further action is suggested at this time.

Reason: The type and amount of waste managed, the concrete construction, the metal plate construction and well maintained appearance of the unit during the VSI support the suggested action.

Supplemental Information: A documented routine inspection is suggested to insure unit integrity and cleanliness.

SWMU No. 21 Old Firefighting Training Area

Suggested Action: An RFI is suggested for this unit.

Reason: This site was used for the open-burning of waste oil, lubricants and spent jet fuel for the purposes of fire fighting training. The observed soil staining noted during the VSI and the unknown amount of waste residue support the suggested action.

Supplemental Information: Soil sampling is suggested to determine the nature and extent of contamination.

SWMU No. 22 Abandoned Pit

Suggested Action: An RFI is suggested for this unit.

Reason: Heavily stained soils were noted during the VSI. The exact purpose of this unit and type of wastes managed are unknown.

Supplemental Information: Soil sampling is suggested to determine the nature and extent of contamination.

SWMU Nos. 23-24 Old Hazardous Waste Tanks (2)

Suggested Action: No further action is suggested at this time.

Reason: The design of the units and no observed contamination at these tanks during the VSI supports the suggested action. The tanks have been cleaned and are no longer operational.

SWMU No. 25 Waste Accumulation Area

Suggested Action: No further action is suggested at this time.

Reason: The unit consists of labeled metal drums on pallets. The area is fenced and paved with asphalt. No visible signs of contamination were noted during the VSI.

Supplemental Information: To insure run-off control, installation of a roof and a berm is suggested.

SWMU No. 26 Vapor Recovery Unit

Suggested Action: No further action is suggested at this time.

Reason: The unit appeared to be well maintained with no visible signs of contamination during the VSI. The unit is constructed of metal, fiberglass and plexiglass and sits on a concrete pad.

Supplemental Information: The actual removal efficiency of the unit is unknown. Removal efficiency is further complicated by the broad range of pollutants being removed (i.e. acids, bases, organics). Stack testing to evaluate pollutant removal and emission concentrations is suggested. There are no air permits associated with this unit.

SWMU Nos. 27-30 Sanitary Treatment Systems (4)

Suggested Action: No further action is suggested at this time.

Reason: Although minor amounts of hazardous constituents may have entered the system, dilution, bio-degradation and design of the units (hypalon lined) minimize any concerns.

Supplemental Information: An inventory of all receiving wastes is suggested. Periodic sampling of the waste water and testing for hazardous constituents would aid in inventory verification. Additionally, it is suggested that the spray evaporation unit be reoriented or redesigned, or operated only under specified meteorologic conditions to minimize overspray.

SWMU Nos. 31-32 Chemical Waste Tanks (2)

Suggested Action: No further action under Corrective Action authorities is suggested for these units.

Reason: These double lined, above-ground units are included in the facility Part B Application for a RCRA Permit dated April 1988. Groundwater monitoring wells have been installed at this unit.

SWMU Nos. 33-34 Fluorspar Tanks (2)

Suggested action: No further action is suggested at this time.

Reason: The concrete construction of the units and the insoluble and non volatile (i.e., Calcium Fluoride) type of waste managed support the suggested action.

Supplemental Information: It is suggested management practices during sludge removal be improved to minimize spillage. Routine inspections and design changes may aid in minimizing potential releases.

SWMU Nos. 35-36 Ethylene Glycol Tanks (2)

Suggested Action: No further action is suggested at this time.

Reason: The tanks containing the waste ethylene glycol appeared to be well maintained and no visible sign of contamination was observed during the VSI.

SWMU No. 37 Waste Oil Accumulation Area at Building 26121

Suggested Action: No further action is suggested at this time.

Reasons: The unit consisted of steel drums on pallets. The area was paved with asphalt. No visible evidence of contamination was observed during the VSI.

SWMU Nos. 38-39 Construction Landfills (2)

Suggested Action: An RFI appears warranted for these units.

Reason: Although the units reportedly receive only inert construction debris it is suspected that hazardous wastes have been disposed of at these units. Based on a spill report form June 1986 some chromium contaminated soil was placed in the landfill(s). Also these units were reported to be in operation prior to RCRA with no reported waste management procedures to segregate wastes or monitor disposal activities.

Supplemental Information: Sampling is suggested to verify the presence of hazardous constituents, and, if present, to determine the nature and extent of release. The development of an inventory of wastes previously disposed and initiation of procedures to assure that hazardous constituents are not disposed of in these units is also suggested.

SWMU No. 40 Waste Oil Accumulation Drum

Suggested Action: No further action is suggested at this time.

Reason: This unit is a single 55-gallon drum used for the accumulation of waste oil. The minor amount of petroleum-based waste stored in a metal drum supports the suggested action.

SWMU Nos. 41-46 Detonation/Burn Field and Disposal Pits (6)

Suggested Action: No further action under Corrective Action authorities is suggested at these units.

Reason: These units are unlined pits in which unexploded ordnances are detonated, burned and buried. These units are included in the facility Part B Application for a RCRA permit dated April 1988. These units are to be further addressed in an addendum to the application under Subpart X regulations.

Supplemental Information: Further monitoring under the permitting authorities is suggested.

SWMU Nos. 47-49 Landfills (3)

Suggested Action: No further action is suggested at this time.

Reasons: This unit reportedly receives only inert debris and refuse. Reported waste types include glass and plastic bottles, rubber tubing, aluminum cans, wood and waste paper. Debris and rusted out 55-gallon drums were noted during the VSI to be in the general area. The unit has been in operation since 1981 (after the implementation of RCRA). No evidence of disposal of hazardous constituents was reported or observed during the VSI.

Supplemental Information: The development of an inventory for wastes previously disposed and initiation of procedures to assure that hazardous constituents are not disposed of in these units is suggested.

SWMU Nos. 50-54 Red Rio Munitions Disposal Areas (5)

Suggested Action: No further action under Corrective Action authorities is suggested at this time.

Reasons: These units are unlined pits in which unexploded ordnance are detonated, burned and buried. These units are included in the facility Part B Permit Application for a RCRA permit dated April 1988. These units are to be further addressed in an addendum to the application under Subpart X regulations.

Supplemental Information: Further monitoring under the permitting authorities is suggested.

SWMU No. 55 Burn Pan

Suggested Action: No further action under Corrective Action authorities is suggested at this time.

Reasons: The Burn Pan is a metal pan on tracks which has not been placed into service. This unit is included in the facility Part B Permit Application for a RCRA permit dated April 1988. This unit is to be further addressed in an addendum to the application under Subpart X regulations.

Supplemental Information: Further monitoring under the permitting authorities is suggested since this is a replacement unit.

SWMU No. 56 Detonation Pit

Suggested Action: No further action under Corrective Action authorities is suggested at this time.

Reasons: This unit is an unlined pit in which unexploded ordnances are detonated. This unit is included in the facility Part B Permit Application for a RCRA permit dated April 1988. This unit will be further addressed in an addendum to the application under Subpart X regulations.

Supplemental Information: Further monitoring under the permitting authorities is suggested.

SWMU Nos. 57-60 Pit and Burial Areas (4)

Suggested Action: An RFI is suggested for these units.

Reasons: The unlined, partially covered burial pits contained visible but unknown amounts of missile debris, bomblets, grenades and other forms of solid waste. Hazardous constituents are likely to include those reactive materials found in explosive ordnances.

Supplemental Information: Surface and subsurface sampling to characterize the nature and extent of contamination is suggested. Parameters to consider analyzing include lead, Cadmium, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, Hydrazine and Furfural.

SWMU No. 61 Incinerator

Suggested Action: An RFI is suggested for this unit.

Reason: The unit was badly rusted with bomblet and grenade debris in and around the unit. The unit is on the soil with no release controls. Hazardous constituents are likely to include those reactive materials found in explosive ordnances.

Supplemental Information: Surface and subsurface sampling to characterize the nature and extent of contamination is suggested. Parameters to consider analyzing include lead, Cadmium, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, Hydrazine and Furfural.

SWMU No. 62 Former Sewage Treatment Plant (STP)

Suggested Action: An RFI appears warranted for this unit.

Reason: The active STP (SWMU Nos. 66-84) has received hazardous constituents. Therefore it is suspected this unit has also received similar wastes. Additionally this unit and its discharge point are located above the sensitive fresh water aquifer at the Main Post Area.

