PETITION TO PERFORM CLASS III MODIFICATIONS TO REMOVE SOLID WASTE MANAGEMENT UNITS 8, 9, 12, 13, 14, 15, 21, 22, 145, 147, and 148 FROM THE WHITE SANDS MISSILE RANGE RCRA PART B PERMIT, IDENTIFICATION NUMBER NM2750211235

Submitted to:

U.S. Army
White Sands Missile Range
Environment and Safety Directorate
White Sands Missile Range, New Mexico 88002-5048

June 2001

Submitted by:

MEVATEC Corporation
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13. ABSTRACT (MAXIMUM 200 WORDS)

Petition requests No Further Action determination by NMED on eleven SWMUs and delisting of the SWMUs from the White Sands Missile Range HSWA Corrective Action Module of the RCRA Part-B Permit. Included in the Class III permit modification petition are SWMUs 8, 9, 12, 13, 14, 15, 21, 22, 145, 147 and 148. Summary of previous investigations and Corrective Action at each of the SWMUs provides the justification for modifying the hazardous waste permit.

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EXECUTIVE SUMMARY

Management of hazardous waste at White Sands Missile Range is conducted in accordance with a Resource Conservation and Recovery Act (RCRA) Part B permit. All hazardous waste corrective action activities are subject to the terms of the Hazardous and Solid Waste Amendments (HSWA) module (Module VIII) of the RCRA Part B permit (Hazardous Waste Permit No. NM2750211235). The United States Environmental Protection Agency (EPA) issued the HSWA module effective on October 24, 1989. According to the terms of the White Sands HSWA module to the Part B permit, sites of environmental concern designated as Solid Waste Management Units (SWMUs) are being investigated, characterized and remediated with the concurrence of White Sands, the Administrative Authority, and the public. The Administrative Authority for the White Sands permit is the New Mexico Environment Department (NMED), which was granted HSWA authority on January 1, 1996.

Investigation and remediation of eleven (11) SWMUs generated data supporting removal of the SWMUs from the White Sands HSWA module by means of a Class III modification to the permit, in accordance with Title 40 of the Code of Federal Regulations, Part 270.42 (40 CFR 270.42) and Title 20 of the New Mexico Administrative Code, Chapter 4.1 (20 NMAC 4.1). The SWMU identification numbers are 8, 9, 12, 13, 14, 15, 21, 22, 145, 147, and 148. An administrative modification will combine SWMU 8 with SWMU 9 and SWMU 12 with 13 for the purposes of corrective action administration (see Appendix B for 8/6/99 NMED letter) according to 20 NMAC 4.2. Results of the RCRA investigations are summarized in this document. The results indicate that the SWMUs were characterized or remediated in accordance with current applicable state or federal regulations. The data generated indicate that contaminants pose an acceptable level of risk under current and projected land use.

This petition to remove SWMUs from Module VIII of the White Sands RCRA Part B permit provides the rationale and criterion necessary to support No Further Action (NFA) status for each SWMU, as outlined in the NMED Hazardous and Radioactive Materials Bureau (HRMB) Standard Operating Procedures Manual, Volume One (NMED, 1998). This petition is submitted to the Administrative Authority in partial fulfillment of the HSWA requirements for a Class III modification. Public participation in the decision to remove the SWMUs is required by 40 CFR 270.24 and a public meeting fulfilling those requirements was held in Las Cruces, New Mexico, on February 23, 2000.

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LIST OF ACRONYMS/ABBREVIATIONS

AST	above-ground storage tank
BTEX	benzene, toluene, ethylbenzene, xylene
°C	degrees centigrade
cm	centimeter
CFR	Code of Federal Regulations
DCE	1, 1-dichloroethylene
DEI	Dow Environmental, Incorporated
EIB	New Mexico Environmental Improvement Board
EID	Environmental Improvement Division
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FFTA	Fire Fighting Training Area
HELSTF	High Energy Laser System Test Facility
HRMB	Hazardous and Radioactive Materials Bureau (of NMED)
HSWA	Hazardous and Solid Waste Amendments (to RCRA)
IT Corp	International Technology Corporation
km	kilometer
l	liter
MAR	Multi-functional Array Radar
m	meter
MCL	maximum contaminant level
MDL	method detection limit
MEK	methyl ethyl ketone (2-butanone)
mg/kg	milligrams per kilogram
µg/kg	microgram per kilogram
mg/l	milligrams per liter
NASA	National Aeronautics and Space Administration
NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
OSWER	EPA Office of Solid Waste and Emergency Response
PCB	polychlorinated biphenyl
PID	photo-ionization detector
PRG	Preliminary Remediation Goal
PR/VSI	Preliminary Review/Visual Site Inspection (of RFA)
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SOP	Standard Operating Procedure
SSL	soil screening level
STP	Sewage Treatment Plant
SVOC	semi-volatile organic compound
SVS	soil-vapor survey

LIST OF ACRONYMS/ABBREVIATIONS
(concluded)

SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TECOM	Test and Evaluation Command, U.S. Army
TPH	total petroleum hydrocarbons
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
UXO	unexploded ordnance
VOC	volatile organic compound
VSI	Visual Site Inspection (of RFA)

PETITION TO PERFORM CLASS III MODIFICATIONS TO REMOVE SOLID WASTE MANAGEMENT UNITS 8, 9, 12, 13, 14, 15, 21, 22, 145, 147, AND 148 FROM THE WHITE SANDS MISSILE RANGE RCRA PART B PERMIT, IDENTIFICATION NUMBER NM2750211235

1.0 INTRODUCTION

White Sands Missile Range petitions for deletion of 11 Solid Waste Management Units from the HSWA module of the RCRA Part B Hazardous Waste Management Permit. The results of previous investigations and/or waste removal actions demonstrate that No Further Action (NFA) is required at these sites. The petition identifies the following SWMUs for deletion from the corrective action module:

SWMU 8 – Waste Oil Tank
SWMU 9 – Waste Oil Sump
SWMU 12 – Vehicle Wash Ramp and Drains
SWMU 13 – Sump and Oil/Water Separator Ramp
SWMU 14 – Used Battery Accumulation Area
SWMU 15 – Used Battery Accumulation Area
SWMU 21 – Old Firefighting Training Area
SWMU 22 – Abandoned Pit
SWMU 145 – Test Cell 4 Lagoon
SWMU 147 – Decontamination Pad Underground Waste Tank
SWMU 148 – MAR Waste Stabilization Pond

Previous investigations and remedial efforts at each SWMU are summarized in Sections 2 through 9, below. At each site, the Criterion 5 established by NMED (NMED, 1998; see Appendix A) justifying removal of the SWMU from the HSWA module is applied. The NMED letter of August 6, 1999 to White Sands recommends administratively combining SWMU 8 with SWMU 9 and SWMU 12 with SWMU 13 because locations and waste steams are the same (Appendix B). Assessments of soil erosion potential at each of the SWMUs are provided in Appendix C. This petition to delete the SWMUs is submitted to NMED in partial fulfillment of the requirements for Class III permit modification promulgated in 40 CFR 270.42.

1.1 Facility Description

White Sands Missile Range (Figure 1-1) is a U.S. Army installation under the Developmental Test Command (DTC), based at Aberdeen Proving Ground, Maryland. The installation occupies 3,200 square miles (8,300 square kilometers) in portions of five New Mexico counties; Doña Ana, Socorro, Lincoln, Otero and Sierra. The White Sands Post Headquarters is located in the southwestern corner of the installation, approximately 27 miles (45 kilometers) east-northeast of Las Cruces, New Mexico, and 45 miles (75 kilometers) north of El Paso, Texas. The missile range was established on July 9, 1945 as the White Sands Proving Ground. The change to the current name occurred in 1958. White Sands is an outdoor laboratory consisting of a large complex of test ranges, launch sites, impact areas and instrumentation sites required for the development and testing of missiles and rockets. White Sands is used as a national range designated for the support of missile development and test programs for the Army, Air Force, Navy, NASA and other government agencies.

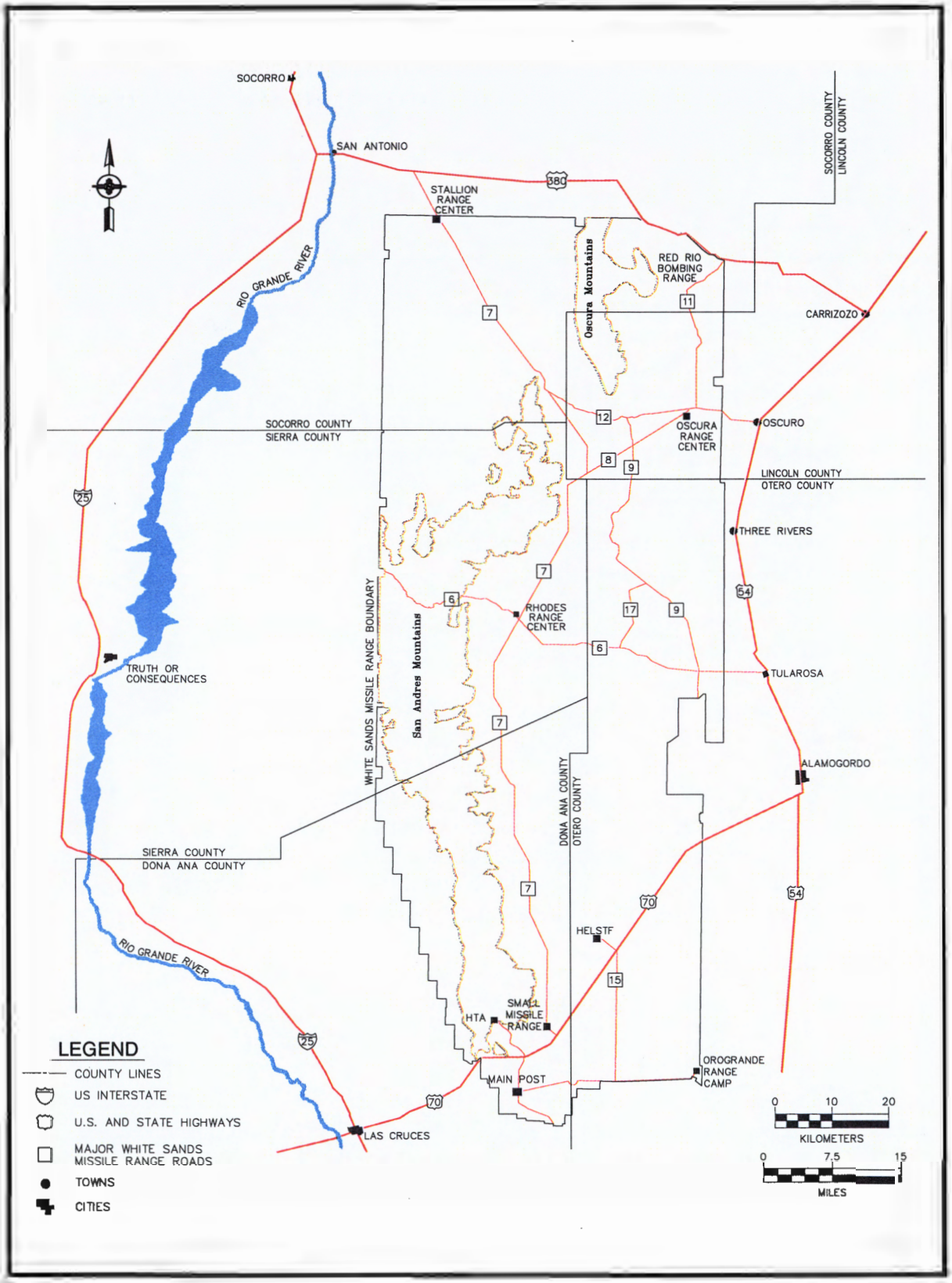


Figure 1-1. Location map of White Sands Missile Range.

1.2 Environmental Setting

Two prominent geomorphic features, the San Andres Mountains and the Tularosa Basin, dominate the topographic relief across Whites Sands Missile Range. The average elevation of the Tularosa Basin is 4,000 feet (1,220 m) above sea level. The San Andres range trends north-south along the western side of the missile range and varies in crest elevation from 5,700 feet (1,737 m) at San Augustin Pass, where Highway 70 crosses the mountains, to over 9,000 feet (2,743 m) at Salinas Peak, the highest point on White Sands.

Average annual precipitation measured at a gauging stations in the Tularosa Basin, southeast of the White Sands Main Post, is 10.8 inches (27.4 centimeters) per year. About 50 percent of the annual precipitation falls in the months of July through September in southern New Mexico. The average high temperature in the summer is about 92 degrees Fahrenheit (°F) (33 degrees Celsius (°C)) with the lows reaching 65 °F (18 °C). During the winter months the average high is about 57 °F (14 °C) and the average low is about 36 °F (2 °C). Average annual humidity readings are only 37 percent. Wind is a climatic factor at Whites Sands from February through May. Westerly winds can reach about 40 miles per hour (65 kilometers per hour).

1.3 Land Use

1.3.1 Current Land Use

White Sands Missile Range is withdrawn public domain land controlled by the Department of Defense. For safety and security reasons, access to White Sands is restricted to authorized military and civilian personnel. Residential areas are limited to concentrated tracts at the Main Post and several uprange command and control centers. The land on the missile range is predominantly used to stage tests of aerial weapons systems. Although much of the weapons testing occurs in the airspace above the range, designated support, launch, and impact areas have been established. The SWMUs included in this Class III permit modification request are located in industrial settings and public access is restricted by fences and military police.

1.3.2 Future Land Use

The Department of Defense will continue the primary mission at White Sands for the foreseeable future. Public access to the approximately 3,200 square miles (8,300 square kilometers) of land comprising the missile range will continue to be restricted.

1.4 Scope

White Sands Missile Range was issued Hazardous Waste Permit No. NM2750211235 by the Environmental Protection Agency (EPA) on October 24, 1989 under the authority of RCRA, Part B. On January 1, 1996 the New Mexico Environment Department became the Administrative Authority for the permit. According to the provisions of HSWA and 40 CFR 270.42, this petition is submitted to NMED to request Class III modifications removing SWMUs 8, 9, 12, 13, 14, 15, 21, 22, 145, 147, and 148 from the Hazardous Waste Part B permit, Module VIII. Previous characterization and/or remediation of the sites in

accordance with current applicable state and federal regulations generated data indicating that contaminants pose an acceptable level of risk under current and projected future use.
This document was developed to comply with the EPA 40 CFR 270.42 regulation which stipulates that a specific Class III permit modification request be made by White Sands and that supporting documentation be provided with the request. The supporting documentation included with this request follows the format outlined in the NMED Standard Operating Procedure Manual (1998), Section II.B.4.a.(a), Page 1; entitled, "HSWA/CA-Related Permit Modification Requests, No Further Action Proposals" (NMED, 1998). In conjunction with the original submittal of this document to NMED in January 2000, White Sands conducted a public information meeting in Las Cruces to involve the interested public in the NFA decision-making process. The meeting was held on February 23, 2000 and the transcript is included as Appendix E.

As RCRA Administrative Authority, the Hazardous Waste Bureau of NMED's Water and Waste Management Division, responded with comments on the January 2000 version of this document. The NMED comments were provided under the October 13, 2000 cover letter. Both the cover letter and comments are included herein as Appendix F. This version of the NFA Petition incorporates laboratory Method Detection Limit information and sample location maps in response to the comments.

2.0 SWMUS 8 & 9; WASTE OIL TANK & SUMP

2.1 Summary

Prior to 1990, the used oil was contained in an underground storage tank (UST), which was identified as SWMU 8. Shortly after SWMU 8 was listed in the corrective action module of the RCRA permit, the UST was removed and replaced with an aboveground storage tank (AST). The "sump" identified as SWMU 9 was reconnected to the new AST and waste oil storage continued at the facility. SWMU 9 is more accurately described as a funnel used to strain rags and other debris from the used oil as it is poured into the storage tank. The AST was removed from the SWMU 8 site in 1996 to allow access to soil confirmation sampling at the site of the former UST (previously removed in 1990). Another AST was installed in 1996 near the SWMU 8 site to collect and store used motor oil. Again, the SWMU 9 Sump (funnel) was reconnected to the new tank to screen out debris prior to recycling the oil. White Sands Missile Range currently maintains the AST at the Main Post to serve as a central collection point for used motor oil. A contracted oil recycler empties the contents as needed. The two SWMUs will be administratively combined according to the Administrative Authority (see Appendix B).

2.2 Descriptions and Operational History

2.2.1 Site Description

Solid Waste Management Units 8 (Waste Oil Tank) and 9 (Sump) are located approximately 300 feet (90 m) east of Building 1794 at the Post Headquarters Maintenance Area (Figure 2-1). Maintenance activities generating waste oil are conducted predominantly at the Heavy Equipment Maintenance Area (Building 1753), the Vehicle Maintenance Shop (Building 1794), and several remote operations. The Post Headquarters Maintenance Area is paved with asphalt. Storm water runoff is generally to east, following the topography, which slopes toward the center of the Tularosa Basin.

The Waste Oil Tank was a 5,000-gallon (18,925-l) capacity steel, UST. The tank was used to collect and store used motor oil from vehicle maintenance activities. Contracted oil recyclers periodically emptied the contents. This tank was removed in 1990 (Photograph 2-1) and its function was replaced by an AST set on the site of the SWMU 8 UST (Photograph 2-2). The AST was removed in 1996 and the site of SWMU 8 was once again excavated in order to obtain soil samples, which had not been collected at the time of the original tank-pull in 1990. The soil samples from below SWMU 8 confirm clean closure of the site (DEI, 1997a). A 4,000-gallon (15,100-l) AST was installed 25 feet (7.6 m) northeast of the SWMU 8 site and this new tank continues to serve the function of the former SWMU 8 tank. Photograph 2-3 is current and shows the repaired asphalt pad through which SWMU 8 was removed, and the AST used to collect waste oil at present.

Solid Waste Management Unit 9 has been connected to each waste oil storage tank and is connected to the waste oil storage tank currently in service (Photograph 2-4). The "sump" is a portable, metal, inverted pyramid standing approximately 3.5 feet (1 m) high. The SWMU 9 structure has also been referred to as a "collection hopper." Its function is to funnel waste oil into the storage tank while straining out debris. The open top of the square funnel is 4 feet (1.2 m) on a side. The depth of the funnel is 17 inches (43 cm). A screen in the sump strains trash and debris from the used oil, which flows from a drain line in the bottom of the sump into the waste oil storage tank.

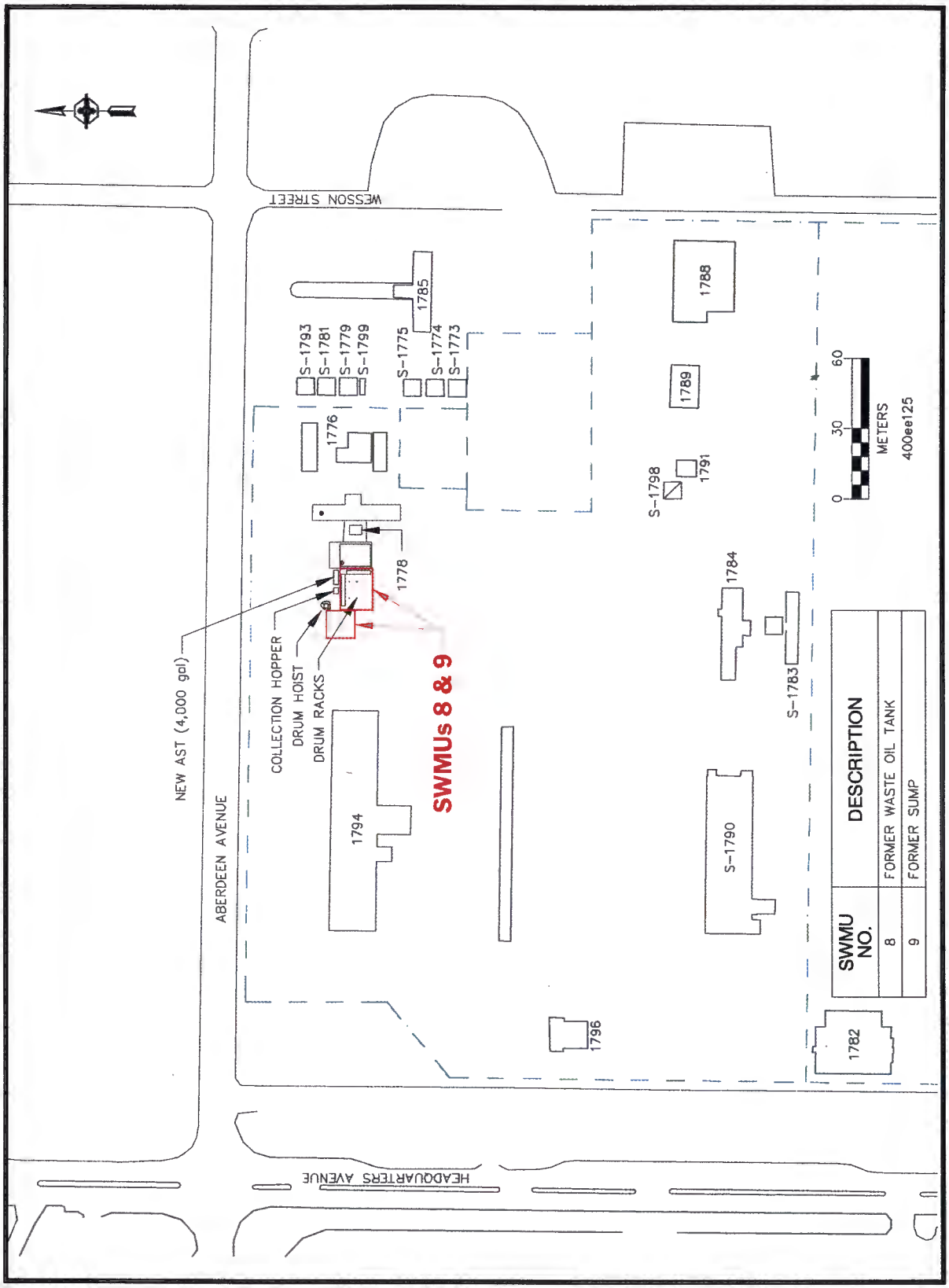
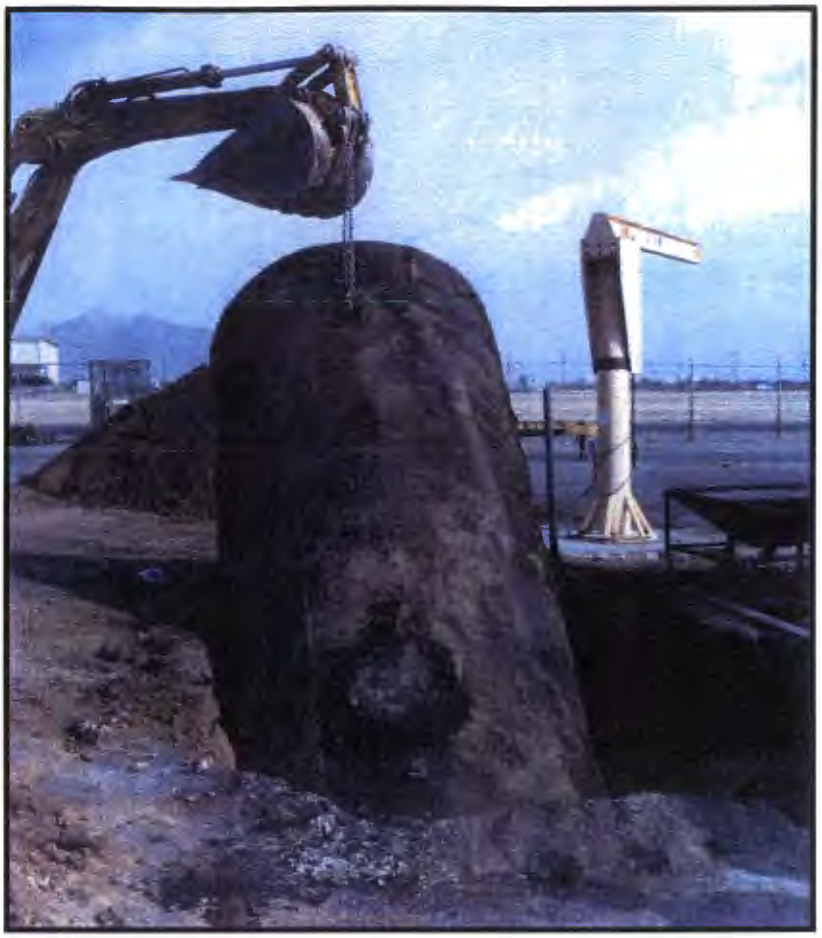


Figure 2-1. Site plan of SWMUs 8 and 9.



Photograph 2-1. Removal of SWMU 8 in 1990. SWMU 9 is visible at right, adjacent to the excavation. The drum hoist is centered between SWMU 8 and SWMU 9.

Photograph 2-2. SWMU 9 Waste Oil Sump connected at left to the AST installed on the site of SWMU 8. Drum hoist is at left. This arrangement was operational from 1990 to 1996, when the AST was removed.

Photograph 2-3. Most recent view of the SWMU 8 and 9 site. Asphalt patch in the foreground is the site of the SWMU 8 removal (1990) and subsequent Sampling (1996).

Photograph 2-4. Close-up taken at the time of Photograph 2-3. SWMU 9 is left of current waste oil AST and right of drum hoist. The SWMU 8 site is in the foreground.

2.2.2 Operational History

The waste oil collection system became operational sometime in the 1950's (Kearney, 1988). The underground tank designated as SWMU 8 was installed in approximately 1963. Waste oil was poured into the metal sink, or sump (SWMU 9), which strains trash and debris from the waste oil. The strained waste oil drained from SWMU 9 into the Waste Oil Tank (SWMU 8). Since the removal of the SWMU 8 tank in 1990, the SWMU 9 sump has been reconnected to each successive aboveground waste oil storage tank used and continues to perform its original function. Disposal of the waste oil stored in the SWMU 8 tank was through reclamation by a commercial oil recycler. Operations today remain substantially similar, the only difference being that storage in the aboveground tank allows for visual verification of releases from both the tank and sump.

2.3 Previous Investigations

2.3.1 Summary

The Waste Oil Tank and Sump were included in four investigations under RCRA. These SWMUs were identified in the White Sands RFA (Kearney, 1988). Both SWMUs were also investigated during the Phase I (IT Corp, 1992b) and Phase II (Sverdrup Environmental, 1994) RFIs. Additional sampling of soils at SWMU 8 was conducted in 1996 and is summarized in a site closure report (DEI, 1997a).

2.3.2 Investigation #1: RCRA Facility Assessment

The RFA consisted of a search of White Sands' records of waste-related activity at SWMUs 8 and 9 and a visual inspection of the site. The RFA report was issued in August 1988 (Kearney, 1988).

2.3.2.1 Non-sampling Data Collection

No record of historic contaminant releases was found. Visible evidence of "light" staining on the ground (pavement) in the area of the tank was reported in the report of the RFA (Kearney, 1988).

2.3.2.2 Sampling Data Collection

No environmental samples were taken during the RFA. A Preliminary Review/Visual Site Inspection (PR/VSI) did not generate analytical data and no records of previous sampling activities or site assessments were found during the PR/VSI.

2.3.2.3 Results and Conclusions

The potential for the release of contaminants to soil/ground water was estimated to be "moderate" due to the nature of underground tanks. Release potential to surface water, air, and the production of subsurface gas from SWMUs 8 and 9 was reported to be "low" in the RFA (Kearney, 1988). The EPA determined that the operational unit would be placed in the HSWA corrective action module (Module VIII) of the White Sands RCRA Part B permit based on the RFA report.

2.3.3 Investigation #2: Phase I-RCRA Facility Investigation

The Phase I RFI (IT Corp, 1992b) was conducted to determine if hazardous constituents potentially released from the Waste Oil Tank (SWMU 8) could be detected in sediment and soil gas samples from the shallow subsurface. The construction and operation of the SWMU 9 allows for visual verification of contaminant releases. The Phase I RFI sampling was designed to determine what additional characterization or remediation of the site would be necessary. The Phase I RFI report was issued in December 1992 (IT Corp, 1992b).

2.3.3.1 Non-sampling Data Collection

No releases from the Sump (SWMU 9) were noted in the Phase I RFI report. A site history of no releases from this unit can be verified visually.

2.3.3.2 Sampling Data Collection

The Phase I RFI sampling approach included a soil-vapor survey (SVS) targeting benzene, toluene, ethylbenzene, xylene (BTEX), methane, and carbon dioxide from a depth of 5-7 feet (1.5-2.1 m) below grade. Additionally, four soil borings were augered and samples were collected from each boring at depths of 5, 10, and 15 feet (1.5, 3, and 4.5 m). Soil samples were analyzed for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), and total chromium, nickel, and lead.

2.3.3.3 Data Gaps

Of the 8 RCRA metals, only chromium and lead were target analytes in the Phase I RFI. The Phase I RFI sampling episode was the first to be conducted at SWMUs 8 and 9. The sampling did not include groundwater, but was intended to determine whether a groundwater investigation would be necessary.

2.3.3.4 Results and Conclusions

The SVS results did not indicate a significant release of VOCs (IT Corp, 1992b). Toluene was detected at a single survey point and xylene was suspected below the instrument detection level at the same location. However, analysis of samples collected from a soil boring drilled at the vapor survey point indicated no VOCs.

Analytical results for TPH in soil samples were below the 1,000 mg/kg soil remediation level established by the New Mexico Environmental Improvement Board (EIB) in 20 NMAC 9.1, Subpart VII.708 (NMED, 1995), except for the 4-foot (1.2 m) depth sample from boring B-3. The TPH result was 22,000 mg/kg and the duplicate sample analysis result was 19,000 mg/kg. TPH results from 10-foot (3 m) depth sample in the same boring location were 3 orders of magnitude less (22 mg/kg). The 15-foot (4.5 m) depth sample did not contain detectable concentrations of TPH.

The 4-foot (1.2 m) depth from boring B-3 was also the only location where VOCs were detected in soil samples. Tetrachloroethylene (PCE) was detected at a concentration of 0.015 mg/kg. The NMED Soil Screening Level (SSL) for tetrachloroethylene at residential

sites is 49 mg/kg (NMED, 2000). Toluene was detected at 0.092 mg/kg. The NMED SSL for toluene is 180 mg/kg. Ethylbenzene was detected at a concentration of 0.044 mg/kg. The NMED SSL for ethylbenzene is 68 mg/kg. The concentration of total xylenes in the sample was quantified at 0.22 mg/kg. The NMED SSL for xylenes is 63 mg/kg. The report of the Phase I RFI concluded that the isolated occurrences of these highly mobile VOCs attribute them to small quantity spills rather than a sustained, systematic release (IT Corp, 1992b).