Supplemental Information: Subsurface sampling is suggested to characterize the nature and extent of contamination. It is suggested the RFI activities be coordinated with the recommendation made in the update of the Installation Assessment (Reference 352) and any other IRP activities.

SWMU Nos. 63-65 Former Sanitary Landfills in Post (3)

Suggested Action: An RFI appears warranted for these units.

Reason: These units were in operation prior to implementation of RCRA and prior to the operation of the Hazardous Waste Landfill (SWMU No. 91). The generation and management of wastes containing hazardous constituents by these units is unknown. However, non-hazardous landfills have received wastes containing hazardous constituents at WSMR (SWMU No. 38-39). These units overlay the Main Post fresh water aquifer.

Supplemental Information: Subsurface sampling is suggested to characterize the nature and extent of contamination. It is suggested the RFI activities be coordinated with the recommendation made in the update to the Installation Assessment (Reference 352) and any other IRP activities.

SWMU No. 66 Influent Pipeline to STP

Suggested Action: No further action is suggested at this time.

Reason: The unit receives waste water collected from the Post area. There is no visual evidence of a release from this unit, and no record of a past release.

Supplemental Information: Due to the age of the unit, the pipeline should be inspected routinely to check for signs of deterioration.

SWMU No. 67 Bar Screen/Grinder (STP)

Suggested Action: No further action is suggested at this time.

Reason: The integrity and construction of this unit and the low potential for release of hazardous constituents do not warrant further action.

SWMU Nos. 68-69 North and South Primary Clarifiers (STP)

Suggested Action: No further action is suggested at this time.

Reason: These units receive waste water. There is no visual evidence to suggest that any releases have occurred from these units. The integrity of the unit is adequately monitored through routine inspections.

SWMU No. 70 Grid Ditch/Splitter Box 1 (STP)

Suggested Action: No further action is suggested at this time.

Reason: This unit manages only sanitary waste water from the Post area. The integrity of the unit is adequately monitored through routine inspections.

SWMU Nos. 71-72 North and South Trickling Filters (STP)

Suggested Action: No further action is suggested at this time.

Reason: These units receive effluent from the clarifiers via Splitter Box 2. No evidence of a release was noted during the VSI.

SWMU No. 73 Splitter Box 2 (STP)

Suggested Action: No further action is suggested at this time.

Reason: This unit receives effluent from the primary clarifiers. No visual evidence was observed to suggest that any releases have occurred from this unit.

SWMU Nos. 74-75 North and South Secondary Clarifiers (STP)

Suggested Action: No further action is suggested at this time.

Reason: These units receive effluent from the trickling filters via Splitter Box 3. No evidence of a release was noted during the VSI.

SWMU No. 76 Splitter Box 3 (STP)

Suggested Action: No further action is suggested at this time.

Reason: This unit receives effluent from the trickling filters. No evidence of a release was noted during the VSI.

SWMU No. 77 Primary Digester (STP)

Suggested Action: No further action is suggested at this time.

Reason: This unit receives effluent from the secondary clarifiers. No visual evidence of a release was noted during the VSI.

SWMU No. 78 Secondary Digester (STP)

Suggested Action: No further action is suggested at this time.

Reason: This unit receives effluent from the primary digester. Methane generated in the digester is routed to the boiler as a supplemental fuel. Excess methane is diverted to the methane flare.

SWMU No. 79 Sludge Beds (STP)

Suggested Action: An RFI is suggested.

Reason: This unlined unit routinely receives sludge from the STP. Past and ongoing waste management practices may have resulted in the introduction of heavy metals and cyanide to the STP. No liner is present to prevent migration of hazardous constituents to the subsoils.

Supplemental Information: Sampling of the sludge is suggested to determine if hazardous constituents are present. If present, further RFI activities may be warranted to determine the extent of contamination.

SWMU No. 80 Waste Pile (STP)

Suggested Action: An RFI is suggested.

Reason: Past waste management practices may have resulted in the introduction of heavy metals and cyanides into the STP. The waste pile consists of debris, dried sludge and soils excavated from the original sludge beds which were destroyed by a 1978 flood. Hazardous constituents may be present in the waste pile. No liner or secondary containment is in place to prevent migration from the waste pile.

Supplemental Information: Sampling of the waste pile is suggested to determine if hazardous constituents are present. If present, further RFI may activities be warranted to determine the extent of contamination.

SWMU No. 81 Boiler (STP)

Suggested Action: No further action is suggested at this time.

Reason: This unit is a closed system. Waste is recirculated inside an enclosed pipe. The boiler is inside a metal building on a concrete foundation. The potential for release to all media is low.

SWMU Nos. 82-83 Former Drainage Ditches (STP)

Suggested Action: An RFI is suggested.

Reason: Past waste management practices may have resulted in the introduction of heavy metals and cyanides to the STP. Low concentrations of these contaminants may be present in this former discharge area.

Supplemental Information: Soil sampling during the RFI is suggested to determine whether hazardous constituents may have been released to the soil as a result of past waste management practices. Portions of the former North Drainage Ditch have been regraded and excavated to create a new impoundment. The STP no longer discharges to this area. The intended use of the new impoundment is unknown. At the time of the VSI, the new impoundment was dry. Exact locations of former discharge areas may be difficult to determine.

SWMU No. 84 Effluent Pipeline (STP)

Suggested Action: No further action is suggested at this time.

Reason: The PVC pipeline is less than three years old. There is no evidence to suggest that any leaks have occurred.

Supplemental Information: Routine inspection is suggested to verify the integrity of the unit.

SWMU No. 85 Playa Lake (STP)

Suggested Action: An RFI is suggested.

Reason: The Playa Lake receives effluent from the STP. Past waste management practices may have resulted in the introduction of heavy metals and cyanides into the STP. Low concentrations of these contaminants may be present in the sediments of the unlined discharge area.

Supplemental Information: Sediment sampling is suggested to determine whether hazardous constituents are present in the soil/sediment in the discharge area.

SWMU No. 86 Sanitary Landfill

Suggested Action: No further action is suggested at this time.

Reason: No hazardous wastes or hazardous constituents are managed in this unit. There is no indication of any release of hazardous constituents from the unit.

SWMU No. 87 Construction Landfill

Suggested Action: No further action is suggested at this time.

Reason: No hazardous wastes or hazardous constituents are managed in this unit. There is no indication of any release of hazardous constituents from the unit.

SWMU No. 88 Hazardous Waste Storage Facility (Container Storage Building)

Suggested Action: No further action is suggested at this time.

Reason: This is an interim status RCRA unit. Waste is stored in drums inside the building on a curbed concrete pad. The potential for release of hazardous constituents to any media from the unit is low. There is no visual evidence of a release at this unit.

SWMU No. 89 Former Evaporation Tank (HWSF)

Suggested Action: No further action is suggested at this time.

Reason: The unit no longer manages waste. A 1981 incident involving PCBs was cleaned up under EPA and State supervision. There is a low potential for continuing release from this unit. During the VSI, there was no indication of a release from this unit.

SWMU No. 90 Evaporation Tank

Suggested Action: No further action is suggested at this time.

Reason: There is low potential for a release from this unit. Secondary containment and waste management practices appear to be adequate. At the time of the VSI, the unit was dry and empty. There was no evidence of cracks or structural failure.

SWMU No. 91 Hazardous Waste Landfill

Suggested Action: No further action under Corrective Action authorities is suggested at this time.

Reason: A Closure Plan submitted for this unit proposes to close the unit with the waste in place. The unit has not received waste since 1981. The Closure Plan is currently being evaluated by EPA Region VI.

Supplemental Information: Verification that all six cells were prepared using the same (or equivalent) encapsulation procedure is suggested.

SWMU Nos. 92-100 Evaporation/Neutralization Pits at Liquid Propellant Storage Area (9)

Suggested Action: An RFI is suggested.

Reason: These pits serve as secondary containment for the storage tanks. None of the pits are lined. At least one of the pits has received nitric acid as the result of a spill. (Reference 16) Because the materials stored at this facility have varied over the years, the pits may have received a variety of hazardous wastes resulting from routine wash-down or run-off from the storage areas.

Supplemental Information: Soil sampling is suggested to determine whether any hazardous constituents are present in the soils. Further RFI action may be required depending on the results of the soil sampling. It is suggested the RFI activities be coordinated with the recommendation made in the update to the Installation Assessment (Reference 352) and any other IRP activities.

SWMU No. 101 Acid Neutralization Pit (Post)

Suggested Action: No further action is suggested under Corrective Action authorities at this time.

Reason: This is a RCRA-regulated unit. The unit was clean closed in 1985 under a Closure Plan approved by NMEID.

SWMU No. 102 Burn Pan (Post)

Suggested Action: No further action under Corrective Action authorities is suggested at this time.

Reason: A Closure Plan for the unit has been submitted and is currently being evaluated by EPA Region VI. Completion of closure is expected by November 1988.

SWMU No. 103 Scrap Metal Yard

Suggested Action: No further action is suggested at this time.

Reason: No hazardous wastes are managed in this unit. The unit receives only scrap metals such as iron, steel, and aluminum which are subsequently recycled.

SWMU No. 104 Old Evaporation Pond (TTF)

Suggested Action: No further action under Corrective Action authorities is suggested at this time.

Reason: This is a RCRA-regulation unit. The site is a former surface impoundment which received methylene chloride which subsequently breached the PVC liner. A Closure Plan has been submitted for this unit. EPA and the State of New Mexico are tracking the remediation and on-going closure activities. The Closure Plan proposes to close the unit as a landfill. Ground-water sampling around the TTF for priority pollutants has been recommended under the IRP.

SWMU No. 105 New Evaporation Tank (TTF)

Suggested Action: No further action is suggested at this time.

Reason: The unit primarily receives wastewater. Expected concentrations of hazardous constituents in the waste stream are low. The unit is constructed of stainless steel. There is no record of a release from this unit. During the VSI, no indication of a release was observed.

SWMU No. 106 Discharge Pipe (TTF)

Suggested Action: No further action is suggested at this time.

Reason: This unit primarily receives wastewater/condensate from the TTF. The expected concentration of hazardous constituents is low. There is no record of a release from this unit, and no visual evidence of a release was noted during the VSI.

SWMU No. 107 Storage Tank (TTF)

Suggested Action: No further action is suggested at this time.

Reason: The unit is constructed of steel. It was installed as an interim storage tank and may never have received waste. The potential waste stream is primarily wastewater/condensate with an expected low concentration of hazardous constituents.

SWMU No. 108 Gas Extraction Wells

Suggested Action: No further action is suggested at this time.

Reason: The vacuum system has not yet been installed but several air wells are in place.

Supplemental Information: The preliminary design for the extraction system does not specify whether the intent is to recover the vapors or to simply vent the vapors to the atmosphere. If the intent is to vent vapors to the atmosphere, the potential environmental impact of any emissions will have to be considered and evaluated.

SWMU No. 109 Drum Storage Area (Splash Pad) at TTF

Suggested Action: An RFI is suggested.

Reason: The unit was constructed over contaminated soil.

Supplemental Information: Further investigation is warranted to define the extent of the contamination and to determine whether ground water quality has been impacted. It is suggested the RFI activities be coordinated with any IRP activities. Ground-water sampling around the TTF for priority pollutants has been recommended under the IRP.

SWMU No. 110 MeCI Catchment System (TTF)

Suggested Action: No further action is suggested at this time.

Reason: There is a low release potential to all media from this unit and there was no evidence of a release observed during the VSI.

SWMU Nos. 111-112 Methylene Chloride Separation System (TTF)

Suggested Action: No further action is suggested at this time.

Reason: There is low release potential to all media from these units and there was no evidence of a release observed during the VSI.

SWMU No. 113 Salt Water Waste Tanks (TTF)

Suggested Action: No further action is suggested at this time.

Reason: No hazardous wastes are managed in this unit. There is low release potential to all media from this unit. No evidence of a release was observed during the VSI.

SWMU No. 114 Rhodes Canyon Landfill (Active)

Suggested Action: No further action is suggested at this time.

Reason: This unit reportedly manages only non-hazardous waste. Therefore, there is low potential for the release of hazardous constituents from this unit. During the VSI, there was no indication of a release from this unit.

SWMU No. 115 Rhodes Canyon Landfill (Inactive)

Suggested Action: An RFI is suggested.

Reason: The unit reportedly received missile debris from uprange impact areas. During the VSI, piles of rubble and several areas of disturbed soil were noted.

Supplemental Information: Soil sampling is suggested to determine whether any hazardous constituents have been disposed in the unit.

SWMU Nos. 116-118 Subgrade Tanks at Rhodes Canyon (3)

Suggested Action: No further action is suggested at this time.

Reason: No information is available to indicate that hazardous wastes may have been managed in these tanks. The tanks appear to be abandoned with wastes in place. The tanks may formerly have stored oil or fuels.

Supplemental Information: If these tanks are returned to active service, the integrity of the tanks should be verified prior to use. The facility should identify what materials may have been stored in the tanks in the past.

SWMU No. 119 Stallion Range Landfill (Active)

Suggested Action: No further action is suggested at this time.

Reason: This unit receives only sanitary waste. There is no indication that any hazardous waste or hazardous constituents have ever been managed in this unit. Therefore, there is a low potential for the release of hazardous constituents from this unit.

SWMU No. 120 Former Stallion Range Landfill

Suggested Action: No further action is suggested at this time.

Reason: This unit received only sanitary waste. There is no indication that any hazardous waste or hazardous constituents were ever managed in this unit. Therefore, there is low potential for the release of hazardous constituents from this unit. No evidence of a release was noted during the VSI.

SWMU Nos. 121-123 Subgrade Tanks at Stallion Range (3)

Suggested Action: An RFI may be warranted at this unit.

Reason: No information is available to indicate the contents of these tanks. The tanks appear to be abandoned former fuel or oil storage tanks. Identification of the contents of tanks and confirmation of the integrity of the tanks appears warranted. If a release has occurred, then further RFI activities may be warranted.

SWMU No. 124 Waste Oil Storage Tank (Stallion Range Center)

Suggested Action: An RFI may be warranted.

Reason: Identification of the contents of tanks and confirmation of the integrity of the tanks appears warranted. If a release has occurred, then further RFI activities may be warranted.

SWMU No. 125 Incinerator at Vet Clinic

Suggested Action: No further action is suggested at this time.

Reason: There is no indication that hazardous constituents were ever managed in this unit. The unit is no longer in use. During the VSI, there was no indication of a release from this unit.

SWMU No. 126 Incinerator at McAffee Clinic

Suggested Action: No further action is suggested at this time.

Reason: No hazardous wastes are managed in this unit. Residue and ash from the incinerator are disposed in the sanitary landfill on WSMR. The potential for release of hazardous constituents from this unit is low.

SWMU No. 127 Autoclave At McAffee Clinic

Suggested Action: No further action is suggested at this time.

Reasons: This is no indication that hazardous constituents were ever managed in this unit.

SWMU No. 128 Silver Recovery System Tailings Tank

Suggested Action: No further action is suggested at this time.

Reasons: The present management controls which include silver recovery, effluent testing and further treatment at the STP support the suggested action.

Supplemental Information: It is suggested that the effluent data be evaluated to ensure hazardous constituent (i.e., silver) concentrations are maintained below EP Toxic levels. The STP discharge is not regulated under NPDES.

SWMU No. 129 Cyanide Treatment Unit

Suggested Action: No further action is suggested at this time.

Reasons: Reportedly no hazardous wastes or constituents are treated by this unit. Further treatment is realized at the STP (SWMU Nos. 66-84).

SWMU Nos. 130-131 Former Spent Developer Storage Tank/Acetic Acid Spill Containment Tank

Suggested Action: No further action is suggested at this time.

Reason: The tank is used only for emergency situations. Reportedly the tank no longer contains any hazardous waste or hazardous constituents.

Supplemental Information: It is suggested that WSMR personnel verify the tank was completely cleaned from any cyanide waste which was previously stored in this tank. The addition of acidic waste in an uncleaned tank could generate toxic hydrogen cyanide gas.

SWMU No. 132 Wastes Stabilization Pond near Orogrande Range Camp

Suggested Action: An RFI appears warranted.