The three target metal analytes were detected at each of the 12 soil sample locations. Total chromium concentrations ranged from 3.8 to 7.0 mg/kg (IT Corp, 1992b). The NMED SSLs list chromium, not as total chromium, but as the chromium 3^+ and chromium 6^+ valence states. The residential SSLs are 100,000 mg/kg and 230 mg/kg, respectively. The EPA Region 9 residential soil Preliminary Remediation Goal (PRG) for total chromium is 210 mg/kg (EPA, 1998). Detected lead concentrations were quantified between 6.1 and 53 mg/kg (Table 2-1; IT Corp, 1992b). The NMED residential SSL for lead is 400 mg/kg. Total nickel concentrations in the samples ranged from 5.8 to 7.4 mg/kg. The NMED nickel SSL for residential land use is 1,500 mg/kg. These analytical results for the target metals are below the applicable risk-based screening action levels (NMED, 2000).

The Phase I RFI concluded that investigation results warrant a Phase II investigation to determine the extent of contaminant release(s) from SWMU 8 (IT Corp, 1992b). Additional investigations were not recommended for SWMU 9, presumably because releases of waste oil from that unit can be verified visually.

2.3.4 Investigation #3: Phase II-RCRA Facility Investigation

Revision 1 of the Phase II RFI report was issued December 12, 1994 (Sverdrup Environmental, 1994). Additional soil sampling around the Waste Oil Tank (SWMU 8) and Sump (SWMU 9) site was conducted.

2.3.4.1 Non-sampling Data Collection

Investigators did not have knowledge of the prior SWMU 8 tank removal in 1990 (Photograph 2-1). A ground penetrating radar survey of the SWMU 8 site was conducted because the 1990 UST removal was not reported in the Phase I RFI. The report of the Phase I RFI refers to a tank removal in 1963, but whether this a mistaken reference to the SWMU 8 removal cannot be determined (IT Corp, 1992a). The ground penetrating radar survey did not detect the (already removed) tank. Subsequently, records were accessed by the White Sands Engineering Housing and Logistics Directorate indicating that the tank had been removed in 1990 (Sverdrup Environmental, 1994).

2.3.4.2 Sampling Data Collection

A total of 17 soil samples were collected from 4 soil borings and two hand auger holes. Nine of the samples were collected at 5-foot (1.5 m) intervals from three, 10-foot (3 m) borings. Five of the samples were collected at 5-foot intervals from a single 20-foot (6 m) boring. Three of the samples were collected from hand auger holes around a drum-hoist pedestal where soil staining

was visible. Soil samples were analyzed for VOCs, semi-volatile organic compounds (SVOCs), TPH, and the 8 RCRA metals.

2.3.4.3 Data Gaps

Analyses of the soil samples were conducted according to the RFI work plan. No data gaps were identified.

2.3.4.4 Results and Conclusions

With the exception of the 9- to 10-foot (approx. 3 m) sample from soil boring SB-03, samples collected from soil borings did not contain VOCs. 2-Butanone was quantified in this sample at an estimated concentration of 0.0238 mg/kg. 2-Butanone is also referred to as methyl ethyl ketone (MEK). The NMED residential SSL for 2-butanone is 37,000 mg/kg. A composite sample of three, 0- to 1-foot (approx. 30 cm) hand auger samples collected from an area of visible contamination surrounding a drum hoist (Figure 2-1) contained 3 VOCs. Total xylenes, toluene, and 1,1,1-trichloroethane were detected at concentrations of 0.112, 0.00542, and 0.00904 mg/kg, respectively. These concentrations are below the NMED residential soil SSLs of 63 mg/kg total xylenes, 180 mg/kg toluene, and 510 mg/kg 1,1,1-trichloroethane (NMED, 2000).

One of the three hand auger holes was extended to a depth of 6 feet (2 m). No VOCs were detected at this depth. An estimated total xylene concentration of 0.0240 mg/kg was reported from the 2-foot (60-cm) depth. VOCs were not detected in the 5 samples from the 20-foot (6 m) boring.

Three of the 17 soil samples contained detectable concentrations of phthalate compounds, which are common constituents in plastics and frequently show up as laboratory contaminants. Bis (2-ethylhexyl) phthalate (DEHP) was detected at the drum hoist area in two hand auger samples. The laboratory reported DEHP concentrations at 1.420 mg/kg in the composited surface soil sample and 0.415 mg/kg in the sample from 2 feet (60 cm) below ground surface. The NMED SSLs list DEHP as di(2-ethylhexyl) phthalate and give a residential screening level of 350 mg/kg. No phthalates were detected in the sample from 6 feet (1.8 m) below the drum hoist. Dibutyl phthalate was detected at 0.355 mg/kg in the 1-foot (30 cm) sample from the 20-ft (6-m) soil boring. The NMED residential SSL for dibutyl phthalate is 6,100 mg/kg. These data were below the applicable screening action levels (NMED, 2000). No other SVOCs were detected in any of the 17 samples.

Total petroleum hydrocarbons were reported above the 31-mg/kg method detection limit (MDL) at three sample locations (Sverdrup Environmental, 1994). TPH was detected beyond one foot in depth around the drum hoist area (Figure 2-1) only. The surface soil surrounding the drum hoist pedestal was sampled because staining was visible. The composited sample of surface soil from three spots around the drum hoist pedestal had a TPH concentration of 6,410 mg/kg. Hand augered soil samples from 2 feet (60 cm) and 6 feet (1.8 m) below the drum hoist contained TPH concentrations of 1,150 mg/kg and 59.4 mg/kg, respectively. Samples from two other soil boring locations around SWMU 8 and 9 contained detectable TPH in shallow (1 ft [30 cm]) soil, but TPH was below the MDL in the deeper samples. TPH concentrations in these shallow samples were 48.6 mg/kg and 39.4 mg/kg and could represent interference from the asphalt pavement

(Sverdrup Environmental, 1994). One soil boring at the SWMU 8 and 9 site had no detectable TPH at any of the three depths sampled. The investigation results demonstrate that only a very limited volume of soil around the drum hoist exceeded the 1,000 mg/kg TPH soil remediation level for land disposal established by the New Mexico Environmental Improvement Board (EIB) in 20 NMAC 9.1, Subpart VII.708 (NMED, 1995).

Of the 8 RCRA toxicity characteristic metals targeted in the sample analyses, 3 were concentrated above the MDLs for the soil medium (Sverdrup Environmental, 1994). Barium was detected at 276 mg/kg in one sample, but was concentrated between 65 mg/kg and 26.6 mg/kg in the other 6 samples in which it was detected. The NMED residential SSL for barium is 5,200 mg/kg (NMED, 2000).

Concentrations of lead were detected in every sample. The highest lead concentration was reported as 22.4 mg/kg in the surface soil sample from the drum hoist area. Lead concentrations in the other 16 soil samples ranged between 5.07 mg/kg and 10.9 mg/kg. The NMED residential SSL for lead is 400 mg/kg (NMED, 2000).

Silver was detected in the soil sample composited from stained soil around the drum hoist pedestal at a concentration of 26.6 mg/kg. Silver was not detected in the two deeper samples from beneath the drum hoist pedestal, nor was it detected in or any of the other 14 soil samples. The NMED residential SSL for silver is 380 mg/kg (NMED, 2000).

The Phase II RFI report concluded that the underground Waste Oil Tank (SWMU 8) had been removed prior to the investigation. It further concluded that the contamination indicated by TPH results in the Phase I RFI (Section 2.3.3.4, above) was isolated. Other contaminants detected were present below applicable screening action levels. The Phase II RFI recommended a spill prevention plan to minimize future releases (Sverdrup Environmental, 1994).

2.3.5 Investigation #4: Waste Oil Tank Removal Confirmation

In mid-Summer 1996, the SWMU 8 site was excavated again to obtain soil samples to confirm the closure and removal of the Waste Oil Tank in 1990. No evidence of a contaminant release was found during the investigation (DEI, 1997a).

2.3.5.1 Non-sampling Data Collection

Investigators observed no visible signs of contamination during excavation of the former SWMU 8 pit (DEI, 1997a).

2.3.5.2 Sampling Data Collection

On August 8 and 14, 1996, three trenches were excavated in the area where the underground Waste Oil Tank was formerly set. The excavations were dug to a depth of 11 feet (3.4 m) into native soil below the former tank pit backfill. Excavated soil was contained onsite pending results of laboratory characterization. Seven samples and one duplicate sample were collected from native soil at the bottom of the excavations at locations shown in Figure 2-2. The soil

samples were analyzed by EPA methods for the 8 RCRA toxicity characteristic metals, TPH, polychlorinated biphenyls (PCBs), and the volatile gasoline components benzene, toluene, ethylbenzene, and xylenes (BTEX) (DEI, 1997a).

2.3.5.3 Data Gaps

No data gaps are reported.

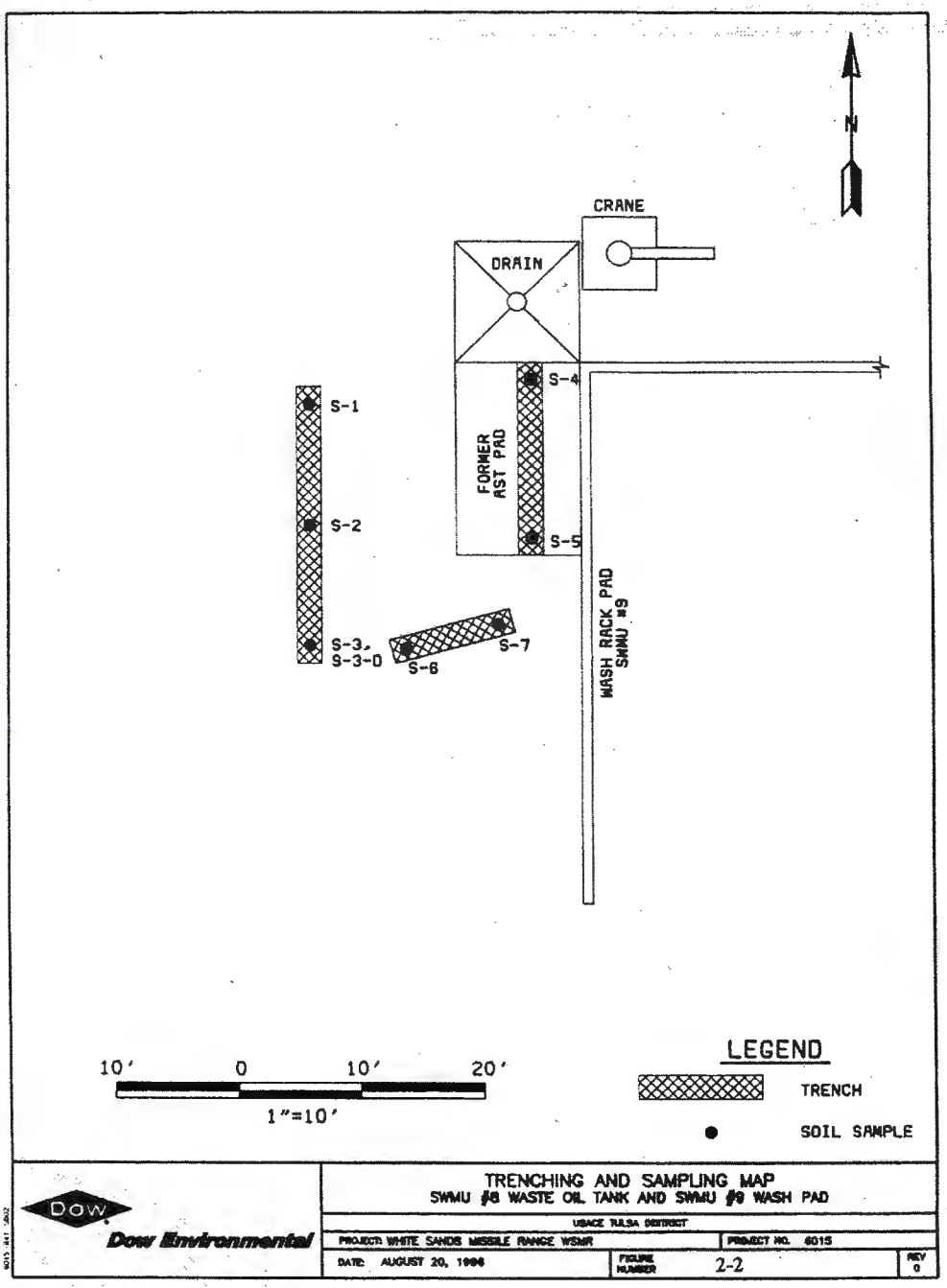


Figure 2-2. Sample locations for confirmation samples from former SWMU 8 site (from DEI, 1997a).

2.3.5.4 Results and Conclusion

The results of the sample analyses are summarized in Tables 2-1, 2-2, and 2-3. Three of the 8 RCRA toxicity characteristic metals were detected in each of the 8 soil samples. Barium detections ranged from 25 mg/kg to 70 mg/kg, all below the NMED residential barium SSL of 5,200 mg/kg (EPA, 1998). Total chromium detections ranged from 3.4 mg/kg to 6.6 mg/kg. The NMED SSLs list chromium, not as total chromium, but as the chromium 3^+ and chromium 6^+ valence states. The residential SSLs are 100,000 mg/kg and 230 mg/kg, respectively. The EPA Region 9 residential soil Preliminary Remediation Goal (PRG) for total chromium is 210 mg/kg (EPA, 1998). Lead detections ranged from 3.9 mg/kg to 48 mg/kg, all below the NMED residential SSL of 400 mg/kg.

Table 2-1. Summary of RCRA metals results from confirmation trenches dug at the site of the SWMU 8 Waste Oil Tank. Samples were collected on August 8 and August 14, 1996.

Sample Attributes			Total RCRA Metals by EPA Methods 6010/7740/7470 (mg/kg)							
Sample ID# (Figure 2-2)	Matrix	Sample Depth (ft)	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
SWMU8-8896-s-1	soil	11	ND (0.50)	ND (2.5)	41	ND (0.50)	4.9	ND (0.10)	3.9	ND (2.5)
SWMU8-8896-s-2	soil	11	ND (0.50)	ND (2.5)	51	ND (0.50)	5.7	ND (0.10)	5.4	ND (2.5)
SWMU8-8896-s-3	soil	11	ND (0.50)	ND (2.5)	49	ND (0.50)	5.4	ND (0.10)	5.2	ND (2.5)
SWMU8-8896-s-3 dup	soil	11	ND (0.50)	ND (2.5)	44	ND (0.50)	5.3	ND (0.10)	5.0	ND (2.5)
SWMU8-81496-s-4	soil	11	ND (0.50)	ND (2.5)	54	ND (0.50)	3.4	ND (0.10)	48	ND (2.5)
SWMU8-81496-s-5	soil	11	ND (0.50)	ND (2.5)	70	ND (0.50)	6.6	ND (0.10)	6.8	ND (2.5)
SWMU8-81496-s-6	soil	11	ND (0.50)	ND (2.5)	25	ND (0.50)	3.5	ND (0.10)	4.4	ND (2.5)
SWMU8-81496-s-7	soil	11	ND (0.50)	ND (2.5)	28	ND (0.50)	4	ND (0.10)	5	ND (2.5)

ND – non detect
mg/kg – milligrams per kilogram

Table 2-2. Summary of confirmation sampling for potential fuel constituents in the trenches dug at the site of the SWMU 8 Waste Oil Tank on August 8 and August 14, 1996.

Sample Attributes			Total Petroleum Hydrocarbons (mg/kg)		EPA Method 8020 (mg/kg)			
Sample ID# (Figure 2-2)	Matrix	Sample Depth (ft)	EPA Method 8015 gasoline-range organ	EPA Method 8015 diesel-range organ	Benzene	Toluene	Ethybenzene	Total Xylenes
SWMU8-8896-s-1	soil	11	ND (15)	ND (25)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)
SWMU8-8896-s-2	soil	11	ND (15)	ND (25)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)
SWMU8-8896-s-3	soil	11	ND (15)	ND (25)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)
SWMU8-8896-s-3 dup	soil	11	ND (15)	ND (25)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)
SWMU8-81496-s-4	soil	11	ND (25)	ND (25)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)
SWMU8-81496-s-5	soil	11	ND (25)	ND (25)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)
SWMU8-81496-s-6	soil	11	ND (25)	ND (25)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)
SWMU8-81496-s-7	soil	11	ND (25)	ND (25)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)

ND – non detect
mg/kg – milligrams per kilogram

Table 2-3. Summary of PCB analytical results from the confirmatory trench excavation at the site of the SWMU 8 Waste Oil Tank on August 8 and August 14, 1996

Sample Attributes			Polychlorinated Biphenyls by EPA Method 8081 (mg/kg)						
Sample ID# (Figure 2-2)	Matrix	Sample Depth (ft)	PCB 1016	PCB 1221	PCB 1232	PCB 1242	PCB 1248	PCB 1254	PCB 1260
SWMU8-8896-s-1	soil	11	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
SWMU8-8896-s-2	soil	11	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
SWMU8-8896-s-3	soil	11	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
SWMU8-8896-s-3 dup	soil	11	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
SWMU8-81496-s-4	soil	11	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
SWMU8-81496-s-5	soil	11	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
SWMU8-81496-s-6	soil	11	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
SWMU8-81496-s-7	soil	11	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)

ND – non detect
mg/kg – milligrams per kilogram

The MDLs for TPH analysis of the 8 soil samples ranged from 15 to 25 mg/kg, but no detection above these values were reported. Similarly, no detections were reported for PCBs (Table 2-3) or BTEX (Table 2-2). The MDL for the BTEX analyses ranged between 0.5 and 1.5 mg/kg. The PCB MDL was 0.05 mg/kg. The investigation report concludes that the sample results confirm clean closure of the former underground Waste Oil Tank (SWMU 8) site (DEI, 1997a).

2.4 Site Conceptual Model

2.4.1 Nature and Extent of Contamination

The results of soil sampling at SWMUs 8 and 9 indicate that detected TPH are related to asphalt paving and the 8-inch (20-cm) diameter drum hoist pedestal. Vertical and lateral migration of the TPH components is very limited in extent. Penetration of hydrocarbons into the upper few feet (<200 cm) of soil indicates that initial release volumes were insufficient to pose a potential threat to groundwater. Likewise, petroleum hydrocarbons emanating from the asphalt paving of the PHQ Maintenance Area are released at a rate that does not exceed the soil's capacity to attenuate the contaminants. The potential underground release source was eliminated when the SWMU 8 UST was removed in 1990. Subsequent confirmatory sampling in 1996 indicates that a release did not occur from the underground Waste Oil Tank. None of the RCRA toxicity characteristic metals are concentrated in soil to the point where leaching could create a toxicity problem at depth or in ground water according to their mobility and transport properties. The distribution and concentrations of contaminants detected during the investigations at the SWMU 8 and 9 sites do not suggest a continuing source.

2.4.2 Environmental Fate

Petroleum hydrocarbon releases potentially containing heavy metals were investigated and the analytical data indicates that migration of contaminants is unlikely based on limited release and migration rates. Petroleum hydrocarbons have been released at a rate slower than the metabolism rate of soil microbes in the shallow subsurface. Microbial degradation and chemical oxidation of the hydrocarbons at the site will continue naturally. Metals are present at concentrations below TCLP maximum contaminant limits. Additionally, the SWMU site is paved, effectively forming a cap that prevents the leaching of any contaminants into the subsurface. No human or ecological exposure pathways are threatened by the SWMU 8 and 9 sites.

2.5 Site Assessments

2.5.1 Screening Assessments

Human and ecological screening assessments appear in the White Sands RFI (see Section 2.4) (IT Corp, 1992; Sverdrup, 1994). The sampling analyses indicate that the risk-based screening action levels established by state and federal regulatory agencies were not exceeded at SWMUs 8 and 9.

2.5.2 Risk Assessments

A formal human and/or ecological risk assessment has not been completed for SWMUs 8 and 9 because the results of the screening analyses did not exceed action thresholds.

2.5.3 Other Applicable Assessments

A screening assessment for soil erosion potential at the site was conducted according to the procedure developed by the NMED Surface Water Quality Bureau. A copy of the completed assessment worksheet is presented in Appendix C. The erosion potential survey found that the risk of contaminant migration with stormwater is low (the site scored 15.6 on a scale of 100).

2.6 No Further Action Proposal

On the basis of the results of previous investigations, application is hereby made to perform a Class III modification to remove SWMUs 8 and 9 from the HSWA module of the White Sands Missile Range RCRA Part B permit (Permit #NM2750211235, Module VIII), in accordance with 40 CFR 264.514 and 270.42, and 20 NMAC 4.1.

2.6.1 Rationale

The results of previous investigations at SWMUs 8 and 9 indicate that the environmental effects of the Waste Oil Tank and accompanying Sump do not pose a threat to human health or the environment, nor affect projected land use. The extent of contaminant releases from the facility does not warrant further corrective action, based on the results of the previous investigations.

2.6.2 Criterion

Based on the results of the RFI sampling, it was concluded that no release of constituents hazardous to human health or the environment in concentrations exceeding the NMED SSLs were identified at SWMUs 8 and 9. Criterion 5 (see Appendix A) of the NMED-HRMB Standard Operating Procedures Manual, Volume 1, Section II.B.4.a.(4).(b)., is applicable (NMED, 1998). The SWMUs were "characterized or remediated in accordance with current applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use."

3.0 SWMU 12 & 13; VEHICLE WASH RAMP, DRAINS, SUMP AND OIL/WATER SEPARATOR,

3.1 Summary

The Vehicle Wash Ramp and Drains (SWMU 12) and the associated Sump and Oil/Water Separator (SWMU 13) are grouped together because both SWMUs are components of a single waste stream. The two SWMUs will be administratively combined according to the Administrative Authority (see Appendix B). The site plan of SWMUs 12 and 13 is shown in Figure 3-1 on the following page. Wastewater generated at the Vehicle Wash Ramp facility drained through the Sump and Oil/Water Separator to a sanitary sewer that carries wastewater to the Main Post Sewage Treatment Plant (STP). Formerly, wastewater from the wash ramp discharged to a storm water drainage ditch. Phase I and II RCRA Facility Investigations (RFI) were conducted to determine the extent of any contamination potentially released from the facility.

3.2 Description and Operational History

3.2.1 Site Description

The Vehicle Wash Ramp and Drains (SWMU 12) and the Sump and Oil/Water Separator (SWMU 13) are located immediately east of Building 1778 in the Main Post area (Photograph 3-1). The dimensions of the concrete wash pad are 40 feet by 15 feet (12 x 4.5 m) and it slopes to a central, longitudinal drain that discharges to the 200-gallon (750 l) sump with oil/water separator at the north end of the drain. The separator/sump is constructed of concrete and covered by a metal grate. When the facility was operational (as shown in Photograph 3-2) waste oil and debris from the separator/sump were periodically transferred to a waste oil tank for recycling and disposal, while the effluent flowed to the STP through the sanitary sewer.

Photograph 3-1. Most recent view of the SWMU 12 and 13 site, looking west with the Organ Needles and Sugarloaf Peak in the background.

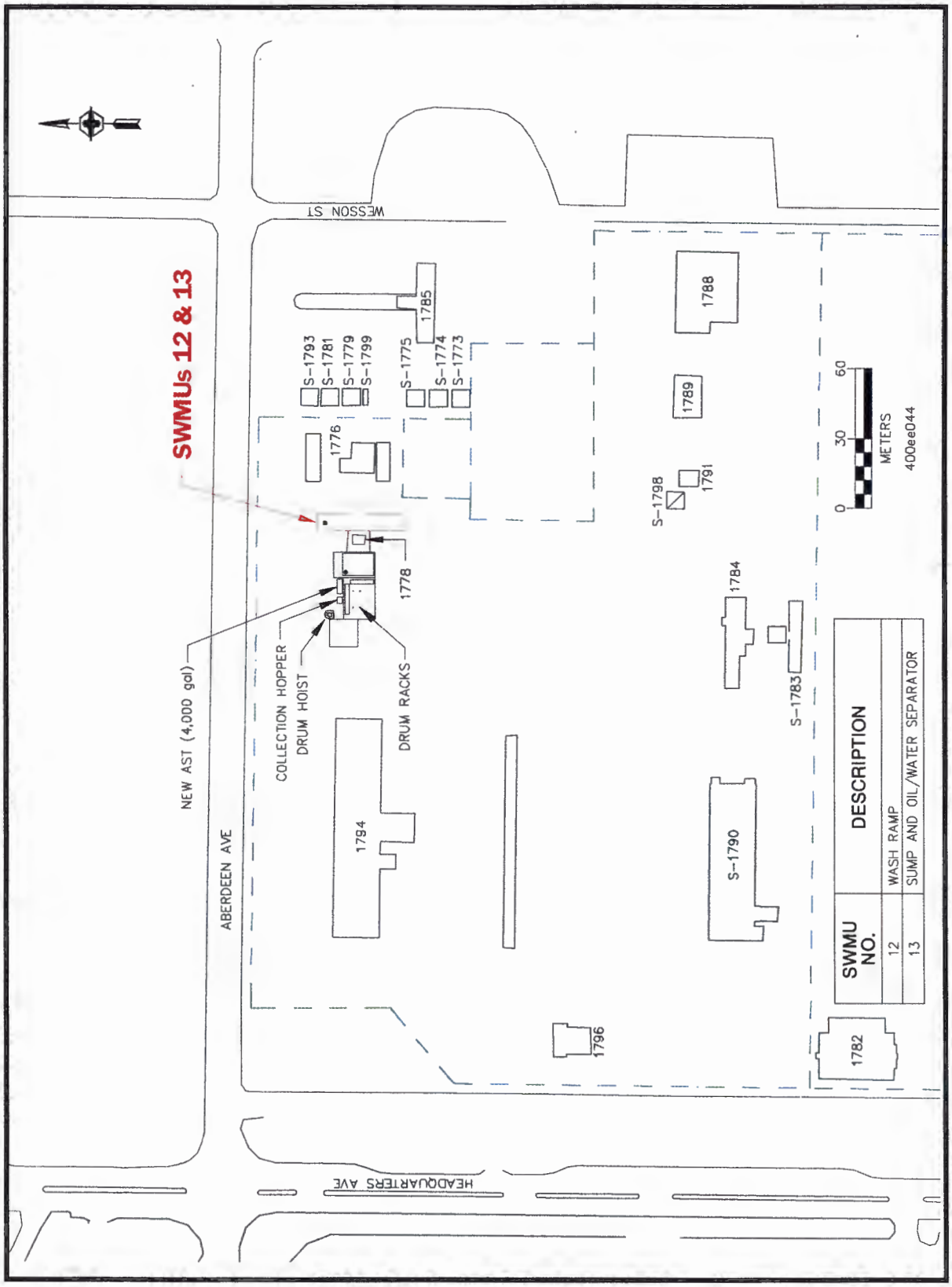


Figure 3-1. Site plan of SWMUs 12 and 13.

Photograph 3-2. View of the operational SWMU 12 Vehicle Wash Ramp, looking west.

At the time that the facility became active in the mid-1950s, wastewater effluent drained into the adjacent storm water drainage ditches. Although the wastewater discharge line was already connected to the sanitary sewer leading to the STP, the Phase I and II RFI (IT Corp., 1992b; Sverdrup, 1994, respectively) sampling approach was designed to determine whether the previous discharges constituted a threat to human health or the environment.

3.2.2 Operational History

The Vehicle Wash Ramp, Oil/Water Separator, and Drains were built in the mid-1950's. The concrete pad collects wastewater from the spray washing of vehicles. The wastewater formerly discharged through a subgrade pipe to the drainage ditch located east of the wash pad. After the Main Post STP was built, the oil/water separator outlet was plumbed to the sanitary sewer system for treatment and disposal of the wastewater. The oil/water separator works by gravity separation and the skimmed oil phase was drained into the Waste Oil Storage Tank (SWMU 8, see Section 2.2). The wash ramp was dismantled in 1997 and hauled off-post for scrap.

3.3 Previous Investigations

3.3.1 Summary

The Vehicle Wash Ramp, Drains, Sump, and Oil/Water Separator were included in three investigations under RCRA. These SWMUs were first identified during the White Sands RFA

(Kearney, 1988). Both SWMUs were also investigated during the Phase I (IT Corp, 1992b) and Phase II (Sverdrup Environmental, 1994) RFIs. Analytical data on contaminant concentrations in surface sediment and soil gas were compiled and presented in the RFI.

3.3.2 Investigation #1: RCRA Facility Assessment

The RFA consisted of a search of White Sands' records of waste-related activity at SWMUs 12 and 13 and a visual inspection of the sites. The RFA report was issued in August 1988 (Kearney, 1988).

3.3.2.1 Non-sampling Data Collection

No record of historic contaminant releases and no visible evidence of release(s) were reported in the RFA (Kearney, 1988).

3.3.2.2 Sampling Data Collection

No environmental samples were taken during the RFA. The PR/VSI did not generate analytical data and no records of previous sampling activities or site assessments were found during the PR/VSI.

3.3.2.3 Results and Conclusions

The potential for the release of contaminants to soil/ground water, surface water, air and production of subsurface gas from SWMUs 12 and 13 was assessed as "low" in the RFA (Kearney, 1988).

3.3.3 Investigation #2: Phase I-RCRA Facility Investigation

The Phase I RFI was conducted to determine if hazardous constituents potentially released from the Vehicle Wash Ramp could be detected in sediment and soil gas samples from the shallow subsurface. Sampling was designed to determine what additional characterization or remediation of the site would be necessary. The Phase I report was issued in December 1992 (IT Corp, 1992b).

3.3.3.1 Non-sampling Data Collection

The Phase I RFI draws all conclusions from sampling data and the non-sampling information reported in the RFA. The report of the Phase I RFI does not present new non-sampling data.

3.3.3.2 Sampling Data Collection

The Phase I RFI sampling approach included a soil-vapor survey (SVS) targeting benzene, toluene, ethylbenzene, xylene (BTEX), methane, and carbon dioxide from a depth of 5-7 feet (1.5-2.1 m) below grade. Additionally, surface sediment samples were taken from the storm water drainage ditch into which SWMUs 12 and 13 formerly discharged. Analytical constituents included VOCs, SVOCs, and total RCRA metals.