Reason: The purpose of this unit and the nature of its contents are unknown although there is no indication that hazardous wastes are managed

in this unit, other sanitary units at WSMR have or are suspected of having hazardous constituents.

Supplemental Information: Sampling to determine if hazardous constituents are present is suggested. Additional activities under the RFI will be dependent on the results of the sampling.

SWMU No. 133 NOMTS Machine Shop Accumulation Area

Suggested Action: No further action is suggested at this time.

Reason: The waste is stored in sealed steel drums on a concrete floor inside the Machine Shop building. There is no evidence of a release from the drums.

SWMU No. 134 NOMTS Outside Accumulation Area

Suggested Action: No further action is suggested at this time.

Reason: The waste is stored in overpack drums within a concrete containment area. There is no evidence of a release from this unit.

SWMU No. 135 Paint Shop Accumulation Area

Suggested Action: An RFI is suggested.

Reason: During the VSI, minor paint spills and drips were observed on the gravel around the drums.

Supplemental Information: Sampling of subsoils under the drums storage area is suggested to determine whether routine and systematic spillage has resulted in the release of hazardous constituents to the subsoils. Constituents of concern may include lead, chromium, and volatile organics such as toluene, xylene, methyl ethyl ketone, methyl isobutyl ketone, and n-butyl acetate.

SWMU No. 136 Paint Shop Spray Booth

Suggested Action: No further action is suggested at this time.

Reason: There is no evidence of a release from this unit. The potential for release to all media except air is low. The potential for release to air is moderate; however, the primary solvent utilized does not contain toxic or ignitable constituents.

Supplemental Information: The paint shop spray booth appears to be in use only on an intermittent, as-needed basis. Effluent and emissions are not continuous and volume is relatively low.

SWMU No. 137 Paint Shop Sump

Suggested Action: An RFI is suggested.

Reason: There is low potential for release to all media. However, effluent from this unit drains to the STP. Due to the age of the sump, there is a high potential for past and ongoing discharges of hazardous constituents to the STP. Sludge and sediment in the sump and in the sewer lines between the sump and the STP may contain hazardous constituents resulting from past usage of paints containing lead and chromium pigments.

SWMU No. 138 Waste Accumulation Area at RATSCAT

Suggested Action: No further action suggested at this time.

Reason: The type and amount of waste handled along with the metal drums on a concrete pad support the suggested action.

AOC A Sinks and Drains - Building 1621

Suggested Action: No further action is suggested at this time.

Reasons: The chemical constituents in the photo chemicals currently being used are very dilute and the majority are sufficiently bio-degraded upon treatment at the Sewage Treatment Plant (SWMUs 67-85). Prior to 1985 photo chemicals containing cyanide were used and discharged to the STP.

AOC B Battery Accumulation Area at North Oscura

Suggested Action: No further action is suggested at this time.

Reasons: No evidence of leakage or spills was noted during the VSI.

Supplemental Information: It is suggested that the batteries be placed on pallets and/or a concrete pad and under a roof to allow protection form the weather elements.

AOC C Areas where heavy pesticides/herbicides are used.

Suggested Action: No further action is suggested at this time.

Reasons: The New Mexico Game and Fish Commission is reportedly monitoring the WSMR for pesticide and herbicide residues and to date has not reported any problems.

AOC D Drum Storage Area at STP

Suggested Action: No further action is suggested at this time.

Reason: No hazardous wastes are managed in this area. During the VSI, there was no visual evidence of a release.

Supplemental Information: Installation of improved secondary containment may be warranted. The collection tub marked "Butts" may be a safety concern.

AOC E Pesticide Storage Area

Suggested Action: No further action is suggested at this time.

Reasons: The pesticides are stored and mixed in commercially approved containers, on a contained concrete slab and within a secured area.

AOC F Methane Vent (Flare) at STP

Suggested Action: Further investigation may be warranted to determine whether unregulated releases to air have occurred.

Reason: Past waste management practices have resulted in hazardous constituents being released to the STP from industrial operations on

WSMR. The STP is not currently operating under a NPDES permit, nor is the Flare operating under any State or federal permit for air emissions permit.

AOC No. G Brine (MeCl) Storage Tanks (TTF)

Suggested Action: No further action is suggested at this time.

Reason: This unit is a product storage tank. No evidence of a release was observed or reported.

AOCs H-L Methylene Chloride Expansion Tanks

Suggested Action: No further action is suggested at this time.

Reason: These are process tanks. No hazardous wastes are managed in the tanks. Design and operational problems, which had resulted in past release, have been corrected. The soil contamination resulting from the past releases is addressed under SWMU No. 109.

AOC M Exploded/Unexploded Low Level Radioactive Ordnances

Suggested Action: No further action is suggested at this time.

Reasons: There is no documented evidence that hazardous constituents are associated with these radioactive ordnances.

AOC N Process Spills at HELSTF

Suggested Action: No further action is suggested at this time.

Reasons: The spills were reported to be either cleaned up or of a minor quantity. Also the large depth to ground water and high evaporation rates will minimize any potential environmental impacts. Furthermore, operational changes have been made to minimize the potential for future releases.

Supplemental Information: It is suggested that the WSMR be requested to verify that spills have been cleaned up to the specified levels.

AOC O Miscellaneous Areas Identified From Aerial Photographs

Suggested Action: No further action is suggested at this time.

Reasons: These areas are not suspected of having a release potential of hazardous constituents as determined by either the Update of the Installation Assessment (Reference 352) or by the VSI team.

AOC P Chemistry Lab Drains

Suggested Action: No further action is suggested at this time.

Reasons: Current practices are reportedly in place which segregate waste chemicals for waste management. Rinsing and dilution has probably mitigated any continuing releases of chemicals due to past practices.

AOC Q HELSTF Lab Drains

Suggested Action: Further action may be warranted to determine the current actual waste management practices.

Reasons: HELSTF personnel were unsure of the actual disposition of the waste which are put down the lab drains.

AOC R Strafing Area - Oscura Range

Suggested Action: Further investigation may be warranted to determine if hazardous constituents are present.

Reasons: It is reported that the bullets may contain lead and that the magnetic collection program is not completely successful.

Supplemental Information: Surface and subsurface soil sampling to characterize the nature and extent of contamination is suggested.

AOC S Septic Tanks With Leach Fields

Suggested Action: No further action is suggested at this time.

Reasons: There is no documented evidence of hazardous constituents being introduced to, or released by the septic tanks.

Supplemental Information: It is suggested that the WSMR develop an inventory of tanks and leach fields along with what wastes are handle by each tank.

AOC T Collection Lines to Sewage Treatment Plant

Suggested Action: Further investigation may be warranted.

Reason: Past waste management practices have resulted in the release of hazardous constituents to the STP. The STP is not currently operating under a NPDES permit. The STP receives industrial waste waters from a variety of tenant and support activities, including boiler blow-down, deionizer regenerant brines, laboratory wastes, steam cleaning facilities, vehicle washracks and paint spray booths.

AOC U Miscellaneous Spills

Suggested Action: Further investigation may be warranted to determine if clean up activities took place and what contamination may still remain.

Reasons: There is no documented evidence that clean up activities took place.

Supplemental Information: Surface and subsurface soil sampling to characterize the nature and extent of contamination is suggested.

AOC V HELSTF Pressure Recovery System

Suggested Action: No further action is suggested at this time.

Reasons: The expected removal efficiencies should minimize the release of hazardous constituents to the air.

Supplemental Information: Verification of the removal efficiencies by stack testing may be warranted.

AOC W Rhodes Canyon Inactive Impoundment

Suggested Action: Further investigation may be warranted to positively identify the past uses of the area and to determine whether any hazardous wastes were managed in the unit.

Reason: The unit was identified as a possible former surface impoundment based on observations made during the VSI. Subsequent interviews with facility personnel and a thorough review of the file materials have disclosed no further information about the unit. An evaluation of release potential could not be completed from existing information.

AOC X Rhodes Canyon Satellite Storage Area

Suggested Action: No further action is suggested at this time.

Reason: The unit is a product storage area. No wastes are managed in this area and no visual evidence of a release was noted during the VSI.

AOC Y Stormwater Drainage Ditch

Suggested Action: Further investigation may be warranted to determine if hazardous constituents are present.