3.3.3.3 Data Gaps

Arsenic was detected at a concentration of 3.2 mg/kg in the drainage ditch sediment sample taken upstream from the SWMU 12 and 13 outfall. The NMED arsenic SSL is 3.9 mg/kg for residential land use and 17 mg/kg for industrial settings (NMED, 2000). The four sediment samples taken downstream were not analyzed for arsenic, but the reason for this is not explained in the report (IT Corp, 1992b).

The Phase I RFI sampling episode was the first to be conducted at SWMUs 12 and 13. The sampling did not include groundwater, but was intended to determine whether a groundwater investigation would be necessary.

3.3.3.4 Results and Conclusions

The investigation approach targeted VOCs through a soil vapor survey. Target BTEX compounds were not detected during the soil vapor survey. A potential decompositional byproduct, methane, was not detected. However, the presence of carbon dioxide (CO_2) at the southeast side of the concrete pad in high concentrations (74 g/m^3) relative to adjacent locations (18 g/m^3) potentially indicated the occurrence of microbial metabolism.

Analytical results of four surface sediment samples and one upstream sample from the storm water drainage ditch that received the Vehicle Wash Ramp effluent indicated the presence of detectable acetone, arsenic, barium, and lead. Contaminant concentrations did not approach applicable federal action levels.

Acetone was detected in one sediment sample at a concentration of 0.17 mg/kg. The report of the Phase I RFI attributed the introduction of acetone to the use of isopropanol during equipment decontamination (IT Corp, 1992b).

Barium was detected in 3 sediment samples and the upstream sediment sample at concentrations of 27, 23, 40, and 41 mg/kg, respectively. The NMED residential SSL is 5,200 mg/kg (NMED, 2000).

Lead was detected in each of the five sediment samples with the highest concentration being 24 mg/kg. These lead concentrations are well below the action level (400 mg/kg) established in the EPA Office of Solid Waste and Emergency Response (OSWER) interim soil lead guidance (EPA, 1994) and adopted as the NMED residential SSL (NMED, 2000).

The Phase I RFI concluded that the data collected did not support a significant contaminant release into the storm water drainage ditch. However, the concentration of CO_2 detected by the soil vapor survey led to the recommendation that subsurface samples be collected near the Wash Ramp to determine if contaminants were released to the subsurface.

3.3.4 Investigation #3: Phase II-RCRA Facility Investigation

Revision 1 of the Phase II RFI report was issued December 12, 1994. The Phase II investigation was designed to determine whether contaminants identified during the Phase I investigation could migrate to receptors. The Phase II RFI concentrated sampling around the Vehicle Wash Ramp and its drainpipe to determine if contaminants had leached downward.

3.3.4.1 Non-sampling Data Collection

The Phase II RFI draws all of its conclusions from sampling data. Non-sampling data is not presented. No additional records of previous contaminant releases or prior assessments were identified during the Phase II RFI.

3.3.4.2 Sampling Data Collection

As shown in Figure 3-2 on following page, nine soil samples were collected from three borings located immediately adjacent to the Vehicle Wash Ramp near the SVS site where the Phase I RFI detected elevated carbon dioxide concentrations. Three 10-foot (3.1 m) borings were sampled at approximate depths of 1-2 ft (30-60 cm), 4-5 ft (1.2-1.5 m), and 9-10 ft (2.75-3 m). Each sample was analyzed for VOCs, SVOCs, TPH and the 8 RCRA metals.

3.3.4.3 Data Gaps

Analyses of the soil samples were conducted according to the RFI work plan. No data gaps were identified.

3.3.4.4 Results and Conclusions

One of the samples collected from the shallowest interval was the only soil sample in which a VOC was detected (Sverdrup Environmental, 1994). The VOC reported was methylene chloride at a concentration of 5.87 micrograms per kilogram (µg/kg), which was qualified as an estimated concentration, just above the quantifiable limit of the analytical method. Methylene chloride was not detected in any of the other soil samples. The reported methylene chloride concentration (0.00587 mg/kg) is below the EPA Region 6 human health risk-based screening level (11 mg/kg) for residential land use (EPA, 1996a) and the EPA Region 9 PRG (8.5 mg/kg) for residential scenarios (EPA, 1998). The NMED SSLs do not include this compound (NMED, 2000). No SVOCs were detected in any of the soil samples. List of the reporting limits for the VOC analyses are presented as Tables 3-1, 3-2 and 3-3 on following pages, which correspond to Soil Boring-01, -02 and -03. The SVOC reporting limits are presented as Tables 3-4, 3-5 and 3-6.

Total petroleum hydrocarbons were reported above the 30 mg/kg MDL in 6 of the 9 soil analyses. Five of the 6 detections (49.2, 39.9, 39.3, 32.2, and 31.5 mg/kg) were very near the MDL. The shallowest sample from borehole SB01 had a more elevated TPH concentration of 289 mg/kg. The detected TPH concentrations were below the 1,000 mg/kg soil remediation level established by the New Mexico Environmental Improvement Board (EIB) in 20 NMAC 9.1, Subpart VII.708 (NM Environmental Improvement Board, 1995).

Four of the RCRA toxicity characteristic metals were detected in the soil samples. Barium was detected in 3 of the 9 samples without correlation to depth. Barium was reported near the 25 mg/kg detection limit in 2 samples (28.9 and 30.5 mg/kg) and well above it in the third (an estimated concentration of 756 mg/kg). All detectable barium concentrations were below the NMED residential SSL of 5,200 mg/kg (NMED, 2000). The list of reported detection limits is reported here as Table 3-7 on following pages.

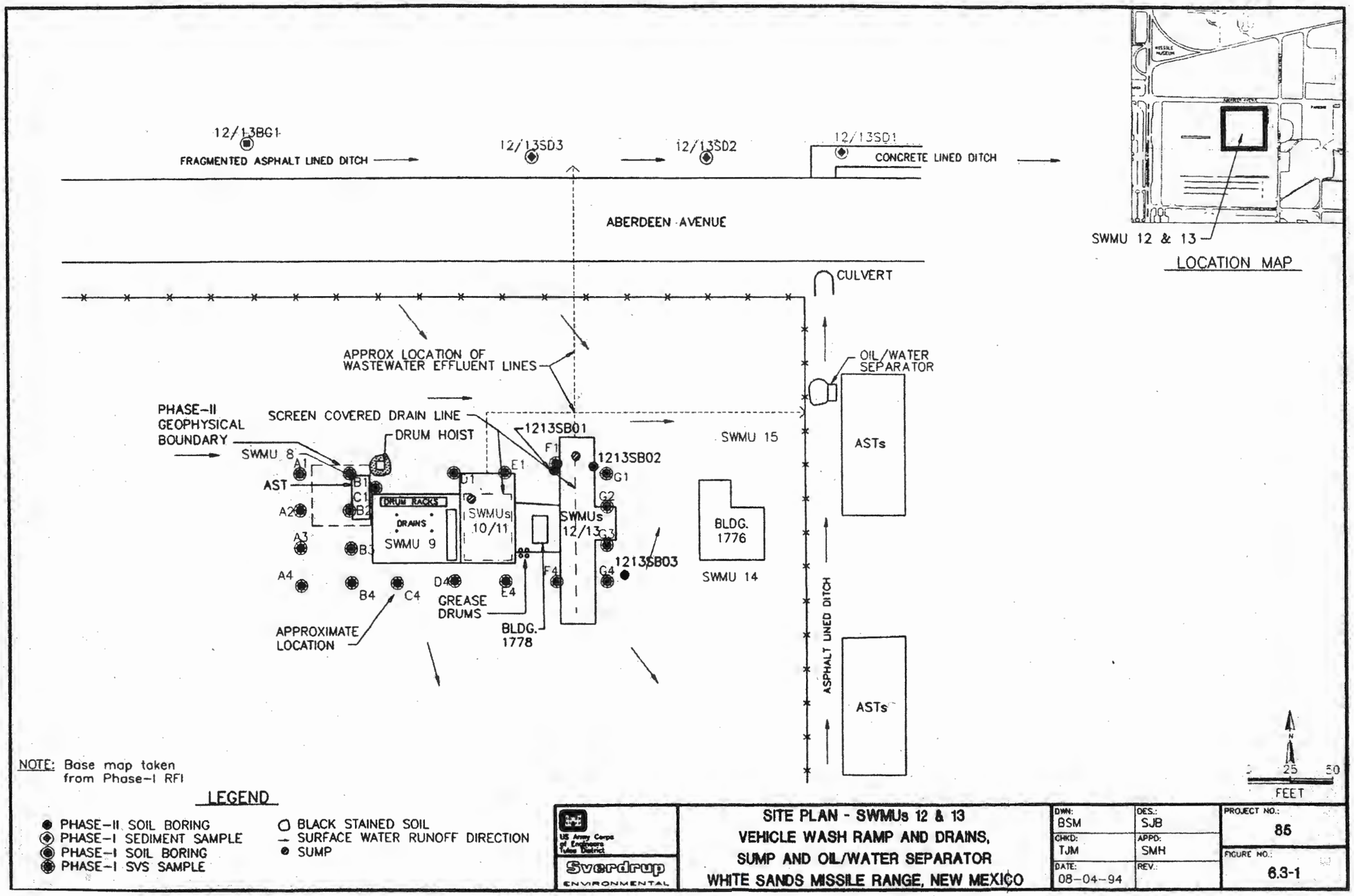


Figure 3-2. Locations of Samples at SWMU 12/13.

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Table 3-1. Summary of VOC results from soil samples collected from Soil Boring 01 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses). The sample location is shown in Figure 3-2.

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8260 (mg/kg)			
		ID# 1213-SB01(001.0)	ID# 1213-SB01(001.0)QC	ID# 1213-SB01(004.0)	ID# 1213-SB01(009.0)
1,1,1-Trichloroethane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,1,2,2-Tetrachloroethane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,1,2-Trichloroethane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,1-Dichloroethane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,1-Dichloroethene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,3-Dichlorobenzene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,4-Dichlorobenzene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,2-Dichlorobenzene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,2-Dichloroethane (EDC)	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,2-Dichloropropane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
2-Chloroethyl vinyl ether	12/07/93	ND (0.0101)	ND (0.0102)	ND (0.0100)	ND (0.0101)
2-hexanone	12/07/93	ND (0.0203)	ND (0.0203)	ND (0.0201)	ND (0.0201)
Acetone	12/07/93	ND (0.0203)	ND (0.0203)	ND (0.0201)	ND (0.0201)
Acrolein	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Acrylonitrile	12/07/93	ND (0.0101)	ND (0.0102)	ND (0.0100)	ND (0.0101)
Benzene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Bromodichloromethane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Bromoform	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Bromomethane (methyl bromide)	12/07/93	ND (0.0101)	ND (0.0102)	ND (0.0100)	ND (0.0101)
cis-1,3-Dichloropropene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Carbon Tetrachloride	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
cis-1,2-Dichloroethene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Chlorobenzene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Chloroethane	12/07/93	ND (0.0101)	ND (0.0102)	ND (0.0100)	ND (0.0101)
Chloroform	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Chloromethane (methyl chloride)	12/07/93	ND (0.0101)	ND (0.0102)	ND (0.0100)	ND (0.0101)
Carbon Disulfide	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Dibromochloromethane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Dibromomethane (methylene bromide)	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Ethylbenzene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Ethyl Methacrylate	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Iodomethane	12/07/93	ND (0.0101)	ND (0.0102)	ND (0.0100)	ND (0.0101)
Methylene chloride	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
2-Butanone	12/07/93	ND (0.0203)	ND (0.0203)	ND (0.0201)	ND (0.0201)
Methyl Isobutyl Ketone (4-me-2-pentanone)	12/07/93	ND (0.0203)	ND (0.0203)	ND (0.0201)	ND (0.0201)
Styrene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Tetrachloroethene (PCE)	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Toluene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
1,2,3-Trichloropropane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
trans-1,2-Dichloroethene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
trans-1,3-Dichloropropene	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
trans 1,4-Dichloro-2-butene	12/07/93	ND (0.0101)	ND (0.0102)	ND (0.0100)	ND (0.0101)
Trichloroethene (TCE)	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Trichlorofluoromethane	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)
Vinyl Acetate	12/07/93	ND (0.0203)	ND (0.0203)	ND (0.0201)	ND (0.0201)
Vinyl Chloride	12/07/93	ND (0.0101)	ND (0.0102)	ND (0.0100)	ND (0.0101)
Xylenes, total	12/07/93	ND (0.00507)	ND (0.00508)	ND (0.00502)	ND (0.00504)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

Table 3-2. Summary of VOC results from soil samples collected from Soil Boring 02 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses). Sample location is shown in Figure 3-2.

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8260 (mg/kg)		
		ID# 1213-SB02(001.0)	ID# 1213-SB02(004.0)	ID# 1213-SB02(009.0)
1,1,1-Trichloroethane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,1,2,2-Tetrachloroethane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,1,2-Trichloroethane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,1-Dichloroethane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,1-Dichloroethene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,3-Dichlorobenzene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,4-Dichlorobenzene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,2-Dichlorobenzene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,2-Dichloroethane (EDC)	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,2-Dichloropropane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
2-Chloroethyl vinyl ether	12/08/93	ND (0.0102)	ND (0.0100)	ND (0.0101)
2-hexanone	12/08/93	ND (0.0204)	ND (0.0201)	ND (0.0201)
Acetone	12/08/93	ND (0.0204)	ND (0.0201)	ND (0.0201)
Acrolein	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Acrylonitrile	12/08/93	ND (0.0102)	ND (0.0100)	ND (0.0101)
Benzene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Bromodichloromethane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Bromoform	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Bromomethane (methyl bromide)	12/08/93	ND (0.0102)	ND (0.0100)	ND (0.0101)
cis-1,3-Dichloropropene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Carbon Tetrachloride	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
cis-1,2-Dichloroethene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Chlorobenzene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Chloroethane	12/08/93	ND (0.0102)	ND (0.0100)	ND (0.0101)
Chloroform	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Chloromethane (methyl chloride)	12/08/93	ND (0.0102)	ND (0.0100)	ND (0.0101)
Carbon Disulfide	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Dibromochloromethane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Dibromomethane (methylene bromide)	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Ethylbenzene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Ethyl Methacrylate	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Iodomethane	12/08/93	ND (0.0102)	ND (0.0100)	ND (0.0101)
Methylene chloride	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
2-Butanone	12/08/93	ND (0.0204)	ND (0.0201)	ND (0.0201)
Methyl Isobutyl Ketone (4-me-2-pentanone)	12/08/93	ND (0.0204)	ND (0.0201)	ND (0.0201)
Styrene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Tetrachloroethene (PCE)	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Toluene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
1,2,3-Trichloropropane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
trans-1,2-Dichloroethene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
trans-1,3-Dichloropropene	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
trans 1,4-Dichloro-2-butene	12/08/93	ND (0.0102)	ND (0.0100)	ND (0.0101)
Trichloroethene (TCE)	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Trichlorofluoromethane	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)
Vinyl Acetate	12/08/93	ND (0.0204)	ND (0.0201)	ND (0.0201)
Vinyl Chloride	12/08/93	ND (0.0102)	ND (0.0100)	ND (0.0101)
Xylenes, total	12/08/93	ND (0.00511)	ND (0.00502)	ND (0.00504)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

Table 3-3. Summary of VOC results from soil samples collected from Soil Boring 03 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses). The sample location is shown in Figure 3-2.

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8260 (mg/kg)		
		ID# 1213-SB03(001.0)	ID# 1213-SB03(004.5)	ID# 1213-SB03(009.5)
1,1,1-Trichloroethane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,1,2,2-Tetrachloroethane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,1,2-Trichloroethane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,1-Dichloroethane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,1-Dichloroethene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,3-Dichlorobenzene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,4-Dichlorobenzene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,2-Dichlorobenzene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,2-Dichloroethane (EDC)	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,2-Dichloropropane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
2-Chloroethyl vinyl ether	12/13/93	ND (0.0107)	ND (0.0104)	ND (0.0105)
2-hexanone	12/13/93	ND (0.0213)	ND (0.0209)	ND (0.0210)
Acetone	12/13/93	ND (0.0213)	ND (0.0209)	ND (0.0210)
Acrolein	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Acrylonitrile	12/13/93	ND (0.0107)	ND (0.0104)	ND (0.0105)
Benzene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Bromodichloromethane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Bromoform	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Bromomethane (methyl bromide)	12/13/93	ND (0.0107)	ND (0.0104)	ND (0.0105)
cis-1,3-Dichloropropene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Carbon Tetrachloride	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
cis-1,2-Dichloroethene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Chlorobenzene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Chloroethane	12/13/93	ND (0.0107)	ND (0.0104)	ND (0.0105)
Chloroform	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Chloromethane (methyl chloride)	12/13/93	ND (0.0107)	ND (0.0104)	ND (0.0105)
Carbon Disulfide	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Dibromochloromethane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Dibromomethane (methylene bromide)	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Ethylbenzene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Ethyl Methacrylate	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Iodomethane	12/13/93	ND (0.0107)	ND (0.0104)	ND (0.0105)
Methylene chloride	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
2-Butanone	12/13/93	ND (0.0213)	ND (0.0209)	ND (0.0210)
Methyl Isobutyl Ketone (4-me-2-pentanone)	12/13/93	ND (0.0213)	ND (0.0209)	ND (0.0210)
Styrene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Tetrachloroethene (PCE)	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Toluene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
1,2,3-Trichloropropane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
trans-1,2-Dichloroethene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
trans-1,3-Dichloropropene	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
trans 1,4-Dichloro-2-butene	12/13/93	ND (0.0107)	ND (0.0104)	ND (0.0105)
Trichloroethene (TCE)	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Trichlorofluoromethane	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)
Vinyl Acetate	12/13/93	ND (0.0213)	ND (0.0209)	ND (0.0210)
Vinyl Chloride	12/13/93	ND (0.0107)	ND (0.0104)	ND (0.0105)
Xylenes, total	12/13/93	ND (0.00534)	ND (0.00522)	ND (0.00525)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

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Table 3-4. Summary of SVOC results from soil samples collected from Soil Boring 01 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses).

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8270 (mg/kg)			
		ID# 1213-SB01(001.0)	ID# 1213-SB01(001.0)QC	ID# 1213-SB01(004.0)	ID# 1213-SB01(009.0)
1,2,4-Trichlorobenzene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
1,2-Dichlorobenzene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
1,2-Diphenyl Hydrazine	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
1,3-Dichlorobenzene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
1,4-Dichlorobenzene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2,4,6-Trichlorophenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2,4-Dichlorophenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2,4-Dimethylphenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2,4-Dinitrophenol	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
2,4-Dinitrotoluene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2,6-Dinitrotoluene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Dibenzo(a,h)anthracene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
bis (2-chloroethoxy) methane	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
bis (2-chloroethyl) ether	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
bis (2-chloroisopropyl) ether	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2-Chloronaphthalene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2-Chlorophenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2-Methylnaphthalene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2-Nitroaniline	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
2-Nitrophenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
3,3-Dichlorobenzidine	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
3-Nitroaniline	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
4,6-Dinitro-2-methylphenol	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
4-Chloro-3-methylphenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
4-Chloroaniline	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
4-Nitroaniline	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
2,4,5-Trichlorophenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
4-Methylphenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
2-Methylphenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Acenaphthylene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Acenaphthene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Anthracene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Bis (2-ethylhexyl) phthalate	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Benzo(a)anthracene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Benzo(a)pyrene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Benzo(b)fluoranthene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Benzo(g,h,i)perylene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Benzo(k)fluoranthene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Benzoic acid	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
Benzidine	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
4-Bromophenyl Phenyl Ether	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Butyl Benzyl Phthalate	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Benzyl alcohol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Chrysene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
4-Chlorophenyl Phenyl Ether	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Dibenzofuran	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Diethylphthalate	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)

Table 3-4. Summary of SVOC results from soil samples collected from Soil Boring 01 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses).
(concluded)

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8270 (mg/kg)			
		ID# 1213-SB01(001.0)	ID# 1213-SB01(001.0)QC	ID# 1213-SB01(004.0)	ID# 1213-SB01(009.0)
Dimethylphthalate	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Di-n-butylphthalate	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Di-n-octylphthalate	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Fluoranthene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Fluorene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Hexachlorobenzene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Hexachlorobutadiene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Hexachloropentadiene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Hexachloroethane	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Indeno(1,2,3-cd)pyrene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Isophorone	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
n-Nitrosodi-n-propylamine	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
n-Nitrosodiphenylamine	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Naphthalene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Nitrobenzene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Pentachlorophenol	12/07/93	ND (1.620)	ND (1.620)	ND (1.610)	ND (1.610)
Phenanthrene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Phenol	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Pyrene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
1-Chloroanaphthalene	12/07/93	ND (0.335)	ND (0.335)	ND (0.332)	ND (0.332)
Diphenylamine	12/07/93	ND (1.010)	ND (1.020)	ND (1.000)	ND (1.010)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

Table 3-5. Summary of SVOC results from soil samples collected from Soil Boring 02 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses).

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8270 (mg/kg)		
		ID# 1213-SB01(001.0)	ID# 1213-SB01(004.0)	ID# 1213-SB02(009.0)
1,2,4-Trichlorobenzene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
1,2-Dichlorobenzene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
1,2-Diphenyl Hydrazine	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
1,3-Dichlorobenzene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
1,4-Dichlorobenzene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2,4,6-Trichlorophenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2,4-Dichlorophenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2,4-Dimethylphenol	12/08/93	ND (0.335)	ND (0.332)	ND (0.332)
2,4-Dinitrophenol	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
2,4-Dinitrotoluene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2,6-Dinitrotoluene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Dibenzo(a,h)anthracene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
bis (2-chloroethoxy) methane	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
bis (2-chloroethyl) ether	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
bis (2-chloroisopropyl) ether	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2-Chloronaphthalene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2-Chlorophenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2-Methylnaphthalene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2-Nitroaniline	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
2-Nitrophenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
3,3-Dichlorobenzidine	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
3-Nitroaniline	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
4,6-Dinitro-2-methylphenol	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
4-Chloro-3-methylphenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
4-Chloroaniline	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
4-Nitroaniline	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
2,4,5-Trichlorophenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
4-Methylphenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
2-Methylphenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Acenaphthylene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Acenaphthene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Anthracene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Bis (2-ethylhexyl) phthalate	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Benzo(a)anthracene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Benzo(a)pyrene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Benzo(b)fluoranthene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Benzo(g,h,i)perylene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Benzo(k)fluoranthene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Benzoic acid	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
Benzidine	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
4-Bromophenyl Phenyl Ether	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Butyl Benzyl Phthalate	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Benzyl alcohol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Chrysene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
4-Chlorophenyl Phenyl Ether	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Dibenzofuran	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Diethylphthalate	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Dimethylphthalate	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)

Table 3-5. Summary of SVOC results from soil samples collected from Soil Boring 02 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses).
(concluded)

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8270 (mg/kg)		
		ID# 1213-SB01(001.0)	ID# 1213-SB01(004.0)	ID# 1213-SB02(009.0)
Di-n-butylphthalate	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Di-n-octylphthalate	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Fluoranthene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Fluorene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Hexachlorobenzene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Hexachlorobutadiene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Hexachloropentadiene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Hexachloroethane	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Indeno(1,2,3-cd)pyrene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Isophorone	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
n-Nitrosodi-n-propylamine	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
n-Nitrosodiphenylamine	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Naphthalene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Nitrobenzene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Pentachlorophenol	12/08/93	ND (1.640)	ND (1.610)	ND (1.610)
Phenanthrene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Phenol	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Pyrene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
1-Chloroanaphthalene	12/08/93	ND (0.337)	ND (0.332)	ND (0.332)
Diphenylamine	12/08/93	ND (1.020)	ND (1.000)	ND (1.010)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

Table 3-6. Summary of SVOC results from soil samples collected from Soil Boring 03 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses).

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8270 (mg/kg)		
		ID# 1213-SB03(001.0)	ID# 1213-SB03(004.5)	ID# 1213-SB03(009.5)
1,2,4-Trichlorobenzene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
1,2-Dichlorobenzene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
1,2-Diphenyl Hydrazine	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
1,3-Dichlorobenzene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
1,4-Dichlorobenzene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2,4,6-Trichlorophenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2,4-Dichlorophenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2,4-Dimethylphenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2,4-Dinitrophenol	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
2,4-Dinitrotoluene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2,6-Dinitrotoluene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Dibenzo(a,h)anthracene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
bis (2-chloroethoxy) methane	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
bis (2-chloroethyl) ether	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
bis (2-chloroisopropyl) ether	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2-Chloronaphthalene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2-Chlorophenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2-Methylnaphthalene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2-Nitroaniline	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
2-Nitrophenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
3,3-Dichlorobenzidine	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
3-Nitroaniline	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
4,6-Dinitro-2-methylphenol	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
4-Chloro-3-methylphenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
4-Chloroaniline	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
4-Nitroaniline	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
2,4,5-Trichlorophenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
4-Methylphenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
2-Methylphenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Acenaphthylene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Acenaphthene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Anthracene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Bis (2-ethylhexyl) phthalate	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Benzo(a)anthracene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Benzo(a)pyrene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Benzo(b)fluoranthene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Benzo(g,h,i)perylene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Benzo(k)fluoranthene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Benzoic acid	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
Benzidine	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
4-Bromophenyl Phenyl Ether	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Butyl Benzyl Phthalate	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Benzyl alcohol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Chrysene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
4-Chlorophenyl Phenyl Ether	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Dibenzofuran	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Diethylphthalate	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Dimethylphthalate	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)

Table 3-6. Summary of SVOC results from soil samples collected from Soil Boring 03 during the Phase II RFI. Sample depth (in feet) included as part of sample ID# (in parentheses).
(concluded)

Analyte	Sample Date	Volatile Organic Compounds by EPA Method 8270 (mg/kg)		
		ID# 1213-SB03(001.0)	ID# 1213-SB03(004.5)	ID# 1213-SB03(009.5)
Di-n-butylphthalate	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Di-n-octylphthalate	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Fluoranthene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Fluorene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Hexachlorobenzene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Hexachlorobutadiene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Hexachloropentadiene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Hexachloroethane	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Indeno(1,2,3-cd)pyrene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Isophorone	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
n-Nitrosodi-n-propylamine	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
n-Nitrosodiphenylamine	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Naphthalene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Nitrobenzene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Pentachlorophenol	12/13/93	ND (1.710)	ND (1.670)	ND (1.680)
Phenanthrene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Phenol	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Pyrene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
1-Chloroanaphthalene	12/13/93	ND (0.352)	ND (0.345)	ND (0.346)
Diphenylamine	12/13/93	ND (1.070)	ND (1.040)	ND (1.050)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

Table 3-7. Summary of RCRA metals results of soil sampling at Soil Borings –01, -02 and –03, collected in December 1993. Sample depth (in feet) included as part of the sample ID# (in parentheses). Locations of the soil borings are shown in Figure 3-2.

Analyte	EPA SW-846	Analytical Results (mg/kg)for RCRA Metals in Soil Samples from SWMU 12/13									
		1213SB01 (001.0)	1213SB01 (001.0)QC	1213SB01 (004.0)	1213SB01 (009.0)	1213SB02 (001.0)	1213SB02 (004.0)	1213SB02 (009.0)	1213SB03 (001.0)	1213SB03 (004.5)	1213SB03 (009.5)
Arsenic	7060	ND (2.54)	ND (2.54)	ND (2.51)	ND (2.52)	ND (2.56)	ND (2.51)	ND (2.52)	ND (2.67)	ND (2.61)	7.70
Barium	6010	ND (25.4)	ND (25.4)	ND (25.1)	ND (25.2)	28.9	ND (25.1)	ND (25.2)	ND (26.7)	ND (26.1)	756
Cadmium	6010	ND (5.07)	ND (5.08)	ND (5.02)	ND (5.04)	ND (5.11)	ND (5.02)	ND (5.04)	ND (5.34)	ND (5.22)	ND (5.25)
Chromium	6010	ND (25.4)	ND (25.4)	ND (25.1)	ND (25.2)	ND (25.6)	ND (25.1)	ND (25.2)	ND (26.7)	ND (26.1)	88.1
Lead	7421	10.3	10.9	6.87	6.40	10.2	6.17	7.53	11.3	7.48	13.5
Mercury	7470	ND (0.0203)	ND (0.0203)	ND (0.0201)	ND (0.0201)	ND (0.0204)	ND (0.0201)	ND (0.0201)	ND (0.0213)	ND (0.0209)	ND (0.021)
Selenium	7740	ND (2.54)	ND (2.54)	ND (2.51)	ND (2.52)	ND (2.56)	ND (2.51)	ND (2.52)	ND (2.67)	ND (2.61)	ND (2.62)
Silver	6010	ND (25.4)	ND (25.4)	ND (25.1)	ND (25.2)	ND (25.6)	ND (25.1)	ND (25.2)	ND (26.7)	ND (26.1)	ND (26.2)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

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Lead was reported from all nine of the Phase II soil samples. Concentrations reached 13.5 mg/kg and the mean concentration of the nine samples was 8.86 mg/kg. The reported lead concentrations were below the NMED residential SSL of 400 mg/kg.

Chromium was detected in one of the soil samples, which was the deepest sample from borehole SB03. The reported chromium concentration is 88.1 mg/kg. The NMED SSLs list chromium, not as total chromium, but as the chromium 3^+ and chromium 6^+ valence states. The residential SSLs are 100,000 mg/kg and 230 mg/kg, respectively. The EPA Region 9 residential soil Preliminary Remediation Goal (PRG) for total chromium is 210 mg/kg (EPA, 1998). Chromium concentrations did not exceed the MDL (approximately 25 mg/kg) in the other 8 samples (Sverdrup Environmental, 1994).

Arsenic was the fourth RCRA metal detected. Arsenic was reported near the 2.5 mg/kg detection limit in the shallowest and deepest samples from borehole SB03. The arsenic concentrations of 2.67 and 7.70 mg/kg, exceeding the NMED residential SSL of 3.9 mg/kg, but not the industrial SSL of 17 mg/kg (NMED, 2000).

The Phase II RFI report concluded that the "results of soil samples collected and analyzed from the three soil borings adjacent to the perimeter of the Vehicle Wash Ramp and Drains indicate that no significant release of contaminants has [occurred] or is occurring." Evidence of a chemical source of the carbon dioxide detected during the Phase I RFI SVS was not found and the recommendation that SWMUs 12 and 13 be removed from the HSWA corrective action list was made (Sverdrup Environmental, 1994).

3.4 Site Conceptual Model

3.4.1 Nature and Extent of Contamination

The potential vertical and horizontal migration routes from the Vehicle Wash Ramp were investigated. The results of soil sampling at SWMUs 12 and 13 indicate that concentrations of the RCRA metals are below established safe exposure levels. Although the SVS indicated that CO_2 exceeded background concentrations, evidence for a potential oxidizing organic contaminant source was not found in subsequent sampling during the RFI.