Reasons: The ditches have reportedly received or potentially could receive run-off from operational areas and spills.

Supplemental Information: Surface and subsurface soil sampling to characterize the nature and extent of contamination is suggested.

AOC Z Abandoned Underground Storage Tank

Suggested Action: Further investigation may be warranted to determine the constituents of the abandoned tank.

Reasons: The tank is a bare metal underground storage tank which reportedly may have contained gasoline.

Supplemental Information: It is suggested that the tank be sampled to determine its contents.

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205. Correspondence from NMEID to WSMR; Subject: Response to December 18, 1985 Notice of Violation, February 24, 1986.

206. NMEID Communication Record with WSMR; Subject: Information requested in NOV, January 28, 1986.

207. Correspondence from USEPA, to WSMR; Subject: Consent Agreement and Final Order, January 29, 1986.

208. Correspondence from WSMR to NMEID; Subject: NOV from October 30, 1985 NASA-NSTF, February 6, 1986.

209. Correspondence from WSMR to NMEID; Subject: Response to NOV, February 6, 1986.

210. Correspondence from NMEID to WSMR; Subject: Notice of Violation issued December 18, 1985, February 24, 1986.

211. Correspondence from WSMR to USEPA; Subject: Submittal of information and WSMR Response, February 27, 1986.

212. Correspondence from WSMR to NMEID; Subject: Submittal of 1985 Biennial Hazardous Waste Reports, March, 28, 1986.

213. USEPA Record of Internal Communication; Subject: WSMR ground-water monitoring waiver, March 28, 1986.

214. Correspondence from NMEID, to WSMR; Subject: Closure of acid neutralization surface impoundment, March 31, 1986.

215. NMEID List of Attendants at Presentation of EMRLD, April 1986.

216. WSMR Hazardous Waste Units, Ground-water monitoring system, April 1986.

217. NMEID Correspondence to WSMR; Subject: Closure of acid neutralization surface impoundment, March 31, 1986.

218. Correspondence from WSMR to USEPA; Subject: Submittal of Inventory of Federal Agency Hazardous Waste Activities, April 4, 1986.

219. Correspondence from WSMR to USEPA; Subject: Submittal of report on hazardous waste soil contamination (acid neutralization), April 8, 1986.

220. NMEID Fiscal year 1986 Hazardous Waste Compliance Monitoring and Enforcement Log.

221. NMEID Data Entry Form, April 17, 1986.

222. Correspondence from WSMR to NMEID; Subject: Environmental Assessment of Locating the Eximer Modified Raman Laser Device Beam Quality, April 18, 1986.

223. Correspondence from NMEID to WSMR; Subject: Personnel transition at WSMR, June 18, 1986.

224. Correspondence from NMEID to WSMR; Subject: Generator Biennial Report Form, June 30, 1986.

225. Correspondence from NMEID to WSMR; Subject: Wastestreams at WSMR (EMRLD BDQ), July 3, 1986

226. Correspondence from WSMR to NMEID; Subject: Introduction letter, July 8, 1986.

227. NMEID Internal Memo; Subject: Spill at HELSTF, July 10, 1986.

228. Correspondence from NMEID to WSMR; Subject: Request for Post-Closure Care for Surface Impoundment.

229. Correspondence from NMEID to WSMR; Subject: Transmittal of Post-Closure Permit Application Checklist, July 21, 1986.

230. Correspondence from NMEID to WSMR; Subject: Chromate Spill on WSMR, July 22, 1986.

231. Correspondence from NMEID to WSMR; Subject: Closure of surface impoundment, July 25, 1986.

232. Correspondence from US EPA to Jacobs Engineering Group. Inc.; Subject: Closure Plans for WSMR.

233. Correspondence from WSMR to NMEID; Subject: Notification for underground storage tanks, July 29, 1986.

234. Correspondence from WSMR to NMEID; Subject: 1985 Generator Biennial Hazardous Waste Report, August 20, 1986.

235. Correspondence from WSMR to USEPA; Subject: Submittal and Revision of Part A Application, August 20, 1985.

236. Correspondence from NASA to NMEID; Subject: Closure, Post-Closure Care Plans for 300, 400 and 600 Areas and Revised Contamination Assessment Plans for 300, 400 Areas and 600 Areas, September 8, 1986.

237. Correspondence from NMEID to NMEID; Subject: NMEID rescinds request for submission of Post-Closure Care Permit Application, September 23, 1986.

238. Correspondence from WSMR to NMEID; Subject: Hazardous Waste Stream at Eximer Ramer Laser Device, September 29, 1986.

239. NMEID Internal Memo; Subject: Solid Waste Evaluation of the DEIS for the proposed ground based free electron laser technology integrating experiment, October 24, 1986.

240. NMEID Inspection Report at WSMR (CEI), October 29, 1986.

241. USEPA Compliance Monitoring Inspection Report, October 29-31, 1986.

242. Correspondence from USEPA to NMEID; Subject: Compliance Monitoring Inspection October 27, 1986 Report; November 28, 1986.

243. Correspondence from USEPA to NMEID; Subject: Compliance Evaluation Inspection October 29-31, 1986 Report; December 16, 1986.

244. Correspondence from NASA to NMEID; Subject: Transmittal of Semiannual ground-water monitoring results, December 16, 1986.

245. Correspondence from NMEID to WSMR; Subject: Notice of Violation Temperature Test Facility, December 22, 1986.

246. Correspondence from NMEID to WSMR; Subject: Notice of Violation, December 22, 1986.

247. Correspondence from TOMAK to NMEID; Subject: Removal of asbestos pipe lining from buildings 384 and 129 at WSMR, December 29, 1986.

248. NMEID Correspondence Record, Subject: Methylene Chloride Spill January 1, 1986.

249. Correspondence from WSMR to NMEID; Subject: Response to Notice of Violation, January 21, 1987.

250. WSMR Submittal of Revised Part A Application, January 23, 1987.

251. WSMR Correspondence; Subject: Chemical waste tank observation program, HELSTF, January 30, 1987.

252. WSMR Hazardous Waste Manifest, February 2, 1987.

253. WSMR Hazardous Waste Manifest, February 4, 1987.

254. WSMR Hazardous Waste Manifest, February 5, 1987.

255. WSMR Hazardous Waste Manifest, February 5, 1987.

256. WSMR Hazardous Waste Manifest, February 6, 1987.

257. NMEID File Memo Subject: Notice of Violation as a result of October 29, 1986 Inspection, February 18, 1987.

258. WSMR Hazardous Waste Manifest, March 10, 1987.

259. WSMR Hazardous Waste Manifest, March 10, 1987.

260. WSMR Hazardous Waste Manifest, March 10, 1987.

261. WSMR Hazardous Waste Manifest, March 10, 1987.

262. Correspondence from NMEID to NASA, WSMR; Subject: Variance from sections 108-F-1 and 2, April 1, 1987.

263. NMEID Correspondence to NASA, WSMR; Subject: Variance from Sections 108-F-1 and 2, April 1, 1987.

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265. NMEID Hazardous Waste Manifest, May 7, 1987.

266. Missing

267. WSMR Correspondence; Subject: Proposed discharge plan for the septic system at the Technical Support Area, High Energy Laser Systems Test Facility, May 15, 1987.

268. WSMR Final Contamination Assessment Report, Temperature Test Facility, May 20, 1987.

269. Correspondence from WSMR to NMEID; Subject: Submittal of a proposed discharge plan for sewage lagoon at HELSTF, May 27,1987.

270. Correspondence from NMEID to WSMR; Subject: Public notice for proposed discharge; June 10, 1987.

271. NMEID Attendants at WSMR-NMEID Meeting, June 10, 1987.

272. NMEID Internal Memo; Subject: NPL Listing, June 12, 1987.

273. Correspondence from NMEID to USEPA; Subject: Initial enforcement action for spill at Temperature Test Facility, June 17, 1987.

274. Correspondence from NMEID to WSMR; Subject: Receipt of discharge plan for HELSTF, June 18, 1987.

275. Correspondence from NMEID to WSMR; Subject: Notice of Violation to WSMR, June 18, 1987.

276. Correspondence from U.S. Dept of Interior, Fish and Wildlife Service to NMEID; Subject: Proposed discharge from WSMR, June 19, 1987.