3.4.2 Environmental Fate

Organic compounds detected in soil at SWMUs 12 and 13 likely have attenuated naturally because downward migration is significantly retarded by adhesion to soils, the reported concentrations are dilute, and oxygen is readily available for natural biodegradation. Metals concentrations are below screening action levels that are protective against migration by leaching. Therefore, contaminant migration offsite is improbable and no mechanism for further concentration of contaminants is apparent. A source no longer exists at the SWMU since the Vehicle Wash Ramp was removed in 1997 (Photographs 3-1 and 3-2).

3.5 Site Assessments

3.5.1 Screening Assessments

Human and ecological screening assessments appear in the White Sands RFI (see Section 3.4) (IT Corp, 1992; Sverdrup, 1994). The sampling analyses indicate that the risk-based screening action levels established by state and federal regulatory agencies for industrial sites were not exceeded at SWMUs 12 and 13.

3.5.2 Risk Assessments

A formal human and/or ecological risk assessment has not been completed for SWMUs 8 and 9 because the results of the screening analyses did not exceed action thresholds.

3.5.3 Other Applicable Assessments

A screening assessment for soil erosion potential at the site was conducted according to the procedure developed by the NMED Surface Water Quality Bureau. A copy of the completed assessment worksheet is presented in Appendix C. The erosion potential survey found that the risk of contaminant migration with stormwater is low (the site scored 15.6 on a scale of 100).

3.6 No Further Action Proposal

On the basis of the results of previous investigations, application is hereby made to perform a Class III modification to remove SWMUs 12 and 13 from the HSWA corrective action module of the White Sands RCRA Part B permit (Permit #NM2750211235, Module VIII), in accordance with 40 CFR 264.514 and 270.42, and 20 NMAC 4.1.

3.6.1 Rationale

The results of previous investigations at SWMUs 12 and 13 indicate that the environmental effects of the Vehicle Wash Ramp and accompanying Sump and Oil/Water separator do not currently pose a threat to human health or the environment, nor affect the projected land use. The extent of contaminant releases from the facility do not warrant corrective action, based on the results of the RCRA investigations.

3.6.2 Criterion

Based on the results of the RFI sampling, it was concluded that no release of constituents hazardous to human health or the environment in concentrations exceeding appropriate NMED screening action levels were identified at SWMUs 12 and 13. Criterion 5 (see Appendix A) of the NMED-HRMB Standard Operating Procedures Manual, Volume 1, Section II.B.4.a.(4).(b)., is applicable (NMED, 1998). The SWMUs were "characterized or remediated in accordance with current applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use."

4.0 SWMUS 14 & 15; USED BATTERY ACCUMULATION AREA

4.1 Summary

Two sites near the Main Post Battery Shop were used to stockpile batteries prior to disposal off-post. Both sites were investigated to determine if a potential release of contaminants required corrective action. During the Phase I and Phase II RFI, lead was detected above background concentrations in sediment on site. Lead was most concentrated in sludge that collected in the Battery Shop sump. The sump was designed to collect solids from wastewater entering the sanitary sewer system. The sump sludge was removed and disposed of as hazardous waste.

4.2 Description and Operational History

4.2.1 Site Description

The former Used Battery Accumulation Areas (Figure 4-1) are located immediately south (SWMU 14) and approximately 50 feet northeast (SWMU 15) of the Building 1776 Battery Shop (Kearney, 1988). Building 1776 is within the secured fence surrounding the Maintenance Area on the Main Post. Lead-acid batteries were stored on asphalt pavement at these SWMUs (Photographs 4-1 and 4-2). A sump located on the east side of Building 1776 collects solids prior to wastewater entering the sanitary sewer system. The sanitary sewer system ultimately discharges the wastewater flowing through this sump into the STP.

Approximately 40,000 pounds of used batteries were collected annually at this facility and stored prior to off-site recycling (Kearney, 1988). Used battery storage operations were moved in 1990 to a facility constructed with a roof and berms to prevent and contain accidental releases.

4.2.2 Operational History

The White Sands RFA could not determine the inception date for battery storage adjacent to Building 1776. Battery storage ceased at the site in 1990 when a covered battery storage area was built. During the operation of SWMUs 14 and 15, batteries were stored on wooden pallets to a height of 3 to 4 feet (90-120 cm). Pallets could then be loaded onto trucks for transport to recycling sites.

4.3 Previous Investigations

4.3.1 Summary

The Used Battery Accumulation Areas (SWMUs 14 and 15) were the subject of three RCRA investigations. The SWMUs were assessed in the White Sands RFA (Kearney, 1988). Sampling of the site was conducted during the Phase I (IT Corp, 1992b) and Phase II (Sverdrup Environmental, 1994) RFIs. The investigations determined that sludge from a sewer line sump required removal due to lead accumulation.

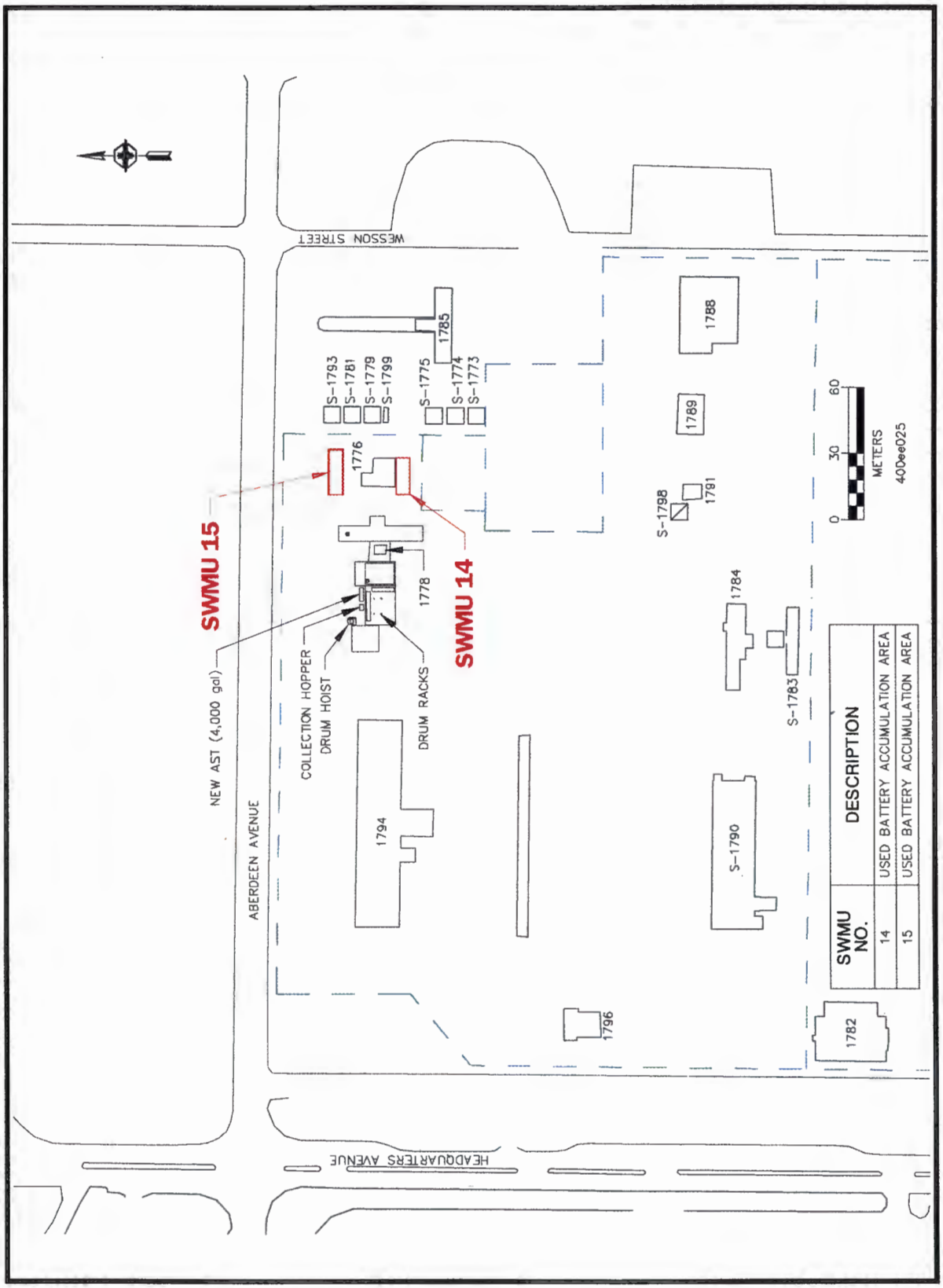

Figure 4-1. Site Plan of SWMU 14 and 15.

Photograph 4-1. View of the Battery Shop (Building 1776) looking southeast. The SWMU 15 site is shown on the asphalt pavement immediately north of the building.

Photograph 4-2. View of Building 1776 (Battery Shop) looking northeast. SWMU 14 was the concrete area immediately south of the building.

4.3.2 Investigation #1: RCRA Facility Assessment

The RFA consisted of a search of White Sands' records of waste-related activity at SWMUs 14 and 15 and a visual inspection of the site. The RFA report was issued in August 1988 (Kearney, 1988).

4.3.2.1 Non-sampling Data Collection

At the time of the RFA, batteries were stored but not drained at Building 1776. Batteries were previously drained in the Battery Shop (Building 1776), however. According to a New Mexico Environmental Improvement Division (EID; predecessor to NMED) inspection report dated October 1986, five or six batteries per day were emptied into a drain with a sump that overflowed to the sanitary sewer line (Kearney, 1988). This battery fluid disposal method was immediately halted at the time of the EID inspection.

4.3.2.2 Sampling Data Collection

No environmental samples were taken during the RFA. The PR/VSI did not generate chemical data and no records of previous sampling activities or site assessments were found during the PR/VSI.

4.3.2.3 Results and Conclusions

The potential for the release of contaminants to soil and or ground water was estimated to be "moderate" because asphalt paving served to prevent spills from migrating vertically (Kearney, 1988). The release potential to surface water was also considered moderate due to the channeling of storm water toward Davies Tank (SWMU 85). The potential contaminants posed a "low" threat to air and "no" threat for subsurface gas generation. The unit was placed in the HSWA corrective action module (Module VIII) of the White Sands RCRA Part B permit based on the RFA report findings.

4.3.3 Investigation #2: Phase I -RCRA Facility Investigation

The Phase I RFI was conducted to characterize potentially hazardous constituents released at the Battery Storage Areas. Characterization of the site included chemical analysis of soil, sediment, and sludge samples. The results of the characterization indicate that further characterization during Phase II of the RFI (Section 4.3.4, below) was appropriate (IT Corp, 1992b).

4.3.3.1 Non-sampling Data Collection

The Phase I RFI notes etching and discoloration on the pavement at both SWMU locations identified in the RFA. It adds that batteries were no longer stored at the site, eliminating any future source of contaminants (IT Corp, 1992b).

4.3.3.2 Sampling Data Collection

Three soil borings were drilled and soil samples were collected at 0.5-foot (15 cm) and 1-foot (30 cm) depths below ground surface. Three surface sediment samples were collected from a storm water drainage ditch downstream from SWMUs 14 and 15. Additionally, grab samples of soil and sediment were collected upslope from the SWMUs. A composite sample of sludge

was collected from the sump in the drain line connecting Building 1776 to the sanitary sewer. All samples were analyzed for total RCRA toxicity characteristic metals (IT Corp, 1992b).

4.3.3.3 Data Gaps

No data gaps are identified. Numerous other samples were analyzed from the immediate vicinity of Building 1776 (IT Corp, 1992a and 1992b; Sverdrup Environmental, 1994). These other samples were collected in conjunction with the RFI of SWMUs 8/9 (Section 2 of this petition), 10/11 (Section 2 of accompanying petition; Document WS-ES-EC-0002), and 12/13 (Section 3 of this petition). The data collected at these adjacent SWMUs provide the rationale for removal from the HSWA corrective action list in this and previous Class III permit modifications submitted to NMED.

4.3.3.4 Results and Conclusions

Analytical results of the sediment samples from storm water runoff channels adjacent to the SWMU indicated measurable concentrations of lead, barium, cadmium, and mercury. Of the five sediment samples analyzed, all contained lead in excess of the MDL, but only two samples contained other RCRA metals in addition to lead (IT Corp, 1992b). The highest reported concentration of lead in sediment was 250 mg/kg. The mean lead concentration was 115 mg/kg. The NMED residential lead SSL is 400 mg/kg (NMED, 2000). Barium concentrations are reported above the MDL in two of the five sediment samples. The highest reported barium concentration in sediment was 68 mg/kg. The corresponding NMED residential SSL is 5,200 mg/kg. Cadmium and mercury were detected in the same two sediment samples that contained barium. The reported cadmium concentrations were 2.5 and 2.3 mg/kg, compared to the NMED residential SSL of 70 mg/kg. The reported mercury concentrations were both 0.2 mg/kg, compared to the NMED residential SSL of 23 mg/kg. None of the five sediment samples analyzed exceeded residential screening levels for any other RCRA metals.

Analysis of soil samples collected from three locations at SWMUs 14 and 15 indicated that lead and barium were present in all samples down to a maximum depth of 1 foot (30 cm) below the ground surface (IT Corp, 1992b). The highest reported lead concentration in soil was 34 mg/kg from a sample collected at 0.5 foot (15 cm). The NMED residential lead SSL is 400 mg/kg (NMED, 2000). The maximum barium concentration detected in soil at the site was 46 mg/kg. The NMED residential SSL for barium is 5,200 mg/kg. The only other RCRA metal detected in the soil samples was cadmium. A cadmium concentration of 2.3 mg/kg was reported from one sampling location at a depth of 0.5 foot (15 cm). The NMED residential SSL for cadmium is 70 mg/kg.

The sludge sample composited from the Building 1776 sump contained detectable concentrations of lead only. The lead concentration was reported as 10,000 mg/kg. The NMED industrial SSL is 1,000 mg/kg. The Phase I RFI concluded that lead concentrations are elevated at the site where lead/acid batteries were handled, but that a source of lead was no longer present at SWMUs 14 and 15 because battery storage practices changed.

4.3.4 Investigation #3: Phase II-RCRA Facility Investigation

Revision 1 of the Phase II RFI report was issued December 12, 1994 (Sverdrup Environmental, 1994). Additional soil sampling was conducted at SWMUs 14 and 15 in order to further characterize the extent to which the RCRA metals contaminate the site.

4.3.4.1 Non-sampling Data Collection

The RFI does not present any non-sampling data.

4.3.4.2 Sampling Data Collection

Seven surface sediment samples were collected from the SWMUs and from storm water runoff channels immediately upslope and downslope. One grab sample of sludge was collected from the sump at Building 1776. The sediment and sludge samples were analyzed for total RCRA toxicity characteristic metals and for lead by the Toxicity Characteristic Leachate Procedure (TCLP). One soil boring was augered to a depth of 5 feet (1.5 m) at the SWMU 14/15 site during the Phase II RFI. Three soil samples were collected for chemical analysis. The sampled depth intervals were 0 to 1 foot (0-30 cm), 2 to 3 feet (60-90 cm), and 4 to 5 feet (1.2-1.5 m). The soil samples were analyzed for total RCRA toxicity characteristic metals and lead by TCLP. The soil samples were also analyzed for VOCs, SVOCs, and TPH (Sverdrup Environmental, 1994).

4.3.4.3 Data Gaps

Analyses of the soil samples were conducted to determine total contaminant concentrations according to the RFI work plan. No data gaps were identified.

4.3.4.4 Results and Conclusions

Detections of total lead were reported from all samples (Sverdrup Environmental, 1994). The maximum lead concentration in samples from the soil borings was 67.9 mg/kg, which was collected from the 2-foot (60-cm) depth. The total lead concentration in the deepest sample taken from the boring, the 4-foot (1.2 m) sample, was reported as 17.8 mg/kg. Total lead concentrations reported from the seven sediment samples ranged from 6.34 to 409 mg/kg. The maximum lead concentration detected in sediment and soil samples exceeds the NMED residential SSL of 400 mg/kg for lead. The 409 mg/kg result does not exceed the NMED industrial SSL for lead, which is 1,000 mg/kg (NMED, 2000). The sludge sample from the sewer drain line sump contained 6,030 mg/kg of lead. When subjected to the TCLP, only one of the samples produced a leachate with a lead concentration exceeding the 0.5 mg/l MDL. The TCLP result for the sludge sample was 1.330 mg/l lead. This result was below the toxicity characteristic Maximum Concentration limit of 5.0 mg/l, established in 40 CFR 261.24.

Arsenic was detected in five of the sediment samples and in the shallowest soil-boring sample. The maximum total arsenic concentration detected was 9.30 mg/kg. The NMED residential SSL for arsenic is 3.9 mg/kg. The NMED industrial SSL for arsenic is 17 mg/kg. The total arsenic concentration in the sludge sample was below the MDL of 6.28 mg/kg (Sverdrup, 1994). Barium was detected in six of the sediment samples and in the shallowest soil-boring sample. The maximum total barium concentration detected was 155 mg/kg. The NMED residential SSL for barium is 5,200 mg/kg. The total barium concentration in the sludge sample was below the MDL of 62.8 mg/kg (Sverdrup, 1994).

Total chromium was detected in one sediment sample, but not in the soil samples or the sludge sample. The reported chromium result was 53.7 mg/kg. The NMED SSLs list chromium, not as

total chromium, but as the chromium 3^+ and chromium 6^+ valence states. The residential SSLs are 100,000 mg/kg and 230 mg/kg, respectively. The EPA Region 9 residential soil PRG for chromium is 210 mg/kg (EPA, 1998).

Total mercury was detected in six of the sediment samples and the sludge sample, but not in any of the three soil samples. The maximum mercury concentration in sediment was reported as 0.179 mg/kg. The reported total concentration of mercury in the sludge sample was 0.100 mg/kg. The NMED residential SSL for mercury is 23 mg/kg.

Total petroleum hydrocarbons were detected in the upper two samples collected from the soil boring. The reported TPH concentration from the 0-1 foot (0-30 cm) sample was 397 mg/kg. The reported TPH concentration from the 2-3 foot (60-90 cm) sample was 149 mg/kg. TPH concentration was reported below the 30.1 mg/kg MDL from the 4-5 foot (1.2-1.5 m) sample at the limit of the soil boring. No NMED SSL is established for TPH. The TPH results were below the 1,000 mg/kg remediation level established by the Environmental Improvement Board for land disposal (NM Environmental Improvement Board, 1995). No VOCs or SVOCs were detected in the samples.

Lead was the toxicity characteristic metal of concern at the site based on sediment analyses. The Phase II RFI report concluded that the probable source of lead at SWMUs 14 and 15 was removed by discontinuing use of the Used Battery Accumulation Areas. Use of the shop drains for discarding battery wastes had been discontinued in 1986. Positive TPH results are attributed to degraded asphalt and an oil sub-base to the asphalt pavement (Sverdrup Environmental, 1994).

4.3.5 Investigation #4: Battery Shop Sump, Concrete Apron, and Asphalt Drainage Ditch Removal

Based on the results of the previous RFIs, White Sands contracted with Radian International, LLC (Radian) to remove materials contaminated with lead from SWMUs 14 and 15. This contract involved excavation of a north-flowing storm-water drainage ditch along the east side of the Battery Shop as well as contents removal from a solids-separator sump in the Building 1776 sewer line. The drainage ditch was re-paved with asphalt and the inlet to the sump was subsequently plugged with concrete to eliminate the possibility of discharges. The results of the Radian remediation effort are contained in the Closeout Report dated September 5, 1997 (Radian, 1997).

4.3.5.1 Battery Shop Sump Contents Removal & Drainage Ditch Excavation

Solids Separator Sump

Samples of solids collected during RFIs (Sections 4.3.3 and 4.3.4, above) from the bottom of a solids-separator sump (Photograph 4-3) accessed from a manhole on the east side of Building 1776 contained lead (IT Corp, 1992b; Sverdrup Environmental, 1994). The sump (Photograph 4-4) was designed and constructed to trap solids from lead-acid battery maintenance activities performed in the Battery Shop. Liquid-phase spillover from the solids separator sump flowed into the sanitary sewer. Sump dimensions include an inside diameter of 18.6 inches (47 cm) and a depth of 24.5 inches (62 cm), comprising a volume of 3.8 cubic feet (0.11 m^3).

Photograph 4-3. Manhole access to the sump on the northeast side of the Battery Shop (Building 1776). The view is facing towards the northwest.

Photograph 4-4. Oblique view of the Battery Shop sump with tape measure for scale.

In 1986, battery waste discharges to the sump were discontinued by White Sands in accordance with direction from NMED (Kearney, 1988). On April 22, 1997, Radian removed all of the contents from the solids-separation sump for disposal. At that time, the sump contained approximately 8 inches (22.3 cm) of liquid and 4 to 5 inches (10 to 13 cm) of sludge. The liquids and sludge were collected in separate drums. Samples from both drums were analyzed for disposal purposes (see Sampling Data Collection, below). The drums were turned into the WSMR Hazardous Material Minimization Center on June 4, 1997 (Radian, 1997).

Concrete Apron

Due to visible staining and etching believed to be the result of battery acid, Radian was also directed to sample the concrete apron on the south side of Building 1776. Sampling of the concrete and underlying soil was performed with a core drill on April 24, 1997 (see Sampling Data Collection, below). Once the laboratory results showed the material to be non-hazardous, the existing concrete apron was demolished with a backhoe-mounted pneumatic chisel (Photograph 4-5). During June 1997, a new concrete apron on the south side of Building 1776 was constructed to replace the former SWMU 14 (Photographs 4-6 and 4-7).

Drainage Ditch

The asphalt drainage ditch runs in a north-south direction on the east side of building 1776. The storm water runoff from SWMUs 14 & 15 flows into this ditch. During April 1997, Radian excavated the sediments overlying the asphalt lining. The excavated sediment totaled 60 cubic yards (45.9 m^3) and was collected in two rolloff containers. Due to lead in the confirmation samples, additional excavation of the asphalt-lined ditch was performed in June 1997. The asphalt lining was found to be as much as 12 inches (0.305 m) thick in some areas resulting in excavation depths of up to 18 inches (0.457 m) and amounting to 150 cubic yards (114.7 m^3) of asphalt/soil material in five rolloff containers (Photograph 4-8). Following the second excavation episode at the drainage ditch, confirmatory soil samples were collected from the centerline of the ditch (see Sampling Data Collection, below). The drainage ditch was backfilled, compacted, and paved to match the surrounding areas (Photograph 4-9).

4.3.5.2 Non-sampling Data Collection

The sump is constructed of KingWare, a ceramic material which is resistant to battery acid whereas concrete is not. The inside diameter of the sump is 18.5 inches (50 cm). The outlet from the sump to the sanitary sewer system is 13.5 inches (34.3 cm) above the sump floor. These dimensions provide a sump cavity of 15.7 gallons (60 l) volume for solids collection. Overflow enters the sanitary sewer system and receives treatment at the Main Post STP (Kearney, 1988). To ensure that use was discontinued in 1986, concrete was used to block the inlet to the sump from the battery maintenance area.There was no non-sampling data associated with the excavation of the concrete apron or the drainage ditch.

4.3.5.3 Sampling Data Collection

Samples of solid and liquid environmental media were collected at SWMU's 14 and 15 during removal of materials identified in previous investigations as containing the contaminant of concern, which was lead from batteries. Samples were analyzed using EPA-approved methods and the analytical results are presented in Section 4.3.5.5, Results and Conclusions, below. A map of the sample locations appears herein as Figure 4-2 (Radian, 1997).

Samples of the Building 1776 solids-separation sump contents were sampled in April 1997, as shown in Figure 4-2 (Radian, 1997). All of the liquid and sludge was removed from the sump and collected in separate drums. Both media were sampled by grab method and analyzed to determine the appropriate disposal method. The samples were analyzed for total RCRA metals, VOCs, SVOCs, herbicides, PCBs, pesticides, TPH, corrosivity, flashpoint, and pH. A TCLP analysis of the sludge was performed in addition to help in determining the final disposal option (Radian, 1997).

Sampling of the concrete apron and the underlying soil was performed with a core drill on April 24, 1997. The concrete apron was demolished with a backhoe mounted pneumatic chisel (see Photographs 4-5 and 4-6). A composite sample was taken from the exposed soil following the concrete removal to determine whether the contaminant of concern was detectable. All three of the samples, the concrete core and the two soil composite samples, were analyzed for total lead concentration and the results are presented in Section 4.3.5.5, Results and Conclusions, below.

Following excavation of the drainage ditch sediment, and the subsoil to a depth of 6 inches (15.24 cm) where no asphalt lining existed, eight confirmatory soil samples, including one duplicate sample, were collected as grab samples. Upon receipt of the results that indicated the presence of the contaminant of concern, additional excavation removed asphalt and soil to a depth of 18 inches (0.45 m). For the purpose of confirming the effectiveness of the remedial excavation of asphalt and soil, five soil samples were collected from the centerline of the ditch and analyzed for total lead. The sample locations are delineated in Figure 4-2. Laboratory results are presented in Section 4.3.5.5, Results and Conclusions, below.

4.3.5.4 Data Gaps

Sampling data was collected by Radian International for the closeout investigation of the used battery accumulation areas. There were no data gaps identified in this report (Radian, 1997).

4.3.5.5 Results and Conclusions

Following the field effort to remove contaminated materials, the results of analytical confirmation of the clean-up were compiled in a Close-Out Report (Radian, 1997). The following text and tables summarizes the results and conclusions of that field effort.

Lead, the contaminant of concern, was detected in both the liquid and sludge samples collected from the Kingware solids-separator sump (Photograph 4-4). Barium, chromium and mercury were also detected. Table 4-1 summarizes the results of the results of the analyses run for total RCRA metals in the waste removed from the solids separator. Total petroleum hydrocarbons in the diesel range, but not the gasoline range were detected in both the liquid and the sludge (see Table 4-2). Of the organic compounds analyzed for (see Table 4-3), only 25 parts per billion Di-n-butylphthalate and 3.6 parts per million Bis (2-ethylhexyl) phthalate, both plasticizers and common laboratory contaminants, were detected in the liquid and sludge sample, respectively. Table 4-3 lists the method detection limits for the other organic compounds that were not detected in the liquid and solid waste contained in the sump. A view of the cleaned sump is depicted in Photograph 4-4.

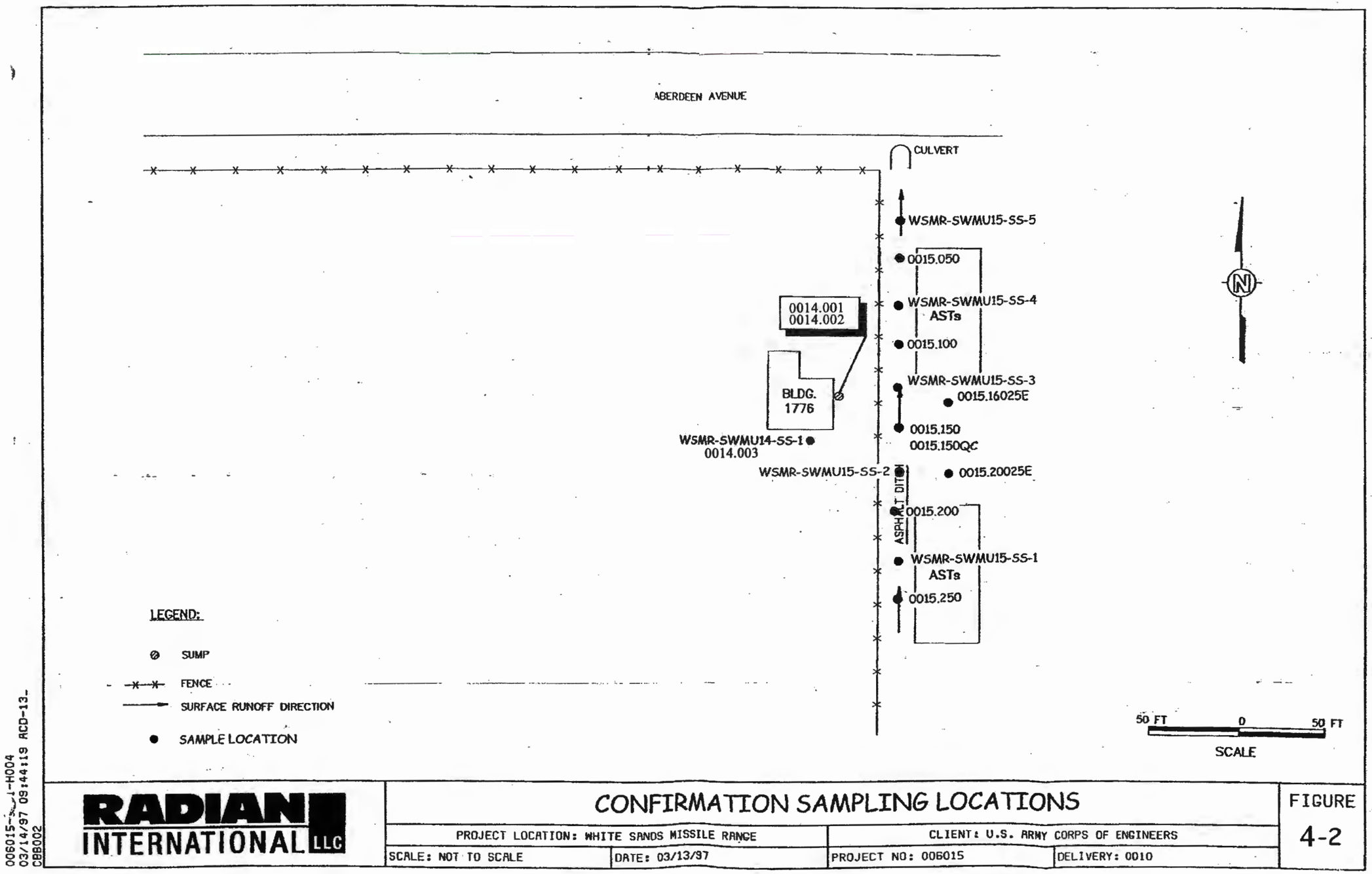

Figure 4-2. Confirmation Sampling Locations.

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Photograph 4-5.
View towards the northeast following removal of the Building 1776 concrete apron in May 1997. Pile of asphalt from drainage ditch excavation visible in right middle ground.

Photograph 4-6.
View looking east during the reconstruction of Building 1776 concrete apron in June 1997.

Table 4-1. Summary of RCRA Metals Results for Waste Analyses for Samples Collected on April 22, 1997 from the Building 1776 Solids-Separator Sump.

Sample Attributes			RCRA Metals (EPA Method 6010/7471)							
Sample ID# (Figure 4-2)	Matrix	Sample Depth	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
0014.001	Liquid (mg/l)	In sump	ND (0.010)	ND (0.05)	0.072	ND (0.010)	ND (0.020)	ND (0.0010)	0.5	ND (0.050)
0014.002	Sediment (mg/kg)	In sump	ND (5.0)	ND (10) UJ	45	ND (5.0)	2.3	0.13	22,000	ND (10)

ND – non detect
UJ – Not detected; Quantitation limit may be inaccurate or imprecise
mg/kg – Milligrams per kilogram
mg/l – Milligrams per liter

Table 4-2. Results of TPH Analysis for Samples of Sludge and Liquid Samples from the Building 1776 Sump, Collected on April 22, 1997.

Sample Attributes		Total Petroleum Hydrocarbons	
Sample ID# (Figure 4-2)	Matrix	EPA method 8015 gasoline-range organics	EPA method 8015 diesel-range organics
0014.001	liquid (mg/l)	ND (1.0) UJ	150 J
0014.002	sediment (mg/kg)	ND (10) UJ	240 J

ND – non detect
UJ – Not detected; Quantitation limit may be inaccurate or imprecise
J - Estimated
mg/kg – Milligrams per kilogram
mg/l – Milligrams per liter

Table 4-3. Summary of Organic Compounds Analysed in Waste Samples from the Building 1776 Solids-Separator Sump

Analyte	Sample Date	Sample Depth	Sediment Sample (ID# 0014.002) (mg/kg)	Aqueous Sample (ID# 0014.001) (mg/L)
SEMIVOLATILES by EPA Method 8270				
1,2,4,5-Tetrachlorobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
1,2,4-Trichlorobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
1,2-Dichlorobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
1,2-Diphenyl Hydrazine	4/22/97	sump	ND (0.33)	ND (0.010)
1,3,5-Trinitrobenzene (SV)	4/22/97	sump	ND (0.33)	ND (0.010)
1,3-Dichlorobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
1,3-Dinitrobenzene (SV)	4/22/97	sump	ND (0.33)	ND (0.010)
1,4-Benzenediamine (p-Phenylenediamine)	4/22/97	sump	ND (0.33)	ND (0.010)
1,4-Dichlorobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
1,4-Naphthoquinone	4/22/97	sump	ND (0.33)	ND (0.010)
1-Naphthylamine	4/22/97	sump	ND (0.33)	ND (0.010)
2,3,4,6-Tetrachlorophenol	4/22/97	sump	ND (0.33)	ND (0.010)
2,4,5-Trichlorophenol	4/22/97	sump	ND (0.33)	ND (0.010)
2,4,6-Trichlorophenol	4/22/97	sump	ND (0.33)	ND (0.010)
2,4-Dichlorophenol	4/22/97	sump	ND (0.33)	ND (0.010)
2,4-Dimethylphenol	4/22/97	sump	ND (0.33)	ND (0.010)

Analyte	Sample Date	Sample Depth	Sediment Sample (ID# 0014.002) (mg/kg)	Aqueous Sample (ID# 0014.001) (mg/L)
2,4-Dinitrophenol	4/22/97	sump	ND (0.33)	ND (0.010)
2,4-Dinitrotoluene	4/22/97	sump	ND (0.33)	ND (0.010)
2,6-Dichlorophenol	4/22/97	sump	ND (0.33)	ND (0.010)
2,6-Dimethylphenol	4/22/97	sump	ND (0.33)	ND (0.010)
2,6-Dinitrotoluene	4/22/97	sump	ND (0.33)	ND (0.010)
2-Acetylaminofluorene	4/22/97	sump	ND (0.33)	ND (0.010)
2-Chloronaphthalene	4/22/97	sump	ND (0.33)	ND (0.010)
2-Chlorophenol	4/22/97	sump	ND (0.33)	ND (0.010)
2-Methoxyethanol	4/22/97	sump	ND (0.33)	ND (0.010)
2-methyl-benzeneamine (o-Toluidine)	4/22/97	sump	ND (0.33)	ND (0.010)
2-Methylnaphthalene	4/22/97	sump	ND (0.33)	ND (0.010)
2-Naphthylamine	4/22/97	sump	ND (0.33)	ND (0.010)
2-Nitroaniline	4/22/97	sump	ND (0.33)	ND (0.010)
2-Nitrophenol	4/22/97	sump	ND (0.33)	ND (0.010)
3,3-Dichlorobenzidine	4/22/97	sump	ND (0.33)	ND (0.010)
3,3'-Dimethylbenzidine	4/22/97	sump	ND (0.33)	ND (0.010)
3-Methylcholanthrene	4/22/97	sump	ND (0.33)	ND (0.010)
3-Nitroaniline	4/22/97	sump	ND (0.33)	ND (0.010)
4,6-Dinitro-2-methylphenol	4/22/97	sump	ND (0.33)	ND (0.010)
4-Aminobiphenyl	4/22/97	sump	ND (0.33)	ND (0.010)
4-Bromophenyl-phenylether	4/22/97	sump	ND (0.33)	ND (0.010)
4-Chloro-3-methylphenol	4/22/97	sump	ND (0.33)	ND (0.010)
4-Chloroaniline	4/22/97	sump	ND (0.33)	ND (0.010)
4-Chlorophenyl-phenylether	4/22/97	sump	ND (0.33)	ND (0.010)
4-Nitroaniline	4/22/97	sump	ND (0.33)	ND (0.010)
4-Nitrophenol	4/22/97	sump	ND (0.33)	ND (0.010)
4-Nitroquinolin-1-oxide	4/22/97	sump	ND (0.33)	ND (0.010)
5-(2-propenyl)-1,3-Benzodioxole (Safrole)	4/22/97	sump	ND (0.33)	ND (0.010)
5-nitro-o-toluidine	4/22/97	sump	ND (0.33)	ND (0.010)
7,12-Dimethylbenz(a)anthracene	4/22/97	sump	ND (0.33)	ND (0.010)
Acenaphthene	4/22/97	sump	ND (0.33)	ND (0.010)
Acenaphthylene	4/22/97	sump	ND (0.33)	ND (0.010)
Acetophenone	4/22/97	sump	ND (0.33)	ND (0.010)
a,a-Dimethylphenethylamine	4/22/97	sump	ND (0.33)	ND (0.010)
Aniline	4/22/97	sump	ND (0.33)	ND (0.010)
Anthracene	4/22/97	sump	ND (0.33)	ND (0.010)
Benzidine	4/22/97	sump	ND (0.33)	ND (0.010)
Benzo(a)anthracene	4/22/97	sump	ND (0.33)	ND (0.010)
Benzo(a)pyrene	4/22/97	sump	ND (0.33)	ND (0.010)
Benzo(b)fluoranthene	4/22/97	sump	ND (0.33)	ND (0.010)
Benzo(g,h,i)perylene	4/22/97	sump	ND (0.33)	ND (0.010)
Benzo(k)fluoranthene	4/22/97	sump	ND (0.33)	ND (0.010)
Benzoic acid	4/22/97	sump	ND (0.33)	ND (0.010)
Benzyl alcohol	4/22/97	sump	ND (0.33)	ND (0.010)
Bis(2-chloro-1-methylethyl) Ether	4/22/97	sump	ND (0.33)	ND (0.010)
bis (2-chloroethoxy) methane	4/22/97	sump	ND (0.33)	ND (0.010)
bis (2-chloroethyl) ether	4/22/97	sump	ND (0.33)	ND (0.010)
bis (2-chloroisopropyl) ether	4/22/97	sump	ND (0.33)	ND (0.010)
Bis (2-ethylhexyl) phthalate	4/22/97	sump	3.6	ND (0.010)
Butylbenzylphthalate	4/22/97	sump	ND (0.33)	ND (0.010)
Chlorobenzilate	4/22/97	sump	ND (0.33)	ND (0.010)
Chrysene	4/22/97	sump	ND (0.33)	ND (0.010)
Cresol, ortho (2-Methylphenol)	4/22/97	sump	ND (0.33)	ND (0.010)
Cresols, meta & para, total	4/22/97	sump	ND (0.33)	ND (0.010)
Di-n-butylphthalate	4/22/97	sump	ND (0.33)	0.025
Di-n-octylphthalate	4/22/97	sump	ND (0.33)	ND (0.010)

Analyte	Sample Date	Sample Depth	Sediment Sample (ID# 0014.002) (mg/kg)	Aqueous Sample (ID# 0014.001) (mg/L)
Dibenzo(a,h)anthracene	4/22/97	sump	ND (0.33)	ND (0.010)
Dibenzofuran	4/22/97	sump	ND (0.33)	ND (0.010)
Diethylphthalate	4/22/97	sump	ND (0.33)	ND (0.010)
Dimethoate	4/22/97	sump	ND (0.33)	ND (0.010)
Dimethylphthalate	4/22/97	sump	ND (0.33)	ND (0.010)
Diphenylamine	4/22/97	sump	ND (0.33)	ND (0.010)
Ethyl methanesulfonate	4/22/97	sump	ND (0.33)	ND (0.010)
Fluoranthene	4/22/97	sump	ND (0.33)	ND (0.010)
Fluorene	4/22/97	sump	ND (0.33)	ND (0.010)
Hexachlorobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
Hexachlorobutadiene	4/22/97	sump	ND (0.33)	ND (0.010)
Hexachlorocyclopentadiene	4/22/97	sump	ND (0.33)	ND (0.010)
Hexachloroethane	4/22/97	sump	ND (0.33)	ND (0.010)
Indeno(1,2,3-cd)pyrene	4/22/97	sump	ND (0.33)	ND (0.010)
Isodrin	4/22/97	sump	ND (0.33)	ND (0.010)
Isophorone	4/22/97	sump	ND (0.33)	ND (0.010)
Isosafrole	4/22/97	sump	ND (0.33)	ND (0.010)
Methapyrilene	4/22/97	sump	ND (0.33)	ND (0.010)
Methyl methanesulfonate	4/22/97	sump	ND (0.33)	ND (0.010)
n-Nitroso-di-n-butylamine	4/22/97	sump	ND (0.33)	ND (0.010)
n-Nitrosodi-n-propylamine	4/22/97	sump	ND (0.33)	ND (0.010)
n-Nitrosodiethylamine	4/22/97	sump	ND (0.33)	ND (0.010)
n-Nitrosodimethylamine	4/22/97	sump	ND (0.33)	ND (0.010)
n-Nitrosodiphenylamine	4/22/97	sump	ND (0.33)	ND (0.010)
n-Nitrosomethyethylamine	4/22/97	sump	ND (0.33)	ND (0.010)
n-Nitrosopiperidine	4/22/97	sump	ND (0.33)	ND (0.010)
n-Nitrosopyrolidine	4/22/97	sump	ND (0.33)	ND (0.010)
Naphthalene	4/22/97	sump	ND (0.33)	ND (0.010)
Nitrobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
o,o,o-Triehtyl Phosphorothioate	4/22/97	sump	ND (0.33)	ND (0.010)
p-Dimethylaminoazobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
Pentachlorobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
Pentachloronitrobenzene	4/22/97	sump	ND (0.33)	ND (0.010)
Pentachlorophenol	4/22/97	sump	ND (0.33)	ND (0.010)
Phenacetin	4/22/97	sump	ND (0.33)	ND (0.010)
Phenanthrene	4/22/97	sump	ND (0.33)	ND (0.010)
Phenol	4/22/97	sump	ND (0.33)	ND (0.010)
Pyrene	4/22/97	sump	ND (0.33)	ND (0.010)
Pyridine	4/22/97	sump	ND (0.33)	ND (0.010)
VOLATILES by EPA Method 8260				
1,1,1,2-Tetrachloroethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,1,1-Trichloroethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,1,2,2-Tetrachloroethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,1,2-Trichloroethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,1-Dichloroethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,1-Dichloroethene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,2,3-Trichlorobenzene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,2-Dibromo-3-chloropropane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,2-Dibromoethane (EDB)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,2-Dichloroethane (EDC)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
1,2-Dichloropropane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
2-hexanone	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Acetone	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Acrylonitrile	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Benzene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Bromochloromethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ

Analyte	Sample Date	Sample Depth	Sediment Sample (ID# 0014.002) (mg/kg)	Aqueous Sample (ID# 0014.001) (mg/L)
Bromodichloromethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Bromoform	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Bromomethane (methyl bromide)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Carbon Disulfide	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Carbon Tetrachloride	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Chlorobenzene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Chloroethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Chloroform	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Chloromethane (methyl chloride)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
cis-1,2-dichloroethene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
cis-1,3-Dichloropropene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Dibromochloromethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Dibromomethane (methylene bromide)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Dichloromethane (methylene chloride)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Ethylbenzene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Iodomethane (methyl iodide)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Methyl Ethyl Ketone	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Methyl Isobutyl Ketone (4-me-2-pentanone)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Styrene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Tetrachloroethene (PCE)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Toluene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
trans-1,2-Dichloroethene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
trans-1,3-Dichloropropene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
trans 1,4-Dichloro-2-butene	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Trichloroethene (TCE)	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Trichlorofluoromethane	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Vinyl Acetate	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Vinyl Chloride	4/22/97	sump	ND (0.50)	ND (0.0050) UJ
Xylenes, Total	4/22/97	sump	ND (1.0)	ND (0.0100) UJ
PESTICIDES by EPA Method 8081				
4,4'-DDD	4/22/97	sump	ND (0.010)	ND (0.10)
4,4'-DDE	4/22/97	sump	ND (0.010)	ND (0.10)
4,4'-DDT	4/22/97	sump	ND (0.010)	ND (0.10)
Aldrin	4/22/97	sump	ND (0.010)	ND (0.10)
alpha-BHC	4/22/97	sump	ND (0.010)	ND (0.10)
beta-BHC	4/22/97	sump	ND (0.010)	ND (0.10)
Chlordane	4/22/97	sump	ND (0.050)	ND (0.50)
delta-BHC	4/22/97	sump	ND (0.010)	ND (0.10)
Dieldrin	4/22/97	sump	ND (0.010)	ND (0.10)
Endosulfan I	4/22/97	sump	ND (0.010)	ND (0.10)
Endosulfan II	4/22/97	sump	ND (0.010)	ND (0.10)
Endosulfan sulfate	4/22/97	sump	ND (0.010)	ND (0.10)
Endrin	4/22/97	sump	ND (0.010)	ND (0.10)
Endrin aldehyde	4/22/97	sump	ND (0.010)	ND (0.10)
gamma-BHC (Lindane)	4/22/97	sump	ND (0.010)	ND (0.10)
Heptachlor	4/22/97	sump	ND (0.010)	ND (0.10)
Heptachlor Epoxide	4/22/97	sump	ND (0.010)	ND (0.10)
Methoxychlor	4/22/97	sump	ND (0.010)	ND (0.10)
Toxaphene	4/22/97	sump	ND (0.050)	ND (0.50)
HERBIDS by EPA Method 8151				
2,4,5-T	4/22/97	sump	ND (0.010) UJ	ND (0.0010)
2,4-DB	4/22/97	sump	ND (0.010)	ND (0.0010)
2,4-Dichlorophenoxyacetic acid (2,4-D)	4/22/97	sump	ND (0.010)	ND (0.0010)
2-(2,4,5-Trichlorophenoxy)propionic acid	4/22/97	sump	ND (0.010)	ND (0.0010)
2-methyl-4-chlorophenoxyacetic acid (MCPA)	4/22/97	sump	ND (0.10)	ND (0.010)
2-methyl-4-chlorophenoxypropionic acid	4/22/97	sump	ND (0.10)	ND (0.010)

Analyte	Sample Date	Sample Depth	Sediment Sample (ID# 0014.002) (mg/kg)	Aqueous Sample (ID# 0014.001) (mg/L)
(MCPP)				
Acifluorfen	4/22/97	sump	ND (0.010)	ND (0.0010)
Bentazon	4/22/97	sump	ND (0.010)	ND (0.0010)
Bromoxynil	4/22/97	sump	ND (0.010)	ND (0.0010)
Chloramben	4/22/97	sump	ND (0.010)	ND (0.0010)
Dacthal	4/22/97	sump	ND (0.010)	ND (0.0010)
Dalapon	4/22/97	sump	ND (0.010)	ND (0.0010)
Dicamba	4/22/97	sump	ND (0.010) UJ	ND (0.0010) UJ
Dichloroprop	4/22/97	sump	ND (0.010)	ND (0.0010)
Dinoseb	4/22/97	sump	ND (0.010)	ND (0.0010)
Picloram	4/22/97	sump	ND (0.010)	ND (0.0010)
PCBs by EPA Method 8081				
Polychlorobiphenyl 1016	4/22/97	sump	ND (0.050)	ND (0.50)
Polychlorobiphenyl 1221	4/22/97	sump	ND (0.050)	ND (0.50)
Polychlorobiphenyl 1232	4/22/97	sump	ND (0.050)	ND (0.50)
Polychlorobiphenyl 1242	4/22/97	sump	ND (0.050)	ND (0.50)
Polychlorobiphenyl 1248	4/22/97	sump	ND (0.050)	ND (0.50)
Polychlorobiphenyl 1254	4/22/97	sump	ND (0.050)	ND (0.50)
Polychlorobiphenyl 1260	4/22/97	sump	ND (0.050)	ND (0.50)

ND – non detect
UJ – Not detected; Quantitation limit may be inaccurate or imprecise
mg/kg – Milligrams per kilogram
mg/l – Milligrams per liter

The concrete apron on the south side of building 1776 was demolished and a composite soil sample was taken (Photograph 4-5). Lead was detected in both the concrete core cut from the Building 1776 apron and the soil immediately beneath the apron. Lead concentrations did not exceed the NMED residential SSL of 400 mg/kg (NMED, 2000), as shown in Table 4-4. Following demolition and removal of the entire concrete apron, a composite sample of soil from beneath the apron resulted in a lead detection of 4.7 mg/kg (Table 4-4).

Table 4-4. Summary of the Analytical Results of Sampling for Lead at the Building 1996 (SWMU 14) Concrete Apron

Sample Attributes				Total Lead by EPA Method 6010
Sample ID# (Figure 4-2)	Sample Date	Matrix	Sample Depth (ft)	Pb (mg/kg)
0014.003	4/24/97	concrete	0 - 0.25	24
0014.003	4/24/97	soil	0.5 – 0.75	36
SWMU14-ss-1	6/2/97	soil	surface composite	4.7

mg/kg – milligrams per kilogram

As summarized above, sediment down-slope from the Battery Shop was excavated in two episodes because the contaminant of concern was detected in confirmation samples following the first episode. Total lead concentrations approached a maximum of 170 mg/kg in the 8 confirmation samples collected from the storm water drainage ditch (Table 4-5). The locations of the sampling sites are indicated on Figure 4-2.

Table 4-5. Summary of the Analytical Results of Confirmatory Sampling for Lead at the Building 1996 (SWMU 14 and 15) Storm-Water Drainage Ditch

Sample Attributes				Total Lead by EPA Method 6010
Sample ID# (Figure 4-2)	Sample Date	Matrix	Sample Depth (ft)	Pb (mg/kg)
0015.050	4/22/97	soil	0.5	83
0015.100	4/22/97	soil	0.5	100
0015.150	4/22/97	soil	0.5	100 J
0015.150 QC	4/22/97	soil	0.5	170 J
0015.200	4/22/97	soil	0.5	110
0015.250	4/22/97	soil	0.5	130
0015.20025E	4/22/97	soil	0.5	150
0015.16025E	4/22/97	soil	0.5	96
SWMU15-ss-1	6/4/97	soil	1.5	6.7
SWMU15-ss-2	6/4/97	soil	1.5	7.2
SWMU15-ss-3	6/4/97	soil	1.5	12
SWMU15-ss-4	6/4/97	soil	1.5	25
SWMU15-ss-5	6/4/97	soil	1.5	4.7

mg/kg – milligrams per kilogram
J – Analyte present. Reported value may not be accurate or precise

Although the confirmation samples from the first episode of excavation did not exceed the current screening action levels in 1997, there was concern that lead was elevated above background concentrations. The effectiveness of the second excavation episode was gauged with 5 confirmatory soil samples. These samples were again analyzed for total lead concentrations, which ranged from 4.7mg/kg to 25 mg/kg (Table 4-5).

Contractors concluded in the Close-Out Report that the sampling showed that the lead contamination released at SWMUs 14 and 15 was abated (Radian, 1997). White Sands has since plugged the floor drain where batteries used to drain with concrete, and has installed a self-contained battery-recycling unit in Building 1776.

4.4 Site Conceptual Model

The asphalt paving that covers the Maintenance Area has prevented the vertical migration of metal contaminants (namely lead) from the site. Sediment accumulations deposited on the asphalt paving by storm-water runoff was documented by analytical evidence acquired during the RFIs. The drainage immediately downslope from SWMUs 14 and 15 was therefore the target of efforts to remove sediments contaminated with lead. The Main Post is situated on the distal portion of the alluvial fan complex eroded from the Organ Mountains to the west. As a result, the slope across the site causes storm water to runoff to the east towards the center of the Tularosa Basin. Coincidentally, the prevailing wind direction is from the west and southwest. Wind and water currents winnow fine-grained particles and disperse them eastward, while coarser (and very dense) material remains behind as sediment. The nature of the site combined with lead being the contaminant of concern would suggest this very simple conceptual site model. Based on acceptance of the site model, White Sands concluded that excavation of surface sediment, paving, and the upper soil layers would be an effective remedial approach to address the lead contamination problem.

4.4.1 Nature and Extent of Contamination

Chemical analyses of sediment and sludge from the SWMU 14 and 15 site confirm that lead was released from the handling of used lead-acid batteries. Due in large part to the density of lead (atomic mass of 207.2), free lead released at the site tends to settle out rapidly wherever storm water runoff velocity decreases. This physical property of lead would theoretically concentrate free lead in sediment deposits in the local storm water runoff channels. The RFI preferentially sampled this sediment for metals content. Chemical analysis of the sediment samples has shown that lead has not concentrated in excess of the appropriate screening action levels protective of human health and the environment. Neither groundwater nor surface water quality standards are jeopardized based on the amount of lead detected at the site.

4.4.2 Environmental Fate

The previous investigations demonstrate that metals concentrations at the SWMUs are near and below the appropriate screening action levels for a residential scenario. It is unlikely that metals will migrate from the paved and fenced maintenance area and concentrate to levels exceeding the residential SSLs. Therefore, it is presumed that the metals will be persistent, but in the absence of a continuing contaminant source, they will remain at concentrations below the screening action levels. Use of the Battery Shop drains for liquid battery waste disposal was discontinued in 1986, eliminating the source of environmental contaminants to the sump.

4.5 Site Assessments

4.5.1 Screening Assessments

Human and ecological screening assessments appear in the White Sands RFI (see Section 4.4) (IT Corp, 1992; Sverdrup, 1994). The sampling analyses indicate that the risk-based screening action levels established by state and federal regulatory agencies were slightly exceeded for lead exposure in residential scenarios. However, the lead concentrations in sediment at the site were well below industrial screening action levels. The site is located in an industrial setting that is surrounded by a fence.

4.5.2 Risk Assessments

A formal human and/or ecological risk assessment has not been completed for SWMUs 14 and 15 because the sludge that exceeded screening action levels was removed from the site (see Section 4.3.5).

4.5.3 Other Applicable Assessments

A screening assessment for soil erosion potential at the site was conducted according to the procedure developed by the NMED Surface Water Quality Bureau. A copy of the completed assessment worksheet is presented in Appendix C. The erosion potential survey found that the risk of contaminant migration with stormwater is low (the site scored 46.6 on a scale of 100).

4.6 No Further Action Proposal

On the basis of the results of previous investigations, application is hereby made to perform a Class III modification to remove SWMUs 14 and 15 from the White Sands Missile Range Part B permit HSWA module (Permit #NM2750211235, Module VIII), in accordance with 40 CFR 264.514 and 270.42, and 20 NMAC 4.1.

4.6.1 Rationale

The results of previous investigations at the Used Battery Accumulation Areas indicate that the environmental effects of SWMUs 14 and 15 do not pose a threat to human health or the environment, nor affect the projected land use. Corrective action has been performed to remove the remaining contaminant source from the sump in the drain line, as determined by the RCRA investigations.

4.6.2 Criterion

Based on the results of the RFI sampling, it was concluded that a release of constituents hazardous to human health or the environment in concentrations exceeding NMED SSLs had occurred from the Battery Shop. However, the identified contaminant source and affected soils were removed in April and June 1997. Criterion 5 (see Appendix A) of the NMED-HRMB Standard Operating Procedures Manual, Volume 1, Section II.B.4.a.(4).(b)., is applicable (NMED, 1998). The SWMU was "remediated in accordance with current applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use."

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5.0 SWMU 21; MAIN POST FIRE FIGHTING TRAINING AREA

5.1 Summary

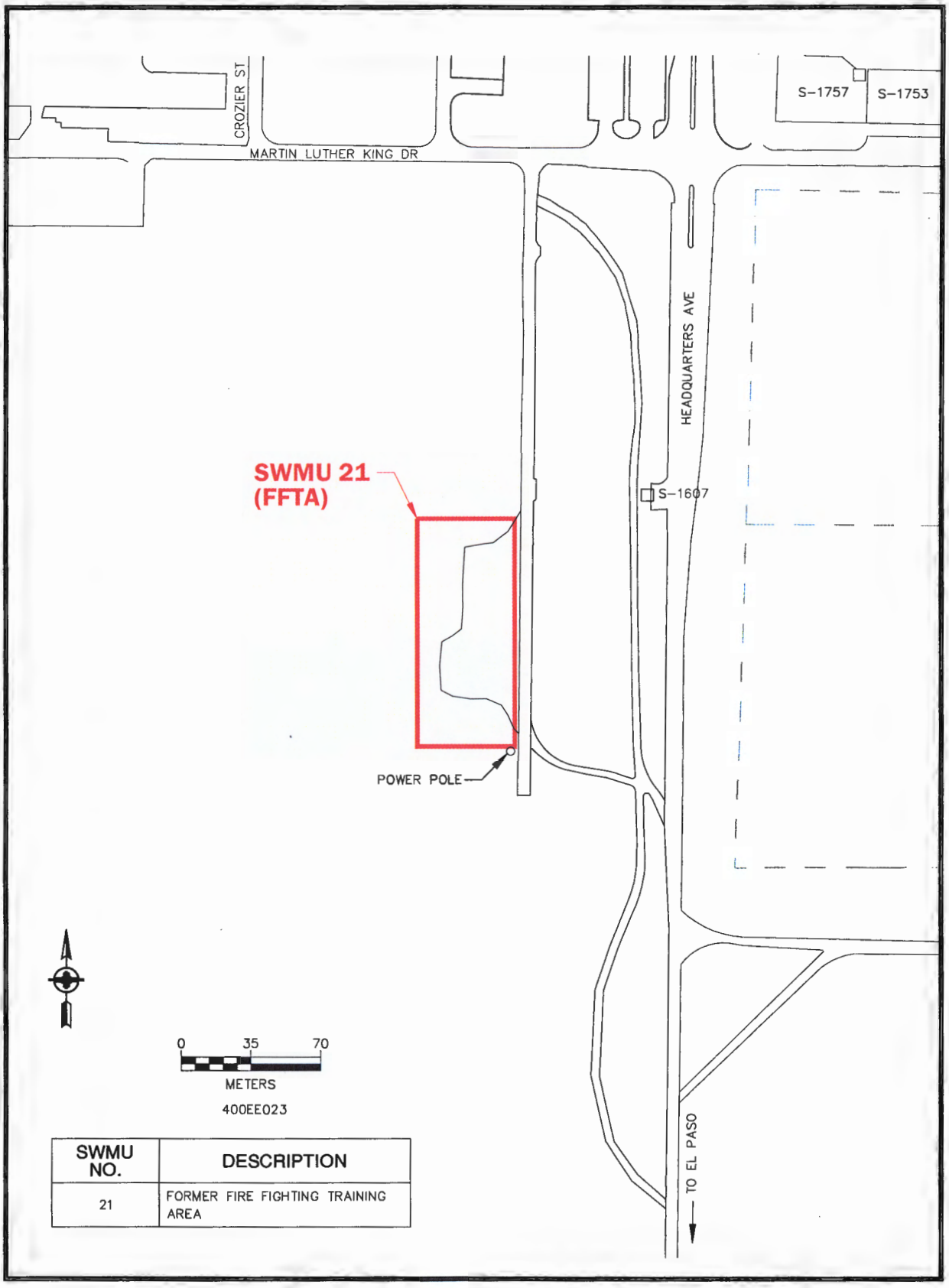
Training for the White Sands Missile Range fire department involved the release and ignition of petroleum-based fuels. One specific area south of the Main Post was dedicated to this purpose. Although the fuels were released to the ground, the site has been investigated during both phases of the RFI. Excavation of the site soils was conducted in 1996 to obtain confirmation samples from the shallow subsurface. Sample analysis confirmed that site contaminants were below the appropriate screening action levels.

5.2 Description and Operational History

5.2.1 Site Description

The Former Fire Fighting Training Area (FFTA) is located immediately south of the White Sands Main Post (Figure 5-1 on the following page). During its operation from the early 1960's until 1982, petroleum-based fuels were ignited to simulate fire emergencies. The site is located approximately 250 feet (75 m) south of Martin Luther King Boulevard (formerly Raritan Avenue), near the intersection with Headquarters Avenue. The FFTA site occupies an area approximately 120 feet by 30 feet (3.5 x 9 m). The current appearance of the SWMU site is shown in Photograph 5-1.

Photograph 5-1. Current view of the Former Fire Fighting Training Area looking south. Power pole at right corresponds to that shown in Figure 5-1.



SWMU NO.	DESCRIPTION
21	FORMER FIRE FIGHTING TRAINING AREA

Figure 5-1. Site plan of SWMU 21.

Present at the site during the RFA in 1988 were two storage tanks mounted on a cradle for the storage of fuels (Kearney, 1988). Two unlined pits were also present. These shallow pits measured 80 by 30 feet (24 x 9 m) and 10 by 10 feet (3 x 3 m) and were reportedly used for the burning fuel simulations, conducted approximately eight times per year.

5.2.2 Operational History

Fire-fighting training was conducted at the FFTA site over a period of approximately 20 years, although precise dates of the exercises were not recorded. Likewise, the volumes of fuels discharges were unrecorded. However, diesel, JP-4, gasoline, and waste oil were at various times burned in the open pits at the site (Kearney, 1988). Training crews extinguished the flames using conventional methods. The site was closed in 1982 and has not been used for any purpose since.