277. Correspondence from NMEID to Mayor Carroll of Alamgordo, NM; Subject: Proposed discharge, June 23, 1987.

278. Correspondence from NMEID to Board of Ortero County Commissioners; Subject: Proposed discharge, June 23, 1987.

279. Correspondence from NMEID to WSMR; Subject: Public notice of proposed discharge, June 23, 1987.

280. Correspondence from J. Ellvinger, HED New Mexico to Major General J.S. Owens (WSMR); Subject: Receipt of closure plans for Acid Neutralization Pit and Burn Pan, June 24, 1987.

281. Public Notice New Mexico Environmental Improvement Division, Nothing related to WSMR, Page 1 of 2, July 1, 1987.

282. Correspondence from J.S. Owens (WSMR) to J. Ellvinger (HED New Mexico); Subject: Submittal of Revised Part A and Response to Notice of Violation to NMEID, July 1, 1987.

283. Correspondence from G. Garcia (NMEID) to R.J. Andreoli (DOA, WSMR);

Subject: Septic tank system at the High Energy Laser Test Facility, July 2, 1987.

284. Correspondence from J.C. Peterson (US Department of the Interior, Fish and Wildlife Service) to M.J. Burkhart (NMEID); Subject: Proposed groundwater discharge plan review, July 7, 1987.

285. Correspondence from W. Honker (USEPA) to J. Ellvinger (NMEID); Subject: Technical review of the closure/post-closure plans for WSMR, July 8, 1987.

286. Correspondence from J.S. Owens (WSMR), to M.J. Burkhat (NMEID); Subject: Fund appropriations, July 12, 1987.

287. NMEID Correspondence to phon (DP-492) approval from R. Mitzelfelt, HED New Mexican to M.L. Howell Jr, Corp of Engineers WSMR, July 22, 1987.

288. NMEID Monitoring and Reporting Form - HELSTF Domestic Sewage disposal, July 22, 1987.

289. NMEID Internal Memo from J. Wanslow to L. Bueschar; Subject: WSMR study of old records, photos, etc., July 24, 1987.

290. Correspondence from NMEID to M.L. Howell (DOA WSMR); Subject: Approval for disposal of wastewater from HELSTF.

291. Memo from H.E. Motiff (DOAF) to Mr. Andreoli (DOA WSMR); Subject: Permitting and transporting of hazardous waste at RATSCAT, August 6, 1987.

292. Correspondence from C.K. Crossman (NMEID) to Las Cruces Sun News; Subject: Legal notice, August 10, 1987.

293. Correspondence from M. Burkhart (NMEID) to J. Owens (WSMR); Subject: Notice of Violation, Aug. 17, 1987.

294. Correspondence from C. Crossman (NMEID) to J. Owens (WSMR); Subject: Proposal to approve Closure Plan submitted for Acid Neutralization Surface Impoundment, Aug. 20, 1987.

295. Correspondence from C.K. Crossman (NMEID) to R. Lummus (Dona Ana County); Subject: Proposed approval of WSMR Closure Plan, Approval August 20, 1987.

296. ibid, to M. Lamb, Alamogordo Daily News.

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300. Revised Part A Hazardous Waste Permit, Sept. 8, 1987.

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302. Correspondence from J. Ellvinger (NMEID) to J. Owens (WSMR); Subject: Notice of disapproval for Closure Plan for Open Burn Pan, Sept. 22, 1987.

303. Memo (USEPA) from M. McKee to H. Frey; Subject: CERCLIS records, Sept. 17, 1987.

304. Correspondence from K. Jones (NMEID) to J. Owens (WSMR); Subject: Compliance Order/Schedule, Sept. 28, 1987.

305. Correspondence from J. Ellvinger (NMEID) to J. Owens (WSMR); Subject: Notice of disapproval, Sept. 22, 1987.

306. Correspondence from B. Hamilton (NMEID) to P. Brechlin (USEPA); Subject: Possible Class I Manifest Violation, Oct. 5, 1987.

307. Correspondence from J. Ellvinger (NMEID) to J. Owens (WSMR); Subject: Closure Plan approval, Oct. 16, 1987.

308. Correspondence from J. Ellvinger (NMEID) to J. Owens (WSMR); Subject: Post-Closure Care Permit Application, Oct. 16, 1987.

309. NMEID Record of meeting, Oct. 16, 1987.

310. Correspondence from J. Ellvinger (NMEID) to J. Owens (WSMR); Subject: Revised Part A notification, Oct. 21, 1987.

311. Correspondence from M. Howell (WSMR) to E. Gordon (NMEID); Subject: Addendum to Burn Pan Closure Plan.

312. Portion of a Closure Plan; Subject: Burn Pan, June 1987 WSMR

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315. NMEID internal memo from A.E. Gordon to Kelley Crossman; Subject: Notes on review of submitted Closure Plan for OBP. November 24, 1987.

316. Correspondence from A.E. Gordon (NMEID) to Las Cruces Sun News; Subject: Request to publish legal notice, Dec 2, 1987.

317. Correspondence from A Gordon, (NMEID) to Maj. General Thomas J.P. Jones (CMDR USA/WSMR); Subject: Closure Plan for Open Burn Pan, Dec 2, 1987.

318. Correspondence from Jack Ellvinger (NMEID) to Maj. General Thomas J.P. Jones (CMDR USA/WSMR); Subject: Inspection at Ratscat to be regulated under the Holloman AFB permit, (not WSMR's), Dec 4, 1987.

319. Correspondence from Elizabeth Gordon (NMEID) to Ms. Miriam Levin (Branigan Mern, Library Las Cruces, NM); Subject: Request to file proposed Closure Plan, fact plan, and legal notice in the repository for WSMR, Dec. 8, 1987

320. Proof of Publication (Deposition certifying publication of Legal Notice of Intent to Terminate, by Permit Denial, the Interim Status of a Hazardous Waste Disposal Unit). Signed by Wayne Barnes, Advertising Director, Las Cruces Sun News Dec 11, 87. Notarized by Heidi L. Hogue, Notary Public in and for Dona Ana County, NM.

321. Correspondence from A. Elizabeth Gordon (NMEID) to Trudy Laird News Director (KGRT AM&FM); Subject: Public Service Announcement of Public Comment Period for Closure Plan submitted by WSAR, Dec 16, 1987.

322. Correspondence from A. Elizabeth Gordon (NMEID) to Mike Camb (Editor, Alamogordo Daily News); Subject: Publication, Legal Notice Re: Closure Plan for Open Burn Pan, WSMR, Dec 16, 1987.

323. Correspondence to Russell Lummur, Dona Ana County Mgr., Dec 16, 1987.

324. Correspondence from A. Gordon (NMEID) to B. Pender (Otero County); Subject: Proposal by Environmental Improvement Division for approval of Closure Plan, Dec. 16, 1987.

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328. Hazardous Waste Manifest, Jan. 19, 1988.

329. Correspondence from J. Ellvinger (NMEID) to J. Owens (WSMR); Subject: Compliance Order/Schedule, Jan. 9, 1988.

330. Correspondence from J. Ellvinger (NMEID) to T. Jones (WSMR); Subject: Notice of violation, Jan. 25, 1988.

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332. Correspondence from A. E. Gordon (NMEID) to Robert Andreoli (Env. Co-or. WSMR); Subject: Scheduling tour at WSMR for Feb 5 & 6, Jan 29, 1988.

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334. Correspondence from Jack Ellvinger (NMEID) to Maj. Gen Thomas Jones (CMDR, WSMR); Subject: Closure Plan Approval (open burn pan of June 1987), Feb 11, 1988.

335. Correspondence from Marc Sides (US EPA Reg. 6) to Elizabeth Gordon (NMEID); Subject: Revisit to WSMR 2 wks prior, Feb 18, 1988.

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348. WSMR Application for Permit and Certification of Registration, for HELSTF, February 21, 1984.

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358. Telephone conversation from Reina Gallegos (WSMR DEHL) to Marianne Smith (A.T. Kearney/Centaur Division), July 25 1988.

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APPENDIX A

VSI TRIP SUMMARY

AND

PHOTOGRAPH LOG

WHITE SANDS MISSILE RANGE

WHITE SANDS, NEW MEXICO

APPENDIX A

VSI TRIP SUMMARY AND PHOTOGRAPH LOG

A.1 VSI Trip Summary

The A.T. Kearney field team conducted a Visual Site Inspection (VSI) at White Sands Missile Range (WSMR) over a five day period from 16 May 1988 through 20 May 1988. The VSI team was composed of technical staff from both A.T. Kearney (ATK) and Kearney/Centaur Division (K/C) of ATK. The VSI team members were:

- o Paul Letki, ATK, Work Assignment Manager
- o Ann Anderson, ATK
- o Patricia Shanley, K/C
- o Marianne Smith, K/C

Due to the size of the facility, the VSI team split into two field teams. Prior arrangements had been made with the WSMR Directorate of Environment, Housing, and Logistics (DEHL) to have each Kearney field team escorted at all times by one member of the DEHL Environmental staff and one WSMR photographer. Due to security concerns, the facility required that all photographs would be taken by the WSMR photographers. The photographers assigned to the VSI were Thomas Moore and PV2 William Mol. The photographers were scheduled to be available from Tuesday through Friday. The field activities for each day of the VSI are summarized below. The first day was spent in reviewing new information, attending briefings with WSMR personnel, and arranging the schedules for each field team for Days 2 through 5.

Day 1: 16 May 1988

The field team arrived at the WSMR Security Post at 0800 and obtained vehicle passes for the field vehicles. At 0830, the field team was met at the Security Post by Ms. Reina Gallegos, Environmental Engineer, and Mr. Fred Chavez, Environmental Technician, both of the DEHL Environmental Office. Ms. Gallegos and Mr. Chavez escorted the ATK team to the Security Division Visitor Control Center to obtain visitor's badges. From there, the team proceeded to the DEHL office and met Mr. Robert Andreoli, the WSMR Environmental Coordinator, and Mr. Lee Banecki, WSMR Environmentalist.

From 0900 until 1020, an introductory briefing was conducted with the DEHL staff. Mr. Andreoli explained that the ATK team would be expected to conform to the normal working hours of the DEHL staff, which is 0745 to 1615 each day. Mr. Andreoli provided reference documents and additional information that had been requested in the Information Needs letter prior to the site visit. Mr. Letki explained the purpose of the VSI, the tasks involved, and the objectives of the field team.

The Information Needs letter was reviewed in detail. Mr. Andreoli clarified the status and locations of some of the tentatively identified SWMUs. Specific questions were answered concerning the various tenant

activities and operations on the facility. The field team also obtained clarification of the boundaries between WSMR and the adjoining areas of Holloman Air Force Base (HAFB) and Ft. Bliss Military Reservation (FBMR). Facility maps were provided, and the remote up-range areas were located.

At 1030, the field team attended a briefing for the Commander of White Sands Missile Range, Major General Thomas J.P. Jones. The briefing was held in the Commander's office. Also attending the briefing were Col. Heath, Deputy Base Commander; Col. Howell, Commander, DEHL; Mr. Andreoli; and Ms. Gallegos. The Commander was briefed on the RFA process, the objectives of the site visit and agenda for the VSI.

At 1100, the field team returned to the DEHL office and resumed the review and discussion of the facility operations and waste management areas. A tentative VSI schedule for each field team was developed so that access to tenant activities and uprange stations could be co-ordinated with the appropriate contacts. Travel to the uprange stations also had to be co-ordinated to accomodate the missile testing schedule because internal roadblocks would be in effect during the tests.

At 1300, the field team attended a Command Briefing presented by Major Engstrom of the Range Operations Directorate. The briefing included an audiovisual presentation highlighting the historical operations of WSMR, the mission and present operations, and the major tenant activities. The presentation was followed by a brief question-and-answer session. Major Engstrom explained the procedures for cleaning up impact areas after each test launch to recover all debris and fragments of missiles from the target area. Recovery teams virtually comb the entire impact zone and collect every fragment that is found. Major Engstrom also exhibited a mock bomblet; missiles are sometimes armed with hundreds of these very small projectiles to study scatter patterns. The Commanded Briefing ended at 1420.

1435 to 1615: The remainder of the afternoon was spent reviewing the additional documents provided by WSMR, completing the review of the information needs letter, and finalizing the VSI schedule for the following day. One of the additional documents provided was a recently completed study using aerial photographic imagery to identify possible areas of contamination on WSMR. High-resolution aerial photographs were studied to identify features such as trenches, impoundments, mounds, disturbed soil, discoloration, and ground scars. Each feature identified was cross-referenced to detailed area maps. The ATK VSI team determined that this information warranted adding several new sites to the VSI schedule. Some of these new sites were previously unidentified areas of contamination, and some were sites which had been vaguely referenced, but were not positively located.

The field team also interviewed Mr. Fred Farewell, a longtime employee of WSMR. Mr. Farewell was very helpful in answering questions about historical activities on WSMR, and in pin-pointing the locations of some of the older landfills, as well as the location of the original sewage treatment plant. Mr. Farewell also provide a perspective on facility waste management practices over the years. Mr. Farewell agreed to be available to answer follow-up questions if needed later in the VSI.

The field team left the DEHL office at 1615, proceeded directly off base, and returned to Las Cruces. The field team met for about three hours during the evening to discuss the day's activities, to prioritize the sites of interest, and to determine the field assignments and itineraries for the following day. Alternative schedules were also scoped out for the week in case access to certain areas could not be arranged, or in case weather conditions caused changes in the range schedule for test launches.

Day 2: 17 May 1988

The VSI activities on Day 2 were split between two field teams. Team 1 consisted of Paul Letki, Pat Shanley, Reina Gallegos, and WSMR photographer Thomas Moore. Team 1 inspected sites on the Post in the morning, then proceeded to the HELSTF area about 20 miles northeast of the Post. The Team 1 activities on Day 2 are summarized below:

Time	Location
0800	Arrive DEHL; met photographer and escort; made phone calls for morning appointments
0845	Building 1621, Audio/Visual and Photo Labs
0915	Building 1794, Vehicle Maintenance Shop
1015	Heavy Equipment Area
1020	Truck Wash Rack/Pad
1040	Building 1753, Heavy Equipment Maintenance; and Building 1752, Steam Cleaning Area
1100	Building 1530, Chemistry/Analytical Lab Army Material Test and Evaluation area
1125	Vet Clinic; office locked; note on door says staff will return at 1300
1135	Fire Training Area
1200	Lunch
1230	Leave DEHL enroute to HELSTF
1310	Arrive HELSTF; check-in at Bldg. S26128, met staff
1350	Start HELSTF inspection tour
1510	Finish HELSTF inspection; completing follow-up questions to personnel at HELSTF
1540	Return to Post Building 1512, Photo Lab; lab personnel end workday at 1600 and declined to begin a tour so late in day. Photo lab tour rescheduled
1545	Dropped photographer at A/V Building
1550	Returned to DEHL
1615	Left WSMR

Team 2 consisted of Ann Anderson, Marianne Smith, Fred Chavez, and Army photographer PV2 William Mol. Team 2 inspected sites in the near vicinity of the Post, primarily the Sewage Treatment Plant, the Sanitary Landfill, the Hazardous Waste Storage Facility, the Liquid Propellant Storage Area, the Acid Neutralization/Burn Pan Area, and the Temperature Test Facility. The Team 2 activities on Day 2 are summarized below:

Time	Location
0850	DEHL, assembling field team
0915	Sewage Treatment Plant (STP)
1035	North Pond, former discharge area for STP
1045	Sanitary Landfill (Active)
1055	Construction Landfill
1107	Playa Lake, discharge area for STP
1130	Hazardous Waste Storage Facility
1150	Hazardous Waste Landfill
1200	Lunch
1315	Liquid Propellant Storage Area
1355	Acid Neutralization/Burn Pan Area
1415	Scrap Metal Yard
1425	Former landfill south of scrap yard
1430	Temperature Test Facility (TTF)
1550	Possible former landfill near NEL
1600	Returned to DEHL
1620	Leaving WSMR

Day 3: 18 May 1988

On Day 3, both field teams concentrated on visiting the remote up-range areas. Team 1 covered the far northeast sections of WSMR, and Team 2 covered the far northwest sections. Due to scheduled afternoon missile tests and internal roadblocks, each team exited WSMR via a north gate and returned to the Post via public highways. Each team drove over 250 miles on Day 3. Team 1 consisted of Paul Letki, Pat Shanley, Fred Chavez, and photographer Tom Moore. Team 1 activities are summarized below:

Time	Location
0745	Arrived DEHL, met photographer and escort; left for Oscura Range Center
1100	Arrive Oscura Range Center Bldg. 9000; Air Force installation (Bombing and strafing practice range); view detonation areas, septic tank and drain field
1135	Left for North Oscura/ Red Rio area
1315	Arrived North gate entrance to North Oscura
1415	Arrived North Oscura Peak
1420	Landfill at North Oscura
1440	Enroute to Post
1620	Arrived back at Post; dropped photographer and escort at DEHL
1630	Left WSMR

Team 2 consisted of Ann Anderson, Marianne Smith, Reina Gallegos, and photographer Bill Mol. Team 2 activities are summarized below:

Time	Location
0730	Arrived DEHL
0845	Left DEHL enroute to Rhodes Canyon

0950	Arrived Rhodes Canyon old landfill
1010	Rhodes Canyon present landfill
1020	Old tanks on RR 6 south of RC landfill
1030	Disturbed area, possible former surface impoundment identified from aerial photos
1040	Satellite storage area near Rhodes Canyon
1050	Enroute to Stallion Range Center via Range Road 7 North
1110	Stopped at intersection of RR 6 and RR 7 to look for possible location of Site 3. Nothing sited.
1145	Arrived Stallion Range Center; Lunch
1230	Met Jim Elwood of FacEng at Stallion Range Center
1240	Viewed sanitary landfill, inactive landfill, inactive leach field/evaporation lagoon
1305	Viewed active leach fields, septic tank
1310	Viewed waste oil storage tank
1340	Noted empty/inactive tanks on hill near north gate; stopped to investigate; appeared to be unused oil or fuel storage tanks
1350	Exit North Gate Security Checkpoint; enroute back to Post via Hwy 380 and I-25
1625	Dropped Ms. Gallegos off at her car in Las Cruces
1645	Dropped photographer off at WSMR Photo Lab
1650	Left WSMR

Day 4: 19 May 1988

Team 1 activities are summarized below:

Time	Location
0740	Arrive DEHL, met photographer and escort; left enroute to Hazardous Test Area (HTA)
0930	Arrive HTA, met Sgt Latham. Visit detonation area and burn pan
1015	Left HTA
1145	Arrive Tula Peak area; view two lagoons, four open debris pits, incinerator, covered trenches, debris piles
1350	Lunch (HAFB)
1410	Enroute to Flower area
1425	Arrive gate to Flower area; gate locked until 1545 due to testing
1455	Arrive DEHL
1505	Interviewed WSMR Agronomist Mr. Anderson regarding use of pesticides on WSMR
1520	Arranging appointments for next day's schedule
1615	Left WSMR

Team 2 activities are summarized below:

Time	Location
0745	Arrive DEHL; making phone calls to arrange day's appointments; called WSMR Radiological Officer George Wenz and interviewed regarding rad waste on WSMR
0925	Pesticide Storage area
1000	Veterinary Clinic; viewed incinerator; interviewed PFC Lisa Comp regarding waste management practices
1010	McAffee Clinic; met 2LT Baker and Capt. Martinez; viewed incinerator, clinical labs; asked about waste management practices
1100	Returned to DEHL; reviewing files
1200	Lunch
1250	Visit Bldg 1512, photoprocessing lab; lab is operated by a contractor; toured lab and viewed silver recovery unit, ozone treatment unit, and adjacent warehouse (Bldg 1524)
1345	Dental Clinic; tour with SFC Weigle, NCOIC; interviewed regarding disposal of scrap film, amalgum, red bag waste and sharps; asked about silver recovery
1400	Visited Fire Chief Aaron de Lao; asked about location where firefighter training was formerly conducted; saw drawings of areas used
1440	Orogrange Range Camp, Surface Impoundment
1500	Return to DEHL
1500	Phone calls to set up next day's appointments; could not contact anyone at RATSCAT
1530	Phoned Julia Hinojos, WSMR Master Planning, to find out location of Facilities 29609 and 29787. Found out both are Air Force owned, but located on WSMR property; also found out location of King 1 site and Roger 122 site (both north of HAFB)
1600	Determined that photographers would be needed only until noon tomorrow
1615	Left DEHL

Day 5: 20 May 1988

Team 1 today is composed of Pat Shanley, Marianne Smith, Reina Gallegos, and Bill Mol. Team 1 activities are summarized below:

Time	Location
0800	Arrive at DEHL; met photographer and escort
0830	Arrive NavOrd Missile Test Station (NOMTS); met Les Gibbs for briefing and tour
0935	Left NOMTS
1010	Arrive area believed to be original STP, near present horse stables; walked area looking for signs of

	former activities; located possible former surface impoundment
1045	Nuclear Effects Laboratory (NEL); interviewed Don White
1130	Lunch
1215	Met Team 2 at DEHL to switch photographers and escorts; waiting for Team 2 to return
1320	Left DEHL enroute to Site 19; observed debris, trenches, mounds, possible former surface impoundment
1400	Site 18 (Acid Neutralization/Burn Pan area) did not stop since this area had already been seen by Team 2
1415	Site 17, possible contamination area; observed area identified from aerial photos as possible debris, graded area with possible ground stain; nothing visible except scattered debris
1425	Army Blockhouse, Bldg 20814; Missile test imminent; site not accessible
1435	Site 20 (LC 34), viewed surface impoundment
1500	Site 22 (LC 38), viewed trenches, pit
1540	Return to Post; visit Paint Shop, Bldg 1742 observed spray booths, sump, drum storage, solvent storage
1600	Returned to DEHL
1615	Left WSMR

Team 2 was composed of Ann Anderson, Paul Letki, Fred Chavez, and Tom Moore. Team 2 activities are summarized below:

Time	Location
0740	Arrive DEHL, met photographer and escort
0900	Launch Complex 50; viewed possible debris site 1/4 mile SW of LC50; observed disturbed area, scattered debris, concrete, metal
0930	Flower Site, Structure H-4205; climbed observation tower to look for signs of stressed vegetation; observed graded area to east and some scattered debris
1005	Returned to LC50 to phone ahead to RATSCAT
1052	Possible location of Site 13; observed depression, possible impact area
1120	Possible location of Site 12; observed water tank, trailer, gravel pit, and rock quarry
1200	Enroute to DEHL
1255	Interviewing Mr. Farewell about old STP, and original landfills on Post
1310	Walked to site indicated by Mr. Farewell as site of original landfill; area is currently part of the maintenance area; covered with gravel; no evidence of former landfill activity
1330	Out-briefing with Commander Jones, Col. Howell, Col.

	Heath, R. Gallegos, L. Banecki, P. Letki, and A. Anderson
1345	Briefing with R. Gallegos and L. Banecki regarding SWMUs and evaluation or release potential; explained content and purpose of PR/VSI Report
1430	Paint Shop
1445	Interview WSMR DEHL employee regarding Artesian springs near Tula Range area, Lake Lucero, and Salt Creek; found out about endangered species on site;
1605	Left WSMR

A.2 VSI PHOTOGRAPH LOG

This section contains the photographs taken during the VSI conducted at White Sand Missile Range (WSMR) from 16 May 1988 through 20 May 1988. For security reasons, all photographs were taken by photographers provided by the U.S. Army. Due to the extensive size of the facility, the VSI team divided into two field teams on Days 2 through 5 of the field event. One photographer and on member of the WSMR Environmental staff accompanied each team. Each team kept separate field logs and photo logs. All film was developed and processed by WSMR. Some of the photos were confiscated for security reasons, but this did not result in any significant gaps in the documentation.

Copies of the photographs were provided at A.T. Kearney about three weeks after the VSI. Each photo was labelled on the back by WSMR with the caption provided by ATK. The photos are all 8 x 10 in color.

Since two photographers were used and two field logs were maintained simultaneously, the photos herein are grouped by field team. The field Team 1 photographer was Tom Moore. Photos logged by Team 1 are listed in chronological order with the prefix "1-". The Team 1 photographer was PV2 Bill Mol. Photos logged by Team 2 are listed in chronological order with the prefix "2-".