5.3 Previous Investigations

5.3.1 Summary

Four investigations were conducted under RCRA at the FFTA. The SWMU was researched in the White Sands RFA (Kearney, 1988). It was investigated during the Phase I (IT Corp, 1992) and Phase II (Sverdrup Environmental, 1994) RFI. Additional sampling of soils at SWMU 21 was conducted in 1996 and is summarized in a site closure report (DEI, 1997b).

5.3.2 Investigation #1: RCRA Facility Assessment

The RFA consisted of a search of White Sands' records of waste-related activity at SWMU 21 and a visual inspection of the site. The RFA report was issued in August 1988 (Kearney, 1988).

5.3.2.1 Non-sampling Data Collection

No records of historic contaminant releases were found. "Several heavily stained areas on the ground of greater than four feet in diameter" were noted in the report of the RFA (Kearney, 1988).

5.3.2.2 Sampling Data Collection

No environmental samples were taken during the RFA. The PR/VSI did not generate chemical data and no records of previous sampling activities or site assessments were found during the PR/VSI.

5.3.2.3 Results and Conclusions

The potential for the release of contaminants to soil/ground water was assumed to be "high" pending site characterization to determine the extent of the contamination (Kearney, 1988). The unit was placed in the HSWA corrective action module (Module VIII) of the White Sands RCRA Part B permit based on the RFA report findings.

5.3.3 Investigation #2: Phase I-RCRA Facility Investigation

The Phase I RFI was conducted to characterize potentially hazardous constituents released at the FFTA. Characterization of the site included chemical analysis of soil samples and a soil vapor survey. The results of the characterization indicate that further characterization during Phase II of the RFI was appropriate (IT Corp, 1992a).

5.3.3.1 Non-sampling Data Collection

Non-sampling data is not included in the report of the Phase I RFI.

5.3.3.2 Sampling Data Collection

The Phase I RFI sampling approach included a soil-vapor survey (SVS) targeting benzene, toluene, ethylbenzene, xylene (BTEX), methane, and carbon dioxide from a depth of 5-7 feet (1.5-2.1m) below grade. Six soil borings were also installed with samples collected from each boring at depths of 5, 10, 15, and 20 feet (1.5, 3, 4.5, and 6m). Additionally, eight near-surface soil samples were collected for analysis and comparison to one background sample. Soil samples were analyzed for VOCs, SVOCs, PCBs/pesticides, TPH, and total RCRA metals.

5.3.3.3 Data Gaps

No data gaps are identified.

5.3.3.4 Results and Conclusions

The SVS results indicated VOC "hot spots" where ethyl benzene, toluene, and xylene were detectable south of the fuel storage tanks (IT Corp, 1992a). Elevated CO_2 concentrations were noted in soil gas in the vicinity of the fuel storage tanks.

As predicted by observations of the soil staining, TPH were detected in all of the near-surface samples. The highest concentration of TPH was the 6,400 mg/kg result reported from a sample at 2 feet (60 cm) below ground surface. The RFI reported detectable TPH at depth in only one soil boring. Reported concentrations were 28 mg/kg and 19 mg/kg from the 5 foot (1.5 m) and 10 foot (3 m) samples from that borehole, respectively. A 1,000 mg/kg soil remediation level was established by the New Mexico Environmental Improvement Board (EIB) in 20 NMAC 9.1, Subpart VII.708 (NMED, 1995), for soils to be disposed of in a permitted landfill. Otherwise, standards for TPH concentration are not in place. Specific organic compounds were not detected in the either the VOC or SVOC analyses (IT Corp, 1992a).

Soil was contaminated with lead at three of the near-surface sampling locations. Concentrations of 3,000 mg/kg and 1,100 mg/kg lead were reported from the analysis of surface soil. A third lead detection from a sample collected at 1 foot (30 cm) below ground surface depth was 480 mg/kg. The NMED residential and industrial SSLs for lead are 400 mg/kg and 1,000 mg/kg, respectively (NMED, 2000)

Other RCRA metals were detected in the samples analyzed. Silver was reported at a maximum concentration of 2.7 mg/kg. Arsenic was reported at a maximum concentration of 2.1 mg/kg.

Barium was reported at a maximum concentration of 1,900 mg/kg. Cadmium was reported at a maximum concentration of 2.3 mg/kg. Chromium was reported at a maximum concentration of 20 mg/kg. All reported concentration were below the NMED residential SSLs (NMED, 2000). Detections of selenium and mercury were not reported from the analyses. The Phase I RFI concluded that further sampling during a Phase II RFI was appropriate for SWMU 21.

5.3.4 Investigation #3: Phase II-RCRA Facility Investigation

Revision 1 of the Phase II RFI report was issued December 12, 1994 (Sverdrup Environmental, 1994). Additional soil sampling around the FFTA (SWMU 21) site was conducted in order to characterize the nature and extent of the contaminants.

5.3.4.1 Non-sampling Data Collection

The RFI noted that some soil at the site was visibly stained. Sampling of the stained areas later revealed that there was a correlation to higher TPH and metals detections (Sverdrup Environmental, 1994) in these areas.

5.3.4.2 Sampling Data Collection

A total of ten surface soil samples collected from 10 hand auger soil borings and 21 soil samples collected from seven soil borings to a depth of 5 feet (1.5 m) were analyzed from SWMU 21. Hand auger samples were collected from a depth of 0 to 1 foot (0-30 cm). Borings were sampled at the 0 to 1 foot (0-30 cm), 2 to 3 foot (60-90 cm), and 4 to 5 foot (1.2-1.5 m) intervals. The soil samples were analyzed for VOCs, SVOCs, TPH, and the RCRA toxicity characteristic metals.

5.3.4.3 Data Gaps

Analyses of the soil samples were conducted to determine total contaminant concentrations according to the RFI work plan. No data gaps were identified.

5.3.4.4 Results and Conclusions

Ethyl benzene and xylene were detected in a surface sample at one of the soil boring locations. No other VOCs or SVOCs were detected in any other samples. Ethyl benzene was quantified at 9.41 µg/kg and total xylenes were detected at a concentration of 68.0 µg/kg. Both results were below the NMED residential SSLs of 68 mg/kg and 63 mg/kg for the respective compounds (NMED, 2000). Total petroleum hydrocarbons were detected in four samples collected from soil borings. Three of the TPH detections were from surface samples. The fourth was the 2- to 3- foot (60-90 cm) interval sample from a boring that also had TPH in the surface sample. Analysis of the 4 to 5 foot (1.2-1.5 m) depth sample from that same borehole did not detect TPH. A screening action level for TPH has not been established. However, one of the samples exceeded the 1,000 mg/kg TPH soil land disposal level established by the New Mexico Environmental Improvement Board (EIB) in 20 NMAC 9.1, Subpart VII.708 (NMED, 1995). Two soil samples taken from vertically below that sample did not contain detectable concentrations of TPH.

Results of analyses for the RCRA metals indicated that the respective screening action levels were not exceeded at the site (Sverdrup Environmental, 1994). Arsenic concentrated above the MDL was reported in data from six of the soil samples. The highest concentration of arsenic was 10.9 mg/kg, which exceeds the NMED residential SSL (3.9 mg/kg) but not the industrial SSL (17 mg/kg). Barium was detected in all but five of the samples analyzed. The highest concentration of barium quantified in the samples was 122 mg/kg, which is below the NMED residential SSL of 5,200 mg/kg. Similarly, lead was ubiquitous in the samples. The highest reported lead concentration is 84.0 mg/kg. This result was an outlier from the other lead data. The mean lead concentration from the results of the 31 analyses was 12.36 mg/kg. The NMED residential SSL for lead is 400 mg/kg. Ten of the samples contained detectable concentrations of mercury. The highest concentration reported was 0.0819 mg/kg mercury, which is below the NMED residential SSL of 23 mg/kg. Silver was detected in three of the 31 soil samples. The maximum concentration of silver in the analytical data was 36.7 mg/kg, compared to the NMED residential SSL of 380 mg/kg (Sverdrup Environmental, 1994; NMED, 2000). Three of the RCRA toxicity characteristic metals, cadmium, chromium, and selenium, were not detected at concentrations above their respective MDLs.

The Phase II RFI report concluded that the extent of contamination resulting from operations at FFTA (SWMU 21) is limited horizontally to the area around the storage tanks and vertically to the upper 1 foot (30 cm) of soil (Sverdrup Environmental, 1994).

5.3.5 Investigation #4: Contaminated Soil Removal

In late January 1996, a 50 by 50-foot (15 m) area of the SWMU 21 site was excavated to a 1-foot (30-cm) depth with a front-end loader (DEI, 1997b). The excavated soil was returned to the site following laboratory analysis of closure confirmation samples. The site was then graded and hydro-seeded.

5.3.5.1 Non-sampling Data Collection

White Sands employees reported that visibly contaminated soil had been excavated from the SWMU 21 site at the time of closure in 1982 (DEI, 1997b).

5.3.5.2 Sampling Data Collection

Six samples of soil collected from the floor of the excavation were analyzed for total RCRA toxicity characteristic metals, TPH, PCBs, and BTEX (DEI, 1997b). The location of the sampling sites is identified in Figure 5-2 on the following page.

5.3.5.3 Data Gaps

No data gaps are reported.

5.3.5.4 Results and Conclusion

The results of sample analyses are summarized in Tables 5-1, 5-2, and 5-3 on following page. None of the six confirmation samples were concentrated with TPH, PCBs, or BTEX above the MDLs. Of the three analyses, the test method for PCBs had a MDL (0.010 mg/kg) most closely

approaching the respective NMED residential SSL. Aroclor 1248 has residential SSL of 1.1 mg/kg (NMED, 2000).

Three RCRA metals were detected in each of the six samples (Table 5-1). Barium was measured at a maximum concentration of 47 mg/kg; chromium at a maximum concentration of 7.1 mg/kg; and lead at a maximum concentration of 5.9 mg/kg (DEI, 1997b). The respective NMED residential SSLs for barium and lead are 5,200 mg/kg and 400 mg/kg, respectively. The NMED SSLs list chromium, not as total chromium, but as the chromium 3^+ and chromium 6^+ valence states. The residential SSLs are 100,000 mg/kg and 230 mg/kg, respectively. The EPA Region 9 residential soil Preliminary Remediation Goal (PRG) for total chromium is 210 mg/kg (EPA, 1998). One sample contained mercury at a reported concentration of 0.46 mg/kg. The NMED residential SSL for mercury is 23 mg/kg.

Organic compounds were not defected in the samples by the laboratory (Tables 5-2 and 5-3). The close-out report concluded that remedial activities at the site are complete based on the confirmation sample results.

5.4 Site Conceptual Model

5.4.1 Nature and Extent of Contamination

The predominant contaminants at the FFTA were petroleum compounds which were intentionally set on fire. The volume of fuel left unburned following the training cycles cannot be determined. However, the results of the investigation at the site indicate that the fuels either did not migrate beyond the limits of excavation or that they are not persistent in the soil. Surface soil immediately affected by operations at the FFTA was removed from the site. Additional contaminated soil from SWMU 21 was excavated and placed at SWMU 22 (see Section 6). Soil sample analyses indicate that surface contamination did not penetrate below the excavation.

5.4.2 Environmental Fate

No source of contamination exists at the site. Previous releases of contaminants were remediated or were below screening action levels.

5.5 Site Assessments

5.5.1 Screening Assessments

Human and ecological screening assessments appear in the White Sands RFI (see Section 5.4) (IT Corp, 1992; Sverdrup, 1994). The sampling analyses indicate that the risk-based screening action levels established by state and federal regulatory agencies for industrial sites were not exceeded at SWMU 21.

DOW

Dow Environmental

SOIL SAMPLE LOG SHEET

☒ SURFACE SOIL
☐ SUBSURFACE SOIL
☐ SEDIMENT LAGOON/ POND
☐ OTHER _____

PAGE 1 OF 2
PROJECT NO. 6015
BY _____

PROJECT NAME WSMR
SAMPLE LOCATION SWMU #21

PROJECT NO. _____
SAMPLE I.D. _____

SAMPLE METHOD:

DEPTH SAMPLED:

SAMPLE DATE & TIME: 1/31/96

SAMPLED BY: Frank Lang

SIGNATURE(S): [illegible]

TYPE OF SAMPLE

☐ LOW CONCENTRATION
☐ HIGH CONCENTRATION
☒ GRAB (0.5) samples
☐ COMPOSITE
☒ GRAB + COMPOSITE R samples

COMPOSITE SAMPLE DATA

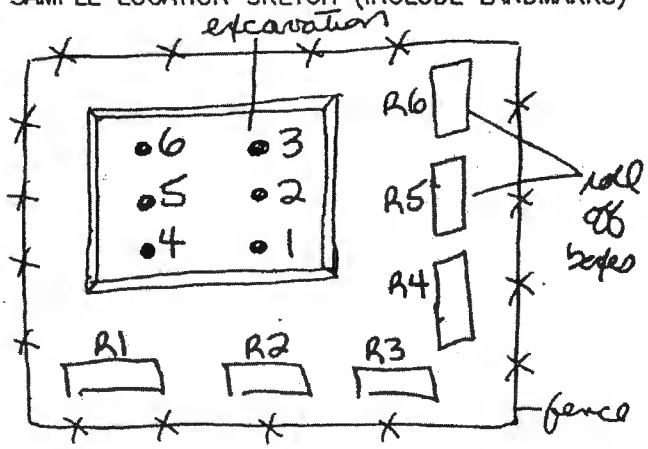
SAMPLE	TIME	DESCRIPTION
0021-R1	0940	
0021-R2	0850	
0021-R3	0855	
0021-R4	0900	
0021-R5	0905	
0021-R6	1000	
0021-01(0.5)	0910	
0021-02(0.5)	0915	
0021-03(0.5)	0920	
0021-04(0.5)	0925	
0021-05(0.5)	0930	
0021-06(0.5)	0935	

SAMPLE DATA

DESCRIPTION:(Color, Material, Water Content, Etc.)

NOTES:

SAMPLE LOCATION SKETCH (INCLUDE LANDMARKS)



ANALYSIS:

R samples - RIC
- TPH
- TCLP VOC
- TCLP SVOC
- TCLP pest
- PCB
- TCLP herb
- TCLP metals

(0.5) samples - TPH
- PCB
- BTEX
- Total metals

DATE SHIPPED	
TIME SHIPPED	
LAB	
VOLUME	

N

Figure 5-2. Log sheet showing relative sample locations (from DEI, 1997b).

Table 5-1. Summary of RCRA metals analytical results from the excavation of the FFTA on January 31, 1996

Sample Attributes			RCRA Metals by EPA Method 6010/7471 (mg/kg)							
Sample ID# (Figure 5-2)	Matrix	Sample Depth (ft)	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
0021-01	soil	0.5	ND (0.50)	ND (2.5)	47	ND (0.50)	7.1	0.46	4.7	ND (2.5)
0021-02	soil	0.5	ND (0.50)	ND (2.5)	42	ND (0.50)	6.6	ND (0.10)	4.6	ND (2.5)
0021-03	soil	0.5	ND (0.50)	ND (2.5)	42	ND (0.50)	5.8	ND (0.10)	4.3	ND (2.5)
0021-04	soil	0.5	ND (0.50)	ND (2.5)	42	ND (0.50)	5.4	ND (0.10)	4.3	ND (2.5)
0021-05	soil	0.5	ND (0.50)	ND (2.5)	36	ND (0.50)	5.7	ND (0.10)	4.4	ND (2.5)
0021-06	soil	0.5	ND (0.50)	ND (2.5)	43	ND (0.50)	6.3	ND (0.10)	5.9	ND (2.5)

ND – non detect
mg/kg – milligrams per kilogram

Table 5-2. Summary of BTEX and TPH results from the excavation of the FFTA on January 31, 1996

Sample Attributes			BTEX by EPA Method 8021 (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)	
Sample ID# (Figure 5-2)	Matrix	Sample Depth (ft)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	EPA Method 8015 gas-range org.	EPA Method 8015 diesel range org.
0021-01	soil	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10) UJ	ND (10)
0021-02	soil	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)
0021-03	soil	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10) UJ	ND (10)
0021-04	soil	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)
0021-05	soil	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)
0021-06	soil	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)

ND – non detect
mg/kg – milligrams per kilogram
UJ – Not detected. Quantitation limit may be inaccurate or imprecise

Table 5-3. Summary of PCB analytical results from the excavation of the FFTA on January 31, 1996

Sample Attributes			Polychlorinated Biphenyls by EPA Method 8081 (mg/kg)						
Sample ID# (Figure 5-2)	Matrix	Sample Depth (ft)	PCB 1016	PCB 1221	PCB 1232	PCB 1242	PCB 1248	PCB 1254	PCB 1260
0021-01	soil	0.5	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0021-02	soil	0.5	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0021-03	soil	0.5	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0021-04	soil	0.5	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0021-05	soil	0.5	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0021-06	soil	0.5	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)

ND – non detect
mg/kg – milligrams per kilogram

5.5.2 Risk Assessments

A formal human and/or ecological risk assessment has not been completed for SWMU 21 because the results of the screening analyses did not exceed action thresholds.

5.5.3 Other Applicable Assessments

A screening assessment for soil erosion potential at the site was conducted according to the procedure developed by the NMED Surface Water Quality Bureau. A copy of the completed assessment worksheet is presented in Appendix C. The erosion potential survey found that the risk of contaminant migration with stormwater is low (the site scored 20.8 on a scale of 100).

5.6 No Further Action Proposal

On the basis of the results of previous investigations, application is hereby made to perform a Class III modification to remove SWMU 21 from the White Sands Missile Range RCRA Part B permit HSWA module (Permit #NM2750211235, Module VIII), in accordance with 40 CFR 264.514 and 270.42, and 20 NMAC 4.1.

5.6.1 Rationale

The results of previous investigations at the SWMU 21 site indicate that the environmental effects of the FFTA do not pose a threat to human health or the environment, nor affect the projected land use. Corrective action has been performed to remove contaminant sources from the site, as determined by the RCRA investigations.

5.6.2 Criterion

Based on the results of the RFI sampling, it was concluded that a release of constituents hazardous to human health or the environment in concentrations exceeding NMED SSLs had occurred at SWMU 21. However, the identified contaminant source was removed in 1996. Criterion 5 (see Appendix A) of the NMED-HRMB Standard Operating Procedures Manual, Volume 1, Section II.B.4.a.(4).(b)., is applicable (NMED, 1998). The SWMU was "remediated in accordance with current applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use."

6.0 SWMU 22; ABANDONED PIT

6.1 Summary

Soil piles at this location near the FFTA contained petroleum hydrocarbons from an unconfirmed source likely to be the adjacent SWMU 21 (see Section 5.0). Analysis of the soil revealed heavy metals contamination associated with the hydrocarbons. Corrective measures were performed to remove the contaminant source. Confirmation samples support a clean closure of this SWMU.

6.2 Description and Operational History

6.2.1 Site Description

The Abandoned Pit was first addressed in the RFA (Kearney, 1988). The site is located approximately 350 feet (105 m) south of Martin Luther King Boulevard (formerly Raritan Avenue) and immediately west of Headquarters Avenue. The RFA identified the site as SWMU 22 because of its proximity to the Former Fire-Fighting Training Area (SWMU 21) and due to its petroleum-stained soil and gravel stockpiles (Kearney, 1988). The RFA gauged the pit dimensions at 25 by 50 feet (7.6 x 15.2 m), but did not give a depth, perhaps implying that the pit was shallow. Use of the pit was not recorded and it was only suspected to be associated with the FFTA because of its proximity. The location of the site is shown in Figure 6-1 on the following page.

6.2.2 Operational History

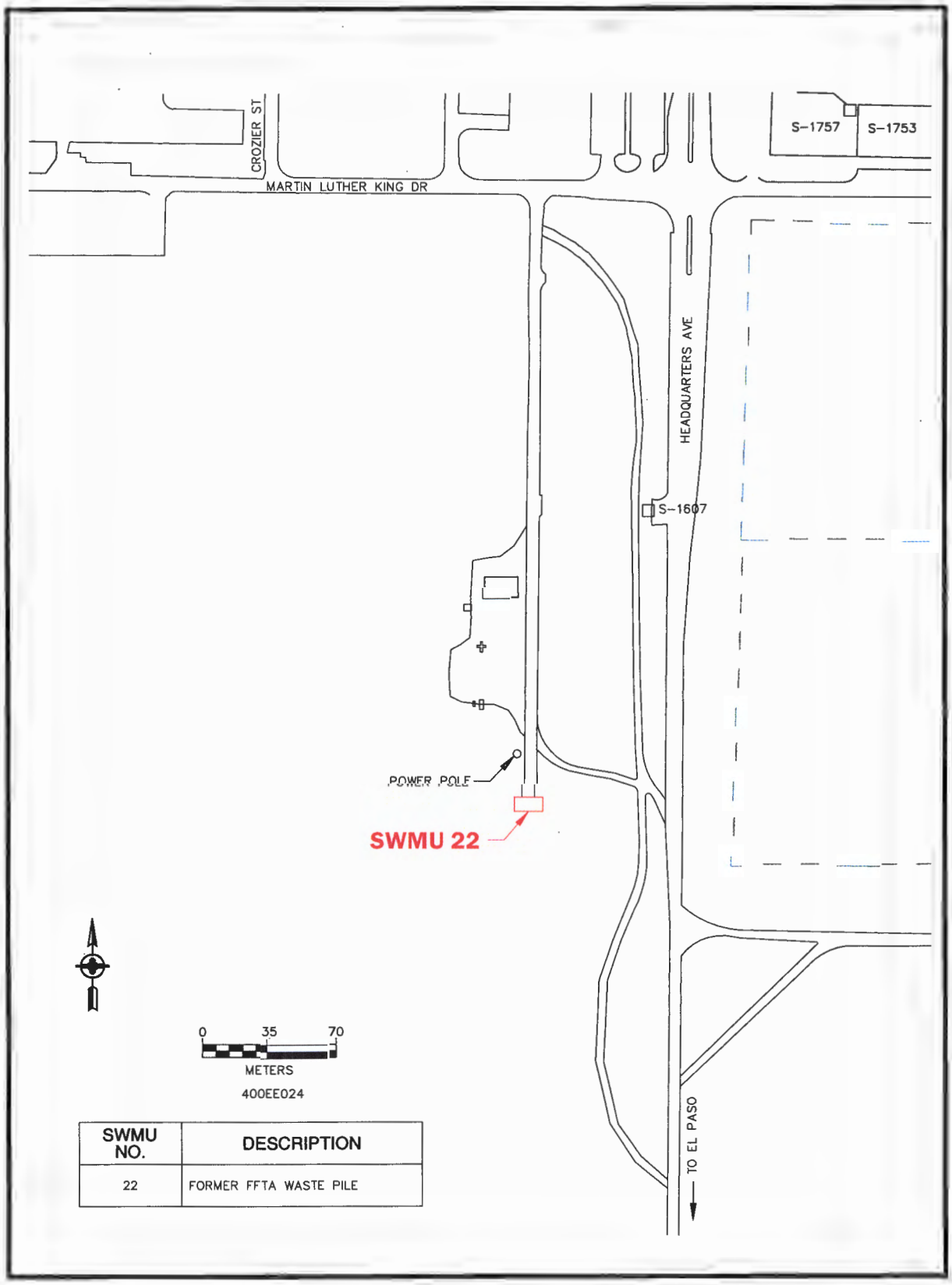
The purpose of the pit has not been identified and, therefore, its operational history is unknown. The Phase I RFI described the site in 1992 as more of a "pile" than a "pit" (IT Corp, 1992a). That report speculated that the soil/gravel pile was excavated from the FFTA (SWMU 21). If the site was in fact related to the FFTA (see Section 5), then the operational dates may coincide. The FFTA was closed in 1982. A current view of the site is shown in Photograph 6-1.

Photograph 6-1.
Current view of SWMU 22 looking south across the

6.3 Previous Investigations

6.3.1 Summary

Four investigations were conducted under RCRA at the site of the Abandoned Pit. The SWMU was described in the White Sands RFA (Kearney, 1988). It was investigated during the Phase I (IT Corp, 1992a) and Phase II (Sverdrup Environmental, 1994) RFIs. Additional sampling of soils at SWMU 22 was conducted in 1996 and is summarized in a site closure report (DEI, 1997c).



SWMU NO.	DESCRIPTION
22	FORMER FFTA WASTE PILE

Figure 6-1. Site plan of SWMU 22, the Abandoned Pit.

6.3.2 Investigation #1: RCRA Facility Assessment

The RFA consisted of a search of White Sands' records of waste-related activity at SWMU 22 and a visual inspection of the site. The RFA report was issued in August 1988 (Kearney, 1988).

6.3.2.1 Non-sampling Data Collection

No records of historic contaminant releases were found. Soil and gravel stained with petroleum hydrocarbons were noted in the report of the RFA (Kearney, 1988). The contaminated material was piled at the southern end of the pit. No volume estimate is given in the report.

6.3.2.2 Sampling Data Collection

No environmental samples were taken during the RFA. The PR/VSI did not generate chemical data and no records of previous sampling activities or site assessments were found during the PR/VSI.

6.3.2.3 Results and Conclusions

The potential for the release of contaminants to soil/ground water was considered "high," pending site characterization to determine the extent of the contamination and the composition of the vadose zone (Kearney, 1988). The unit was placed in the HSWA corrective action module (Module VIII) of the White Sands RCRA Part B permit based on the RFA report findings.

6.3.3 Investigation #2: Phase I-RCRA Facility Investigation

The Phase I RFI was conducted to characterize potentially hazardous constituents released at the Abandoned Pit. Characterization of the site included chemical analysis of soil samples and a soil vapor survey. The results of the characterization indicate that further characterization during Phase II of the RFI was appropriate (IT Corp, 1992a).

6.3.3.1 Non-sampling Data Collection

Non-sampling data is not included in the report of the Phase I RFI.

6.3.3.2 Sampling Data Collection

Eleven grab samples of the excavated soil pile and surface soil were collected. Additionally, a 20-foot (6 m) soil boring was located adjacent to the waste soil pile and near a "hot spot" identified during the SWMU 21 SVS (see Section 5). Soil was sampled from the boring at depths of 1 to 2 feet (30-60 cm), 4 to 5 feet (1.2-1.5 m), 9 to 10 feet (2.75-3 m), 14 to 15 feet (4.25-4.6 m), and 19 to 20 feet (5.8-6.1 m). Soil samples were analyzed for VOCs, SVOCs, PCBs/pesticides, TPH, and total RCRA metals.

6.3.3.3 Data Gaps

No data gaps are identified.

6.3.3.4 Results and Conclusions

All of the surface samples contained detectable TPH. The highest concentration was 21,000 mg/kg TPH and the mean concentration was 8,150 mg/kg. Significant TPH was reported in the 4 to 5 foot sample from the soil boring (3,100 mg/kg), but TPH was not detected in the deeper samples. The results confirmed the suspicion that the stockpiled soil was contaminated with petroleum hydrocarbons (IT Corp, 1992a).

Analytical methods to detect VOCs, SVOCs, and PCBs did not identify the source of the TPH results. The only organic compounds identified in the Phase I RFI report are methylene chloride and 2-hexanone at trace concentrations. Methylene chloride was reported from 3 of the samples at concentrations of 0.023, 0.015, and 0.013 mg/kg. The EPA Region 9 residential soil PRG for methylene chloride is 8.5 mg/kg (EPA, 1998). NMED has not established a methylene chloride SSL (NMED, 2000). A single detection of 2-hexanone was reported from one sample at a concentration of 0.17 mg/kg. Neither a NMED SSL, nor an EPA soil PRG is established for 2-hexanone.

Heavy metals were also concentrated in the stockpiled soil relative to the subsurface. Lead was detected in each of the 11 grab samples. The highest concentration of lead reported was 4,200 mg/kg and other more elevated results included 2,900 mg/kg, 1,100 mg/kg, and 1,000 mg/kg. In subsurface samples from the soil boring, lead concentrations were more typical of the White Sands Post Headquarters area. The highest reported lead concentration from the soil boring was 92 mg/kg and the mean concentration of the 6 samples analyzed is 20.5 mg/kg. The NMED residential SSL for lead is 400 mg/kg and the industrial SSL is 1,000 mg/kg (NMED, 2000).

Cadmium results also suggest that the soil stockpile was a contaminant source. Cadmium concentrations exceeded the MDL in the surface grab samples but did not exceed the same detection limit in the subsurface soil samples. The highest cadmium concentration was an order of magnitude below the NMED residential SSL of 70 mg/kg (NMED, 2000). Arsenic, barium, chromium, and silver were all reported in various samples at concentrations far below their respective residential SSLs (IT Corp, 1992a).

The Phase I RFI concluded that the analytical results warranted additional sampling and a Corrective Measures Study to define and remove the contaminated soil.

6.3.4 Investigation #3: Phase II-RCRA Facility Investigation

Revision 1 of the Phase II RFI report was issued December 12, 1994 (Sverdrup Environmental, 1994). Additional soil sampling at SWMU 22 was conducted in order to characterize the nature and extent of the contaminants.

6.3.4.1 Non-sampling Data Collection

The RFI noted that drainage from the stockpile collected in a small ditch. Samples from the ditch were included in the sampling data collection (Sverdrup Environmental, 1994).

6.3.4.2 Sampling Data Collection

A total of 12 surface soil samples and 2 shallow subsurface soil samples were collected from 12 hand auger borings. Surface samples were collected from 0 to 1 foot (0-30 cm) depth and subsurface samples were collected at between 2 and 3 feet (60-90 cm) depth. The soil samples were analyzed for VOCs, SVOCs, TPH, and the RCRA toxicity characteristic metals.

6.3.4.3 Data Gaps

Analyses of the soil samples were conducted to determine total contaminant concentrations according to the RFI work plan. No data gaps were identified.

6.3.4.4 Results and Conclusions

Results correlated well with the sample results from the Phase I RFI investigation. Contaminants were again found in the soil stockpile and runoff from the stockpile apparently transported contaminants into the adjacent ditch. Three samples containing an estimated 23,000 mg/kg TPH were collected from the stockpile and the ditch. Six of the remaining samples were below the MDL for TPH. The report concluded, "Based on results of the analysis done on the soil sample[s] the horizontal extent of the contamination is limited to the "pile," the shallow drainage ditch, and the immediate surrounding area" (Sverdrup Environmental, 1994).

Barium and lead were detected in all of the samples. As in the Phase I investigation, metals were elevated in samples with higher TPH concentrations. This suggests that the petroleum hydrocarbons may have been contaminated with some RCRA metals. The two highest lead concentrations, 733 and 690 mg/kg, were detected in samples that also contained 23,000 mg/kg TPH. Results of the other 12 lead samples were below the NMED residential SSL (400 mg/k; NMED, 2000). Similarly, the highest barium results (583 and 515 mg/kg) are from the same samples with the high lead and TPH. The NMED residential SSL for barium is 5,200 mg/kg.

The report of the Phase II RFI concluded that "elevated concentrations of the detected metals were related to soil samples with high TPH concentrations" (Sverdrup Environmental, 1994). Because both RFI phases linked TPH to the soil stockpile, the report concluded that removal of the soil and eroded material should be considered in a Corrective Measures Study.

6.3.5 Investigation #4: Contaminated Soil Removal

In late-January 1996, contaminated soils in the area of the SWMU 22 site were excavated (DEI, 1997c). The excavated soil was disposed of on-site following chemical analysis of soil samples.

6.3.5.1 Non-sampling Data Collection

No non-sampling data is reported.

6.3.5.2 Sampling Data Collection

Six samples of soil collected from the floor of the excavation were analyzed for total RCRA metals, TPH, PCBs, and BTEX (DEI, 1997c). Sample locations are shown in Figure 6-2.

DOW

Dow Environmental

SOIL SAMPLE LOG SHEET

☒ SURFACE SOIL
☐ SUBSURFACE SOIL
☐ SEDIMENT LAGOON/ POND
☐ OTHER

PAGE 1 OF 1
PROJECT NO. 6015
BY P. Reilley
PROJECT NO. 6015
SAMPLE I.D. Various

PROJECT NAME WSMR
SAMPLE LOCATION SWMU 22

SAMPLE METHOD: Grab + Composite
DEPTH SAMPLED: 0-1'
SAMPLE DATE & TIME: 1-25-96 / 1-26-96 Various
SAMPLED BY: P Reilley / F. Laing
SIGNATURE(S):

TYPE OF SAMPLE
☐ LOW CONCENTRATION
☐ HIGH CONCENTRATION
☒ GRAB
☒ COMPOSITE
☐ GRAB–COMPOSITE

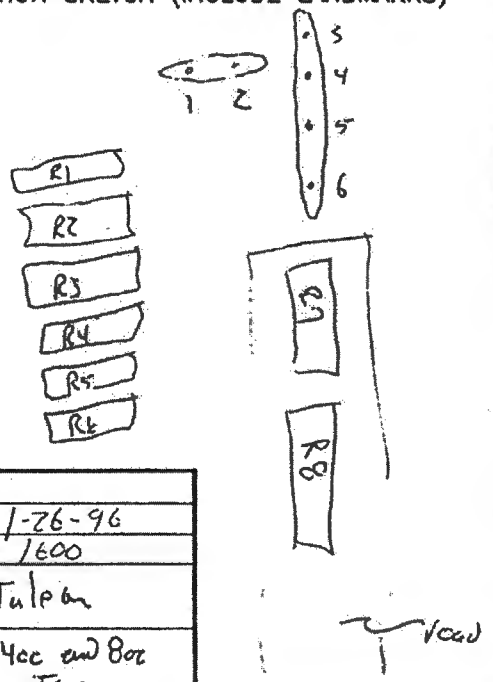
COMPOSITE SAMPLE DATA

SAMPLE	TIME		DESCRIPTION	
0022-01(0-1)	1-26	1350		
0022-02(0-1)	1-26	1255		
0022-03(0-1)	1-26	1302		
0022-04(0-1)	1-26	1305		
0022-05(0-1)	1-26	1310		
0022-06(0-1)	1-26	1315		
0022-R1	1-25	0830	Rolloff	A
0022-R2	1-25	0835	"	WM-2058
0022-R3	1-25	0840	"	WM-205
0022-R4	1-26	1247	"	7011 ~~4F~~ 203
0022-R5	1-26	1250	"	7011
0022-R6	1-26	1320	"	7004
0022-R7	1-26	1330	"	20
0022-R8	1-26	1325	"	3030

SAMPLE DATA
~~DESCRIPTION: (Color, Material, Water Content, Etc.)~~

NOTES:
Samples 0022-01(0-1) thru 0022-06(0-1) correspond to #s 1-6 on sketch

SAMPLE LOCATION SKETCH (INCLUDE LANDMARKS)



ANALYSIS:	TCLP
8015M (GRO)	8080 PCB
8080 PCB	1311/8150 Herb
8020 BTEX	TCLP Metals
RCRA Metals	
9041 pH	
1020 Flashpoint	
10 Conductivity	
1311/8240 TCLP VOA	
1311/8270 TCLP SVOA	
1311/8080 TCLP Pest	

DATE SHIPPED	1-26-96
TIME SHIPPED	1600
LAB	Tulsa
VOLUME	4oz and 8oz Jars

Figure 6-2. Log sheet showing relative sample locations (from DEI, 1997c).

6.3.5.3 Data Gaps

No data gaps are reported.

6.3.5.4 Results and Conclusion

The analytical results from confirmation sampling are summarized in Tables 6-1, 6-2, and 6-3. One of the six confirmation samples contained a measurable TPH concentration of 24 mg/kg. Otherwise, no samples were concentrated with TPH, PCBs, or BTEX above the MDLs (DEI, 1997c). Detection limits of the PCB and BTEX analyses were well below EPA Region 9 residential soil PRGs (EPA, 1998). There is no NMED SSL for TPH, but the 24 mg/kg is below the 1,000 mg/kg TPH soil remediation level for land disposal established by the New Mexico Environmental Improvement Board (EIB) in 20 NMAC 9.1, Subpart VII.708 (NMED, 1995).

Table 6-1. Summary of RCRA metals analytical results from the excavation of the FFTA (SWMU 22) on January 26, 1996

Sample Attributes			RCRA Metals by EPA Method 6010/7471 (mg/kg)							
Sample ID# (Figure 6-2)	Matrix	Sample Depth (ft)	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
0022-01	soil	0-1	ND (0.50)	ND (2.5)	180	ND (0.50)	6.4	0.46	180	ND (2.5)
0022-02	soil	0-1	0.54	ND (2.5)	45	ND (0.50)	5.3	ND (0.10)	10	ND (2.5)
0022-03	soil	0-1	0.57	ND (2.5)	68	ND (0.50)	6.1	ND (0.10)	26	ND (2.5)
0022-04	soil	0-1	ND (0.50)	ND (2.5)	38	ND (0.50)	4.3	ND (0.10)	6.1	ND (2.5)
0022-05	soil	0-1	0.67	ND (2.5)	45	ND (0.50)	5.7	ND (0.10)	8.7	ND (2.5)
0022-06	soil	0-1	0.78	ND (2.5)	50	ND (0.50)	7.9	ND (0.10)	12	ND (2.5)

ND – non detect
mg/kg – milligrams per kilogram

Table 6-2. Summary of BTEX and TPH results from the excavation of the FFTA (SWMU 22) on January 26, 1996

Sample Attributes			BTEX by EPA Method 8021 (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)	
Sample ID# (Figure 6-2)	Matrix	Sample Depth (ft)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	EPA Method 8015 gas-range org.	EPA Method 8015 diesel range org.
0022-01	soil	0-1	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	24
0022-02	soil	0-1	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)
0022-03	soil	0-1	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)
0022-04	soil	0-1	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)
0022-05	soil	0-1	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)
0022-06	soil	0-1	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.5)	ND (10)	ND (10)

ND – non detect
mg/kg – milligrams per kilogram

Table 6-3. Summary of PCB analytical results from the excavation of the FFTA (SWMU 22) on January 26, 1996

Sample Attributes			Polychlorinated Biphenyls by EPA Method 8081 (mg/kg)						
Sample ID# (Figure 6-2)	Matrix	Sample Depth (ft)	PCB 1016	PCB 1221	PCB 1232	PCB 1242	PCB 1248	PCB 1254	PCB 1260
0022-01	soil	0-1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0022-02	soil	0-1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0022-03	soil	0-1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0022-04	soil	0-1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0022-05	soil	0-1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0022-06	soil	0-1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)

ND – non detect
mg/kg – milligrams per kilogram

Lead and barium (Table 6-1) were both detected at maximum concentrations of 180 mg/kg, below their respective NMED residential SSLs of 400 and 5,200 mg/kg (NMED, 2000). A maximum chromium result of 7.9 mg/kg was below the NMED SSLs listing chromium, not as total chromium, but as the chromium 3^+ and chromium 6^+ valence states. The residential SSLs are 100,000 mg/kg and 230 mg/kg, respectively (NMED, 2000). Four of the samples contained detectable silver and a maximum concentration was quantified at 0.67 mg/kg. These results were below the 380 mg/kg NMED residential SSL for silver. Arsenic, cadmium, mercury, and selenium were not present in concentrations above the MDL.

Organic compounds were not detected (Tables 6-2 and 6-3) by the laboratory in the soil samples collected from the locations show in Figure 6-2. The close-out report concluded that remedial activities at the site are complete based on the confirmation sample results. Excavated soil was returned to the site, graded and hydro-seeded (DEI, 1997c).

6.4 Site Conceptual Model

6.4.1 Nature and Extent of Contamination

Contaminants discovered at SWMU 22 were adsorbed to the soil in the stockpile and did not migrate independently of the soil to which they adhered. Some contaminant migration did occur when a fraction of the soil was eroded and washed a short distance away, but neither petroleum hydrocarbons nor metal were migrating laterally or vertically on their own. Contaminated soil was effectively remediated when it was removed for disposal.

6.4.2 Environmental Fate

No source of contamination exists at the site. SWMU 22 will revert to its natural state without human or ecological risk.

6.5 Site Assessments

6.5.1 Screening Assessments

Human and ecological screening assessments appear in the White Sands RFI (see Section 3.4) (IT Corp, 1992; Sverdrup, 1994). The sampling analyses indicate that the risk-based screening action levels established by state and federal regulatory agencies for industrial sites were not exceeded at SWMU 22.

6.5.2 Risk Assessments

A formal human and/or ecological risk assessment has not been completed for SWMU 22 because the results of the screening analyses did not exceed action thresholds.

6.5.3 Other Applicable Assessments

A screening assessment for soil erosion potential at the site was conducted according to the procedure developed by the NMED Surface Water Quality Bureau. A copy of the completed assessment worksheet is presented in Appendix C. The erosion potential survey found that the risk of contaminant migration with stormwater is low (the site scored 20.8 on a scale of 100).

6.6 No Further Action Proposal

On the basis of the results of previous investigations, application is hereby made to perform a Class III modification to remove SWMU 22 from the White Sands Missile Range Part B permit HSWA module (Permit #NM2750211235, Module VIII), in accordance with 40 CFR 264.514 and 270.42, and 20 NMAC 4.1.

6.6.1 Rationale

The results of previous investigations at the SWMU 22 site indicate that the environmental effects of the Abandoned Pit do not pose a threat to human health or the environment, nor affect the projected land use. Corrective action has been performed to remove contaminant sources from the site, as determined by the RCRA investigations.

6.6.2 Criterion

Based on the results of the RFI sampling, it was concluded that a release of constituents hazardous to human health or the environment in concentrations exceeding NMED SSLs had occurred at SWMU 22. However, the identified contaminant source was removed in early 1996. Criterion 5 (see Appendix A) of the NMED-HRMB Standard Operating Procedures Manual, Volume 1, Section II.B.4.a.(4).(b)., is applicable (NMED, 1998). The SWMU was "remediated in accordance with current applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use."

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7.0 SWMU 145; TEST CELL 4 LAGOON

7.1 Summary

The Test Cell 4 Lagoon site was characterized due to a documented release of wastewater from the facility. Soil and groundwater below the lagoon were characterized. The facility was remediated following the characterization.

7.2 Description and Operational History

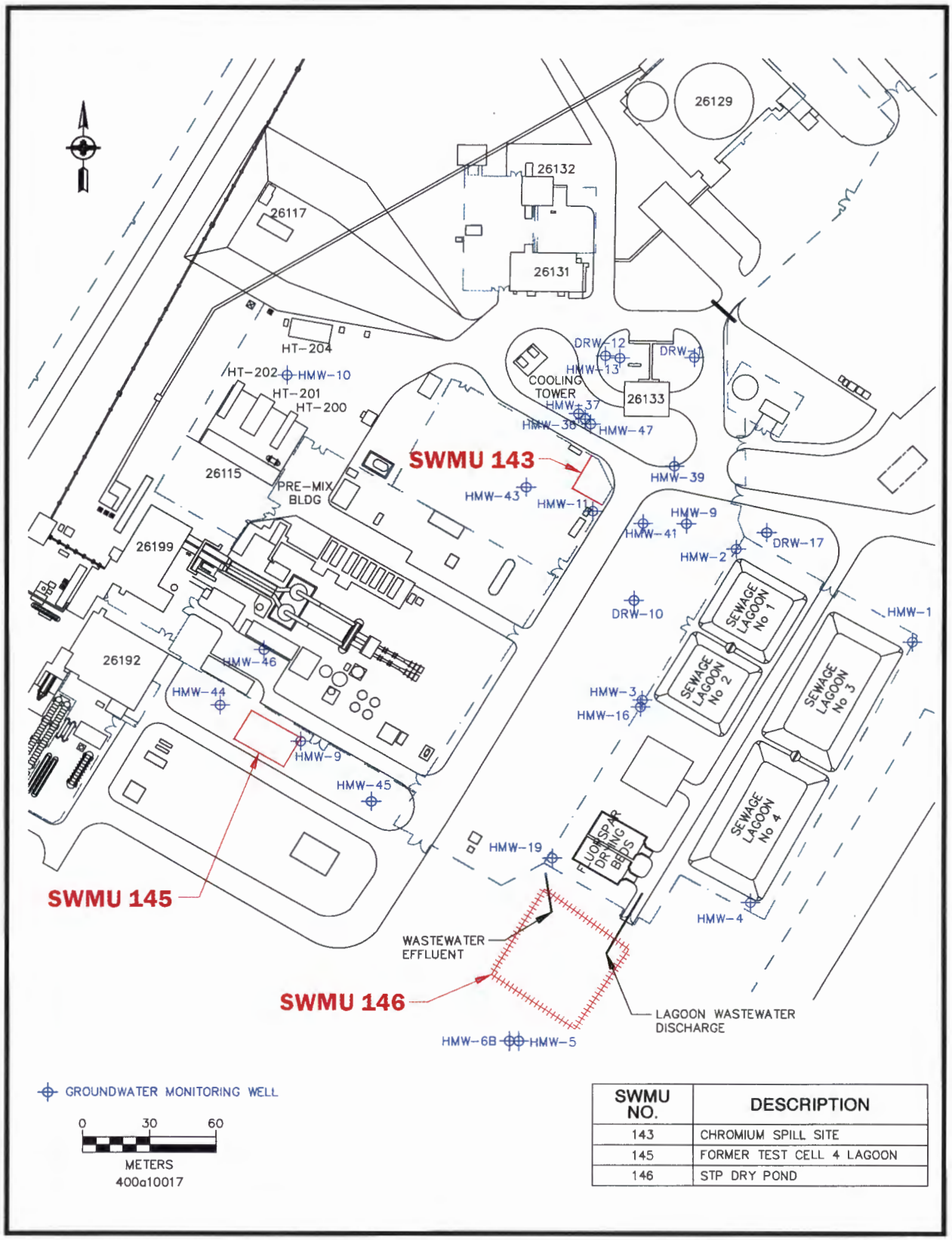
7.2.1 Site Description

The Test Cell 4 Lagoon site (SWMU 145) is located approximately 600 feet (180 m) west of the Wastewater Treatment Lagoons (SWMUs 27-30) at the High Energy Laser Systems Test Facility (HELSTF). Following construction in the late 1980's, the lagoon measured 105 feet (32 m) by 60 feet (18 m) by 6 feet (1.8 m) deep. A 6-mil liner was installed in the lagoon. The location of the site is shown in Figure 7-1 on the following page.

Photograph 7-1. View of Test Cell 4 (Building 26192) looking northwest. The SWMU 145 site is in the middle ground bounded on both sides by monitor wells HMW-9 and HMW-44.

7.2.2 Operational History

The Test Cell 4 Lagoon was used only once. In 1989, a 30,000 gallon (113,550 l) discharge of wastewater containing sodium fluoride was discharged into the lined lagoon (IT Corp, 1992b). During the days following the discharge, rapidly decreasing wastewater levels indicated that liner integrity was compromised. A current site view appears in Photograph 7-1.



SWMU NO.	DESCRIPTION
143	CHROMIUM SPILL SITE
145	FORMER TEST CELL 4 LAGOON
146	STP DRY POND

Figure 7-1. Site Plan of SWMU 145, the former HELSTF Test Cell 4 Lagoon.

7.3 Previous Investigations

7.3.1 Summary

The Test Cell 4 Lagoon was investigated during the Phase I (IT Corp, 1992a) and Phase II (Sverdrup Environmental, 1994) RFIs. Confirmation sampling was conducted during site remedial work (DEI, 1997e).

7.3.2 Investigation #1: Phase I-RCRA Facility Investigation

The Phase I RFI was conducted to characterize potentially hazardous constituents released at the Test Cell 4 Lagoon. Characterization of the site included chemical analysis of soil and sediment associated with SWMU 145. The investigators concluded that the data indicate that the wastewater release did not increase surface or subsurface contaminants significantly above background concentrations (IT Corp, 1992b).

7.3.2.1 Non-sampling Data Collection

Non-sampling data is not included in the report of the Phase I RFI.

7.3.2.2 Sampling Data Collection

A composite sample of sediment was collected from the bottom of the empty lagoon. Six soil samples were collected from an 80-foot (24 m) groundwater monitoring well (HMW-9) drilled adjacent to the lagoon. Soil samples were collected from the monitoring well at 5-foot (1.5-m) intervals between depths of 10 and 35 feet (3 and 10.5 m). A groundwater sample was collected from the completed monitor well (HMW-9). A shallow soil sample was also collected from a depth of 2 feet (60 cm) in an adjacent area thought to be unaffected by the lagoon discharge. Samples were analyzed for VOCs, SVOCs, TPH, fluoride, and total RCRA metals (IT Corp, 1992b).

7.3.2.3 Data Gaps

No data gaps are identified.

7.3.2.4 Results and Conclusions

Fluoride was detected in all of the samples (IT Corp, 1992b). Fluoride concentrations in the monitor well soil boring samples ranged from 0.66 to 2.4 mg/kg. The composite sediment sample result was reported as 3.4 mg/kg fluoride. The fluoride concentration in the shallow background soil sample was reported as 0.29 mg/kg. The EPA Region 9 residential soil PRG for fluoride is 3,300 mg/kg (EPA, 1998). Fluoride was detected in the groundwater sample from HMW-9 at a concentration of 2.42 mg/l. The New Mexico Water Quality Control Commission (NMWQCC) standard for fluoride is 1.6 mg/l (WQCC, 2001).

Concentrations of arsenic were above the MDL in all of the soil samples, but not in the groundwater sample (IT Corp, 1992b). Soil analytical results were reported below the EPA Region 9 residential soil PRG of 21 mg/kg. The highest arsenic concentration reported (3.8 mg/kg) came from the 30-foot (9-m) sample.

Barium was detected in the deep soil samples, but not in the shallower samples or the sediment composite from the lagoon. The highest barium result was 140 mg/kg. The EPA Region 9 residential soil PRG for barium is 5,200 mg/kg.

Lead was detected in the 30-foot (9-m) soil sample at a concentration of 6.7 mg/kg and in the composite sediment sample at a concentration of 6.0 mg/kg. Lead was below the MDL in the other samples analyzed. The EPA Region 9 residential soil PRG for lead is 400 mg/kg.

Selenium was detected in the groundwater sample, but not in the soil or sediment samples. A selenium concentration of 0.019 mg/l was reported from HMW-9. The NMWQCC standard for selenium is 0.05 mg/l (WQCC, 2001).

Organic compounds were detected during the analysis of the samples from SWMU 145. Chloroform was detected in the groundwater sample at a concentration of 0.017 mg/l. The NMWQCC standard for chloroform is 0.1 mg/l (WQCC, 2001). Acetone was detected in one soil sample at a concentration of 0.20 mg/kg. The isolated acetone detection in the 35-foot (10.5-m) sample is below the EPA Region 9 residential soil PRG of 1,400 mg/kg (EPA, 1998). TPH was reported from the composite sediment sample collected in the lagoon. The 68 mg/kg result is below the 1,000 mg/kg TPH soil remediation level for land disposal established by the New Mexico Environmental Improvement Board (EIB) in 20 NMAC 9.1, Subpart VII.708 (NMED, 1995).

No other environmental contaminants were detected above the MDLs of the analyses run during the investigation. The Phase I RFI concluded that the analytical results justify discontinuing the RFI at SWMU 145 (IT Corp, 1992b). However, the RFI was continued at SWMU 145 during Phase II.

7.3.3 Investigation #2: Phase II-RCRA Facility Investigation

Revision 1 of the Phase II RFI report was issued December 12, 1994 (Sverdrup Environmental, 1994). Additional soil sampling during monitor well construction was conducted at SWMU 145.

7.3.3.1 Non-sampling Data Collection

Non-sampling data from SWMU 145 is not presented in the report of the Phase II RFI.

7.3.3.2 Sampling Data Collection

Three groundwater monitoring wells HMW-44, HMW-45, and HMW-46 were installed and sampled during the Phase II RFI. Five soil samples were collected during the installation of the wells. Groundwater and soil samples were analyzed for VOCs, SVOCs, fluoride, and total (and dissolved for the water samples) RCRA metals.

7.3.3.3 Data Gaps

The analytical results from the acid fraction of the SVOC analysis of the water samples from HMW-9, HMW-44, and HMW-46 were rejected due to poor surrogate recovery.

7.3.3.4 Results and Conclusions

Five of the eight RCRA metals, along with fluoride, were detected in the five soil samples (Sverdrup Environmental, 1994). Arsenic was detected in two of the five samples at concentrations of 3.18 and 14.8J mg/kg. The "J" qualifier flags the result as an approximate concentration for a positively identified analyte. The EPA Region 9 residential PRG for arsenic is 21 mg/kg (EPA, 1998). Barium was detected in each of the soil samples. The maximum detected concentration reported was 81.6 mg/kg, compared with the EPA Region 9 residential soil PRG of 5,200 mg/kg. Chromium was detected in four of the five samples. Two chromium results were quantified at the maximum reported value of 11.6 mg/kg. The EPA Region 9 residential soil PRG for chromium is 210 mg/kg. Lead was detected in each of the five samples at a maximum concentration of 6.98 mg/kg. The residential PRG for lead is 400 mg/kg. Silver was detected in three of the soil samples at a maximum concentration of 11.9 mg/kg. The corresponding EPA Region 9 residential PRG is 370 mg/kg. Fluoride concentrations in the five soil samples ranged up to a maximum of 2.96 mg/kg. The EPA Region 9 residential soil PRG for fluoride is 3,300 mg/kg (EPA, 1998).

Total fluoride concentrations in groundwater samples from HMW-44, HMW-45, and HMW-46 were 3.2, 2.25, and 2.0 mg/l, respectively. The EPA maximum contaminant level (MCL) for total fluoride in water is 4.0 mg/l (EPA, 1996b). The NMWQCC groundwater fluoride standard of 2.0 mg/l applies to the dissolved (filtered) portion of the sample. Filtered groundwater samples were not analyzed for fluoride during the Phase II RFI.

Arsenic, barium, hexavalent chromium, lead, mercury, and selenium were detected in groundwater samples. The only metal concentration that exceeded the corresponding NMWQCC groundwater standard was selenium from HMW-44. The dissolved selenium concentration reported was 0.066 mg/l compared to the NMWQCC standard of 0.05 mg/l (WQCC, 2001). Total selenium concentration in HMW-44 was quantified at 0.074 mg/l, exceeding the MCL of 0.05 mg/l (EPA, 1996b). Selenium concentrations from the other groundwater monitoring wells did not exceed standards (Sverdrup Environmental, 1994). The maximum reported selenium concentrations from HMW-45 and HMW-46 were 0.01 and 0.02 mg/l, respectively.

The dissolved lead (0.049 mg/l) analysis for groundwater from the same well (HMW-44) was elevated nearly to the NMWQCC standard of 0.05 mg/l. This result is questionable, however, because the result of the unfiltered analysis (0.004 mg/l) is an order of magnitude less than the dissolved result. This situation is physically impossible because of the filtering and may indicate laboratory equipment or reporting error.

The hexavalent chromium detection in HMW-9 of 0.041 mg/l is below the EPA Region 9 PRG for tap water (0.18 mg/l; EPA, 1998). There is no NMQCC standard or MCL for hexavalent chromium. Neither the total chromium nor the dissolved total chromium analyses detected the analyte above the 0.025 mg/l MDL.

Several organic compounds were detected in the groundwater samples collected during the SWMU 145 investigation. However, none of the organic compounds are associated with the operation of the Test Cell 4 Lagoon. Although installed during the SWMU 145 investigations, monitor wells HMW-9, HMW-44, HMW-45, and HMW-46 are available to monitor other potential contaminant sources. Other SWMUs in the immediate vicinity include SWMU 143, the Chromate Spill Site, and SWMU 146, the Sewage Treatment Lagoons Dry Infiltration Pond (Figure 7-1).

Three VOCs and no SVOCs were identified in the groundwater samples (Sverdrup Environmental, 1994). 1, 1-dichloroethene (1, 1-DCE; also 1,1-dichloroethylene) was positively identified in the sample from HMW-44 and the concentration was approximated at 0.205 mg/l. The NMWQCC standard for 1, 1-DCE is 0.005 mg/l. The EPA Region 9 PRG for 1, 1-DCE in tap water is 0.000046 mg/l (EPA, 1998). Chloroform was detected in HMW-9 and HMW-46 at concentrations of 0.0064 and 0.0060 mg/l, respectively. The NMWQCC standard for chloroform is 0.1 mg/l (WQCC, 2001). The EPA Region 9 PRG for chloroform in tap water is 0.00016 mg/l. An approximated concentration of 1.450 mg/l of the positively identified compound, 1, 1, 1-trichloroethane (TCA), was reported from the HMW-44 sample. The NMWQCC standard for TCA is 0.06 mg/l. The EPA Region 9 PRG for TCA in tap water is 0.790 mg/l (EPA, 1998).

The report of the Phase II RFI concluded that selenium occurrence at HELSTF may be natural because the total dissolved solids (TDS) concentration is high in the regional aquifer (Sverdrup Environmental, 1994). Of the three wells for which there is data in the report, TDS values ranged from 3,880 mg/l to 16,400 mg/l. The report attributed a general decrease in fluoride and selenium in HMW-9 since the Phase I RFI to natural attenuation. However, subsequent monitor well installation and sampling at HELSTF has built a database substantiating background concentrations that are consistent with the SWMU 145 analytical results (see Section 7.4, below).

7.3.4 Investigation #3: Contaminated Soil Removal

Corrective measures were implemented in April 1996 to remove the lagoon liner and the first 2 feet (60 cm) of soil beneath it. Soils below the excavated SWMU site were sampled to confirm that remediation was complete (DEI, 1997e).

7.3.4.1 Non-sampling Data Collection

The report states, "no obvious signs of contamination were noted," such as "discoloration or staining," following removal of the lagoon liner (DEI, 1997e).

7.3.4.2 Sampling Data Collection

Nine soil samples were collected from 2 feet (60 cm) and 3 feet (91 cm) below the floor of the excavation following removal of the lagoon and subsoils. Six of the soil samples were analyzed for fluoride and pH, only. The other 3 samples were analyzed for fluoride, pH, and total RCRA metals.

7.3.4.3 Data Gaps

No data gaps are reported.

7.3.4.4 Results and Conclusion

The highest reported concentration of fluoride in a soil confirmation sample was 23 mg/kg (DEI, 1997e). The EPA Region 9 PRG for soil in residential areas is 3,300 mg/kg. Barium was detected in the 3 samples analyzed for total RCRA metals. The highest barium concentration

reported was 36 mg/kg. The EPA Region 9 residential soil PRG for barium is 5,200 mg/kg. One of the 3 confirmation samples contained measurable lead and chromium. The lead result of 2.5 mg/kg was below the residential soil PRG of 400 mg/kg. The chromium result of 1.0 mg/kg was also below the corresponding residential soil PRG of 210 mg/kg (EPA, 1998). No other RCRA metals were concentrated above their respective MDLs. Soil pH ranged from 7.7 to 8.2. The average pH of the 9 confirmation soil samples was 7.88.

The report of the investigation concluded that confirmation sampling results indicated that the former SWMU 145 site was remediated and that no further corrective measures were necessary.

7.4 Site Conceptual Model

7.4.1 Nature and Extent of Contamination

Contaminants identified in groundwater monitoring wells surrounding SWMU 145 do not correlate with contaminants released at the SWMU or with contaminants identified in soil samples. Fluoride concentrations in the wells are indistinguishable for fluoride data compiled from other HELSTF monitoring wells. The report of the SWMU Groundwater Monitoring Program presents data from 5 SWMU sites at HELSTF (MEVATEC, 1997). Fluoride is generally elevated at these monitored sites (Wastewater Treatment Lagoons, Construction Landfill, Cleaning Facility, Chromate Spill Site, and the Laser Systems Test Center Wastewater Discharge Area). The volume of water represented by this data is many orders of magnitude greater than that which could be contaminated by the release from SWMU 145. The data is suggestive of a regional source of fluoride that may be natural.

The investigations indicate that subsurface soils from the Test Cell 4 Lagoon site do not contain contaminants that can be considered a source of future contaminant migration. Migration along subsurface and/or surface pathways is not expected due to the overall absence of a source demonstrated in the RFI. A slightly alkaline soil pH is normal for the desert southwest region and the SWMU 145 soil pH is inline with the measured pH of the borrow material hauled from offsite to backfill the lagoon excavation (DEI, 1997e).

7.4.2 Environmental Fate

Measured environmental contaminants at the SWMU 145 are not concentrated significantly above natural background concentrations. The migration of contaminants from the site is not expected to be quantifiable at any monitoring location horizontally or laterally adjacent to the former Test Cell 4 Lagoon site.

7.5 Site Assessments

7.5.1 Screening Assessments

Human and ecological screening assessments appear in the White Sands RFI (see Section 7.4) (IT Corp, 1992; Sverdrup, 1994). The sampling analyses indicate that the risk-based screening action levels established by state and federal regulatory agencies were not exceeded at SWMU 145.

7.5.2 Risk Assessments

A formal human and/or ecological risk assessment has not been completed for SWMU 145 because the results of the screening analyses did not exceed action thresholds.

7.5.3 Other Applicable Assessments

A screening assessment for soil erosion potential at the site was conducted according to the procedure developed by the NMED Surface Water Quality Bureau. A copy of the completed assessment worksheet is presented in Appendix C. The erosion potential survey found that the risk of contaminant migration with stormwater is low (the site scored 15.6 on a scale of 100).

7.6 No Further Action Proposal

On the basis of the results of previous investigations, application is hereby made to perform a Class III modification to remove SWMU 145 from the White Sands Missile Range Part B permit HSWA module (Permit #NM2750211235, Module VIII), in accordance with 40 CFR 264.514 and 270.42, and 20 NMAC 4.1.

7.6.1 Rationale

The results of previous investigations at the SWMU 145 site indicate that the environmental effects of the Test Cell 4 Lagoon do not pose a threat to human health or the environment, nor affect the projected land use. Corrective action has been performed to remove the remaining contaminant source from the site, as determined by the White Sands RFI.

7.6.2 Criterion

Based on the results of the RFI sampling it was concluded that the one-time release of contaminants from the HELSTF Test Cell 4 Lagoon did not cause subsurface soil or water to become contaminated above background concentrations. The Test Cell 4 Lagoon was removed in April 1996. The SWMU 145 site is no longer hazardous to human health and the environment. Criterion 5 (see Appendix A) of the NMED-HRMB Standard Operating Procedures Manual, Volume 1, Section II.B.4.a.(4).(b)., is applicable (HRMB, 1998). The SWMU was "characterized and remediated in accordance with current applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use."

8.0 SWMU 147; DECONTAMINATION PAD UNDERGROUND WASTE TANK

8.1 Summary

The Decontamination Pad Underground Waste Tank was located adjacent to the southeast corner of Building 26131 at HELSTF (Figure 8-1). During the RFI, investigators found that the reported Underground Waste Tank was actually a collection sump and that wastewater was actually pumped out of the sump for storage in an aboveground tank. The two-phase RFI determined that releases of environmental contaminants from the SWMU had not occurred. In 1996, corrective measures were undertaken to remove the remaining sump contents and close the sump with concrete.

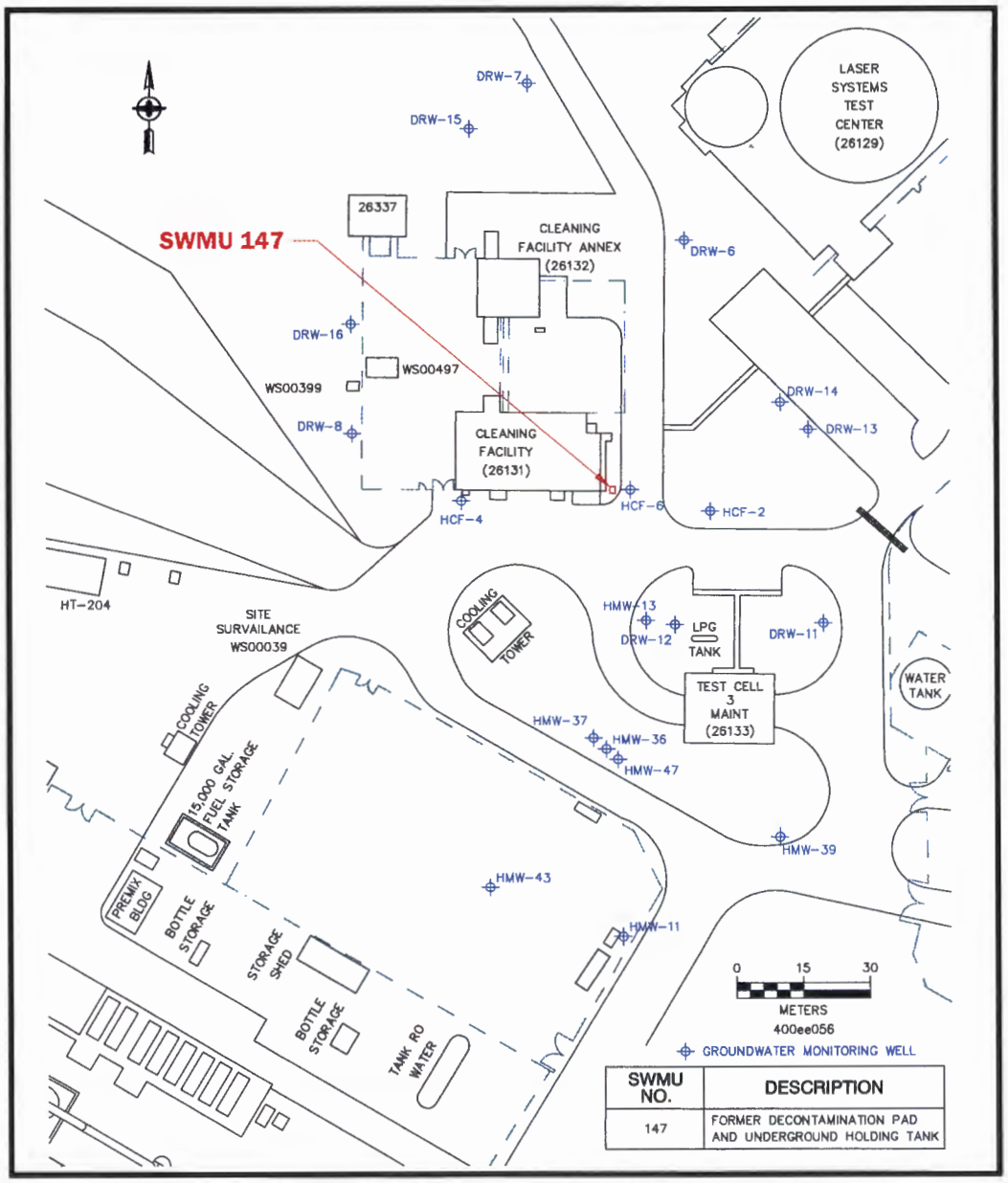


Figure 8-1. Site Plan of SWMU 147 and the relative locations of nearby SWMUs.

8.2 Descriptions and Operational History

8.2.1 Site Description

Solid Waste Management Unit 147 is immediately adjacent to the southeast corner of Building 26131 (HELSTF Cleaning Facility), as shown in Photograph 8-1. The SWMU consisted of a sump with the dimensions of 5 feet (1.5 m) by 3 feet (90 cm) by 6.7 feet (2 m) deep. The sump was constructed flush to grade with a steel plate covering the sump (Photograph 8-2). A grate allowed wastewater to drain from a wash pad into the sump. The wash pad occupies approximately 200 square feet (18.5 m^2) adjacent to Building 26131.

Photograph 8-1.
Most recent view of the Decontamination Pad looking east. The closed SWMU 147 sump (Underground Waste Tank) is the smooth concrete surface in sunlight in the foreground.

Photograph 8-2. Same view of the SWMU 147 Underground Waste Tank as Photograph 8-1, when operational.

8.2.2 Operational History

The site was constructed for use as a wash pad and wastewater collection sump in 1982 (Sverdrup Environmental, 1994). The wash pad served to clean large pieces of equipment that could not be cleaned inside Building 26131. Wastewater collected in the sump was then pumped to an aboveground storage tank to await disposal.

Following Phases I and II of the White Sands RFI, the underground sump was decommissioned. The sump contents were removed and the sump was filled with concrete in April 1996 after an investigation to characterize soils below the sump.

8.3 Previous Investigations

8.3.1 Summary

The Decontamination Pad Underground Waste Tank was not identified as a SWMU until after the White Sands RFA had been completed. Therefore, characterization of SWMU 147 was conducted during the Phase I (IT Corp, 1992b) and Phase II (Sverdrup Environmental, 1994) RFI. In 1996, the SWMU was closed and confirmation sampling results were reported (DEI, 1997d).

8.3.2 Investigation #1: Phase I-RCRA Facility Investigation

The Phase I RFI was conducted to characterize potentially hazardous constituents released at the Decontamination Pad Underground Waste Tank SWMU. Characterization of the site included chemical analysis of soil collected from a boring drilled next to the SWMU site.

8.3.2.1 Non-sampling Data Collection

The RFI report refers to hydrogeological information collected at SWMU 142, SWMU 148, and SWMUs 33 and 34 because these SWMUs are located in close proximity to SWMU 147. Borings to 17 feet (5.2 m) at SWMU 142 encountered gypsiferous silt grading abruptly downward into fine-grained quartz sand and silt interbedded with clayey sand and silt. These two distinct depositional facies are similarly noted in other wells and borings at HELSTF. The report interprets the upper, gypsum-rich detrital sediment as eolian and evaporite deposits originating in an ancient lake. The lower, sand-rich unit represents a marginal lacustrine depositional environment where fluvial-deltaic and sheet flow sands entered the system during storm events (IT Corp, 1992b).

8.3.2.2 Sampling Data Collection

A 35-foot (10.6 m) boring was drilled on the east side of SWMU 147. Six soil samples were collected at 5-foot (1.5 m) intervals between 5 and 30 feet (1.5 and 9 m). The samples were analyzed for VOCs, SVOCs, total RCRA toxicity characteristic metals, and TPH.

8.3.2.3 Data Gaps

No data gaps are reported.

8.3.2.4 Results and Conclusions

Analytical methods to detect VOCs identified 1, 1-dichloroethane and BTEX compounds (except for toluene). The 1, 1-dichloroethane was detected at 15 feet (4.6 m) and 25 feet (7.6 m) below ground surface at a maximum concentration of 0.051 mg/kg. The NMED residential SSL for 1, 1-dichloroethane is 560 mg/kg (NMED, 2000). The maximum benzene concentration at a depth of 25 feet (7.6 m) was reported as 0.17 mg/kg, compared to the NMED residential SSL of 6.4 mg/kg. Ethylbenzene concentrations in soil peaked at 4.1 mg/kg in the sample collected at 25 feet (7.6 m) below ground surface. The ethylbenzene NMED residential SSL is 68 mg/kg. Total xylenes were reported at a maximum concentration of 0.12 mg/kg in the 15-foot (4.6-m) sample. The xylene residential SSL is 63 mg/kg. Only ethylbenzene was detected in soil in the 30-foot (9-m) depth sample at a concentration of 0.046 mg/kg.

Acetone and carbon disulfide were reported from one or more. Acetone was detected in 4 of the 6 samples at a maximum concentration of 0.60 mg/kg. Acetone does not have a corresponding NMED SSL, but the EPA Region 9 residential soil PRG for acetone is 1,400 mg/kg (EPA, 1998). Similarly, carbon disulfide was found in one sample at a concentration of 0.0065 mg/kg, compared to a residential soil PRG of 350 mg/kg. A SSL was not established by NMED for carbon disulfide. Post-sampling introduction of these common laboratory contaminants cannot be ruled out and may be suspected due to their trace concentrations.

Three components of diesel fuel were detected by the SVOC analysis. Naphthalene at a maximum concentration of 14 mg/kg was reported from the 25-foot (7.6-m) sample. The NMED residential and industrial SSL for naphthalene is 41 mg/kg (NMED, 2000). Fluorene was detected at a maximum concentration of 2 mg/kg, compared to a residential SSL of 15 mg/kg. Phenanthrene was detected at peak concentration of 18 mg/kg. The NMED residential SSL for phenanthrene is 1,800 mg/kg.

Following the trend of the VOC and SVOC data, TPH concentrations peaked in the 25-foot (7.6 m) sample (13,000 mg/kg) and decrease greatly in the 30-foot (9-m) sample (190 mg/kg) (IT Corp, 1992b). Although three of the six TPH samples exceeded the NM EIB land disposal standard of 1,000 mg/kg (NM Environmenal Improvement Board, 1995), the RFI report identifies SWMU 154, the Systemic Diesel Spill, as the likely source of the TPH (IT Corp, 1992b).

Total arsenic, barium, and lead were detected in some of the soil samples at concentrations that are indistinguishable from background. The highest arsenic concentration was 2.1 mg/kg below the NMED residential SSL for arsenic (3.9 mg/kg; NMED, 2000). Barium and lead were detected in a single sample at 22 mg/kg and 6.2 mg/kg, respectively. The respective NMED residential SSLs are 5,200 mg/kg for barium and 400 mg/kg for lead.

8.3.3 Investigation #2: Phase II-RCRA Facility Investigation

The Phase II RFI analyzed soil samples from the site to characterize the site in terms of contaminants potentially released. The report of the Phase II RFI was issued December 12, 1994 (Sverdrup Environmental, 1994).

8.3.3.1 Non-sampling Data Collection

During the Phase II RFI, site plans were obtained that showed that earlier reports of an underground storage tank were inaccurate. An aboveground tank had actually been used to

collect wastewater from the SWMU 147 sump (Sverdrup Environmental, 1994). The Phase II RFI reports that the sump dimensions were 5 feet (1.5 m) by 3 feet (90 cm) by 6.7 feet (2 m) deep. Approximately 2 feet (60 cm) of sediment and water were contained in the sump at the time of the Phase II RFI sampling event.

8.3.3.2 Sampling Data Collection

The RFI Work Plan called for a total of 45 soil samples to be collected from five soil borings around the suspected SWMU 147 underground storage tank. However, because of the new evidence indicating that wastewater was stored in an aboveground tank (not in an underground tank) investigators decided to cancel the soil boring program in October 1993 (Sverdrup Environmental, 1994).

In lieu of the planned soil samples, water and sediment from the sump were sampled. Samples were to be analyzed for VOCs, SVOCs, TPH, and RCRA toxicity characteristic metals. The sediment was also analyzed for RCRA metals by TCLP.

8.3.3.3 Data Gaps

The glass container with the sump wastewater TPH sample was broken and no TPH analysis of the water could be performed.

8.3.3.4 Results and Conclusions

Four VOCs and one SVOC were detected in the wastewater samples collected from the SWMU 147 sump. Two of the eight RCRA metals, barium and lead, were present in concentrations above the MDLs. Comparative regulatory levels are given although a release from the sump due to overflow or failed integrity is unconfirmed.

Methylene chloride was detected at a concentration of 0.0172 mg/l in the wastewater. The NMWQCC groundwater standard for methylene chloride is 0.1 mg/l (WQCC, 2001). 1, 1 Dichloroethene (1, 1-DCE; 1, 1-dichloroethylene) was present in the water sample at a concentration of 2.35 mg/l. The NMWQCC groundwater standard for 1, 1-DCE is 0.005 mg/l and the MCL is 0.007 mg/l. 1, 1-Dichloroethane was detected at a concentration of 0.210 mg/l in the sample collected from the SWMU 147-sump wastewater. The NMWQCC groundwater standard for 1, 1-dichloroethane is 0.025 mg/l. 1, 1, 1-Trichloroethane was detected at a concentration of 4.87 mg/l in the wastewater. The NMWQCC groundwater standard for 1, 1, 1-trichloroethane is 0.06 mg/l and the MCL is 0.2 mg/l. Bis(2-ethylhexyl)phthalate was positively identified at an estimated concentration of 0.034 mg/l. There is no NMWQCC standard for bis(2-ethylhexyl) phthalate but the MCL is 0.006 mg/l (EPA, 1996b).

Barium concentration in the wastewater sample from the SWMU 147 sump was reported as 0.14 mg/l, compared to the NMWQCC groundwater sample of 1.0 mg/l (WQCC, 2001). In the same sample, lead concentration was 0.004 mg/l. The NMWQCC standard for lead is 0.05 mg/l. The analytical results the sump sediment sampling indicated the presence of chlorinated solvents similarly to the wastewater samples. Methylene chloride, 1, 1-DCE, MEK (2-butanone), 1, 1-dichloroethane, and 1, 1, 1-trichloroethane were detected in the sediment at the following concentrations:

methylene chloride -	34.6 mg/kg
1, 1-DCE -	2,220 mg/kg
MEK -	56.2 mg/kg
1, 1-dichloroethane -	929 mg/kg
1, 1, 1-trichloroethane-	8,270 mg/kg

Additionally, the SVOC and TPH analyses of the sump sediment detected compounds concentrated above the MDLs. The TPH result was 45,100 mg/kg (or 4.5%). The SVOC analysis identified two phthalates in the sump sediment. Bis(2-ethylhexyl)phthalate was present in an estimated concentration of 28.3 mg/kg. The di-n-octylphthalate estimated concentration was 1.62 mg/kg.

Total barium, cadmium, chromium, lead, mercury, and selenium were present in concentrations exceeding the MDLs. Chromium and lead were present in concentrations exceeding the EPA Region 9 residential PRGs (210 mg/kg and 400 mg/kg, respectively; EPA, 1998). Chromium in the sump sediment sample was quantified at 289 mg/kg and the lead concentration was 490 mg/kg. The NMED SSLs list chromium, not as total chromium, but as the chromium 3^+ and chromium 6^+ valence states. The residential SSLs are 100,000 mg/kg and 230 mg/kg, respectively. None of the metals exceeded MDLs when the sediment was analyzed by TCLP (Sverdrup Environmental, 1994).

The report concluded that a Corrective Measures Study should be conducted at SWMU 147 to determine remedial alternatives for the sump, even though the RFI found that an underground storage tank never existed at the site.

8.3.4 Investigation #3: Sump Removal and Closure

The contents of the sump that was named as the Decontamination Pad Underground Waste Tank were removed by DEI in 1996. Prior to sealing the sump with concrete, soil borings were made through the bottom of the sump to collect soil samples.

8.3.4.1 Non-sampling Data Collection

Investigation results were based on soil sampling. Non-sampling data is not presented in the site closure report (DEI, 1997d).

8.3.4.2 Sampling Data Collection

Liquid waste and sludge were sampled and then pumped out for disposal. A core drill was used to perforate three holes through the bottom of the sump. Three soil samples plus one quality control sample were taken from six inches (15 cm) below the bottom of the sump. The locations of the soil samples are shown in Figure 8-2 on the following page.

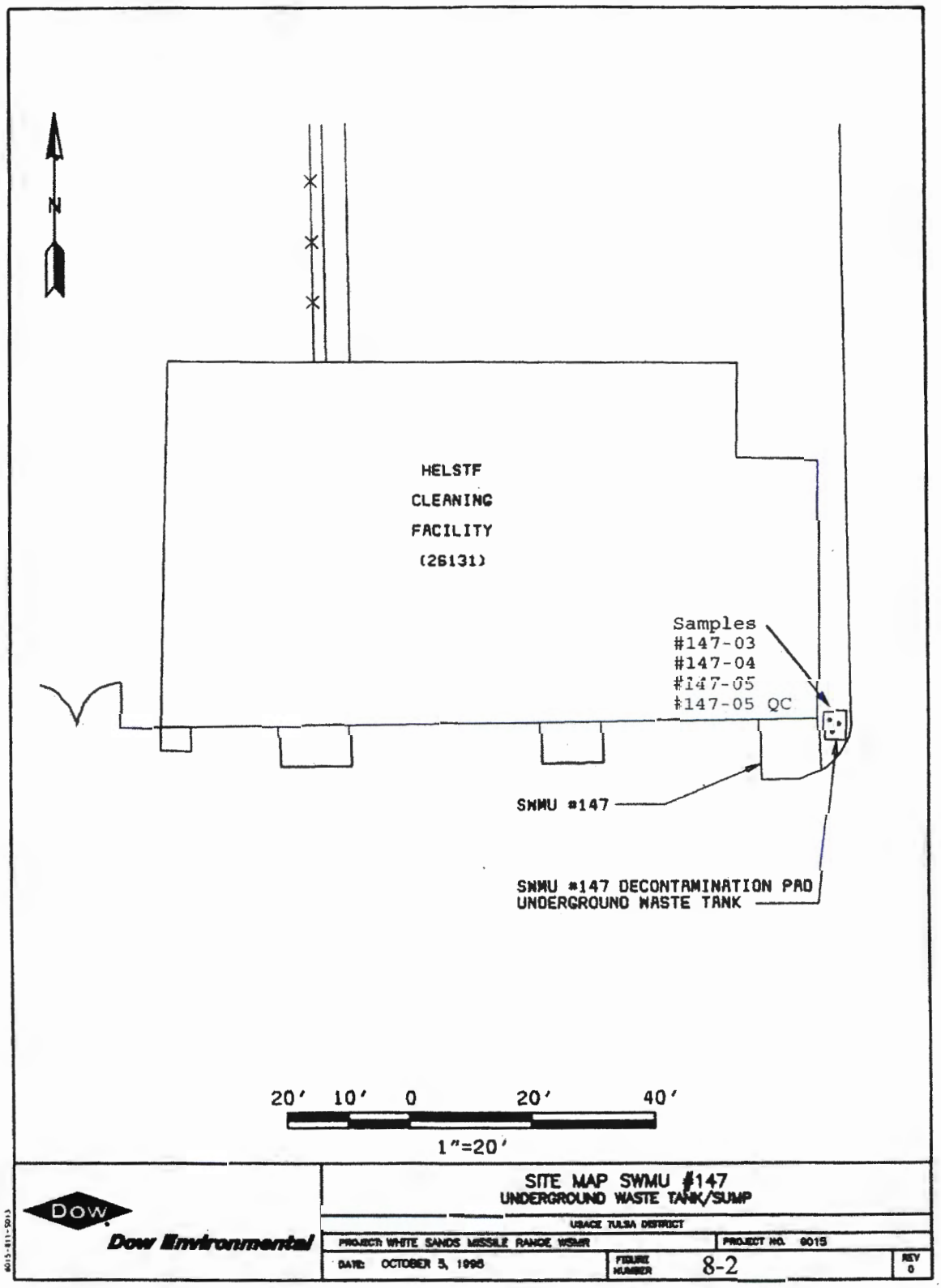


Figure 8-2. Locations of sample sites within the concrete sump during the Phase II RFI (from DEI, 1997d).

Sump wastewater was analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH. The sediment in the sump was analyzed for TPH and PCBs, then a full TCLP suite was run including VOCs, SVOCs, PCBs, pesticides/herbicides, and RCRA toxicity characteristic metals. Soil from beneath SWMU 147 was analyzed for VOCs, SVOCs, TPH, and PCBs (DEI, 1997d).

8.3.4.3 Data Gaps

No data gaps appear in the report (DEI, 1997d).

8.3.4.4 Results and Conclusions

Analyses of the sump contents proved to be hazardous. The hazardous waste was drummed and shipped to Louisiana for incineration (DEI, 1997d).

Tables 8-1, 8-2 and 8-3 on the following pages summarize the analytical results of soil samples collected from below SWMU 147. If present, organic compounds analyzed for by VOC, SVOC and PCB methods were below the corresponding MDLs. The contractor sealed the sump with concrete without analyzing soil for total metals for comparison to screening action levels (DEI, 1997d).

8.4 Site Conceptual Model

8.4.1 Nature and Extent of Contamination

Soil analyses at SWMU 147 indicate that contaminants identified in the wastewater sump (primarily solvents) are detectable in adjacent soils, but at concentrations below the appropriate screening action levels. Diesel fuel components found in soil samples adjacent to the SWMU are likely attributable to the Systemic Diesel Spill (SWMU 154) because these compounds were never in use at SWMU 147.

8.4.2 Environmental Fate

The SWMU 147 sump has been eliminated as a future potential source of contaminants. Prior VOC releases to the soil were shown in the RFI to be minimal. Without a source of wastewater, concentrations of VOCs will remain below screening action levels. Further decreases in VOC concentrations in soil would be expected due to oxidation and microbial metabolism.

8.5 Site Assessments

8.5.1 Screening Assessments

Human and ecological screening assessments appear in the White Sands RFI (see Section 8.4) (IT Corp, 1992; Sverdrup, 1994). The sampling analyses indicate that the risk-based screening action levels established by state and federal regulatory agencies were not exceeded at SWMU 147.

8.5.2 Risk Assessments

A formal human and/or ecological risk assessment has not been completed for SWMU 147 because the results of the screening analyses did not exceed action thresholds.

Table 8-1. Summary of VOC results from soil samples collected beneath SWMU 147.

Sample Attributes			Volatile Organic Compounds by EPA Method 8260 (mg/kg)			
Analyte	Sample Date	Sample Depth (ft)	ID# 147-03	ID# 147-04	ID# 147-05	ID# 147-05 QC
1,1,1-Trichloroethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,1,2,2-Tetrachloroethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,1,2-Trichloroethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,1-Dichloroethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,1-Dichloroethene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,2,3-Trichlorobenzene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,2-Dichloroethane (EDC)	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,2-Dichloropropane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
2-Chloroethyl vinyl ether	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
2-hexanone	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Acetone	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Acrolein	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Acrylonitrile	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Benzene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Bromodichloromethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Bromoform	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Bromomethane (methyl bromide)	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
cis-1,3-Dichloropropene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Carbon Tetrachloride	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
cis-1,2-Dichloroethene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Chlorobenzene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Chloroethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Chloroform	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Chloromethane (methyl chloride)	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Carbon Disulfide	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Dichlorodifluoromethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Dibromochloromethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Dibromomethane (methylene bromide)	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Ethylbenzene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Ethyl Methacrylate	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Iodomethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Dichloromethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Methyl Ethyl Ketone	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Methyl Isobutyl Ketone (4-me-2-pentanone)	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Styrene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Tetrachloroethene (PCE)	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Toluene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
trans-1,3-Dichloroethene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
trans-1,3-Dichloropropene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
trans 1,4-Dichloro-2-butene	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Trichloroethene (TCE)	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Trichlorofluoromethane	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Vinyl Acetate	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Vinyl Chloride	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Xylenes, meta	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Xylenes, ortho	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Xylenes, para	1/31/96	0.5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)

ND – non detect
mg/kg – milligrams per kilogram

Table 8-2. Summary of SVOC results from soil samples collected beneath SWMU 147.

Sample Attributes			Volatile Organic Compounds by EPA Method 8270 (mg/kg)			
Analyte	Sample Date	Sample Depth (ft)	ID# 147-03	ID# 147-04	ID# 147-05	ID# 147-05 QC
1,2,4-Trichlorobenzene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
1,2-Dichlorobenzene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
1,2-Diphenyl Hydrazine	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
1,3-Dichlorobenzene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
1,4-Dichlorobenzene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2,4,6-Trichlorophenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2,4-Dichlorophenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2,4-Dimethylphenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2,4-Dinitrophenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2,4-Dinitrotoluene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2,6-Dinitrotoluene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Dibenzo(a,h)anthracene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
bis (2-chloroethoxy) methane	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
bis (2-chloroethyl) ether	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
bis (2-chloroisopropyl) ether	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2-Chloronaphthalene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2-Chlorophenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2-Methylnaphthalene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2-Nitroaniline	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
2-Nitrophenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
3,3-Dichlorobenzidine	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
3-Nitroaniline	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
4,6-Dinitro-2-methylphenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
4-Chloro-3-methylphenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
4-Chloroaniline	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
4-Nitroaniline	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Acenaphthene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Anthracene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Bis (2-ethylhexyl) phthalate	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Benzo(a)anthracene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Benzo(a)pyrene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Benzo(b)fluoranthene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Benzo(g,h,i)perylene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Benzo(k)fluoranthene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Benzoic acid	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Benzidine	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
4-Bromophenyl Phenyl Ether	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Butyl Benzyl Phthalate	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Benzyl alcohol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Chrysene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
4-Chlorophenyl Phenyl Ether	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Cresols	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Phenan	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Dibenzofuran	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Diethylphthalate	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Dimethylphthalate	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Di-n-butylphthalate	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Di-n-octylphthalate	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Fluoranthene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Fluorene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Hexachlorobenzene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Hexachlorobutadiene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Hexachloropentadiene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Hexachloroethane	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Indeno(1,2,3-cd)pyrene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Isophorone	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
n-Nitrosodi-n-propylamine	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
n-Nitrosodimethylamine	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)

Sample Attributes			Volatile Organic Compounds by EPA Method 8270 (mg/kg)			
Analyte	Sample Date	Sample Depth (ft)	ID# 147-03	ID# 147-04	ID# 147-05	ID# 147-05 QC
n-Nitrosodiphenylamine	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Naphthalene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Nitrobenzene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Pentachlorophenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Phenanthrene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Phenol	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Pyrene	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
Pyridine	1/31/96	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)

ND – non detect
mg/kg – milligrams per kilogram

Table 8-3. Summary of confirmation sampling for TPH and PCBs from beneath SWMU 147 on January 31, 1996

Sample Attributes			EPA Method 8015 (mg/kg)		EPA Method 8020 (mg/kg)						
Sample ID# (Figure 8-2)	Matrix	Sample Depth (ft)	Gasoline range organics	Diesel range organics	PCB 1016	PCB 1221	PCB 1232	PCB 1242	PCB 1248	PCB 1254	PCB 1260
0147-03	soil	0.5	ND (10)	ND (10)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0147-04	soil	0.5	ND (10)	ND (10)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0147-05	soil	0.5	ND (10)	ND (10)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
0147-05 QC	soil	0.5	ND (10)	ND (10)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)

ND – non detect
mg/kg – milligrams per kilogram

8.5.3 Other Applicable Assessments

A screening assessment for soil erosion potential at the site was conducted according to the procedure developed by the NMED Surface Water Quality Bureau. A copy of the completed assessment worksheet is presented in Appendix C. The erosion potential survey found that the risk of contaminant migration with stormwater is low (the site scored 15.6 on a scale of 100).

8.6 No Further Action Proposal

On the basis of the results of previous investigations, application is hereby made to perform a Class III modification to remove SWMU 147 from the White Sands Missile Range Part B permit HSWA module (Permit #NM2750211235, Module VIII), in accordance with 40 CFR 264.514 and 270.42, and 20 NMAC 4.1.

8.6.1 Rationale

The results of previous investigations at the Decontamination Pad Underground Waste Tank indicate that the environmental effects of SWMU 147 do not pose a threat to human health or the environment, nor affect the projected land use. Corrective action has been performed to eliminate the sump as a future contaminant source.

8.6.2 Criterion

The SWMU 147 was sealed with concrete in 1996 to prevent any discharges of wastewater. Criterion 5 (see Appendix A) of the NMED-HRMB Standard Operating Procedures Manual, Volume 1, Section II.B.4.a.(4).(b)., is applicable (NMED, 1998). The SWMU was "characterized and remediated in accordance with current applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use."

9.0 SWMU 148; MAR WASTE STABILIZATION POND

9.1 Summary

A sewage treatment lagoon that served the previous occupants of the current HELSTF site was designated as SWMU 148. The treatment lagoon was decommissioned and paved for equipment storage, which is the current use of the site. Characterization of soils beneath the site during the White Sands RFI did not confirm contamination from the SWMU. Groundwater contamination near the site is attributed to adjacent SWMUs.

9.2 Description and Operational History

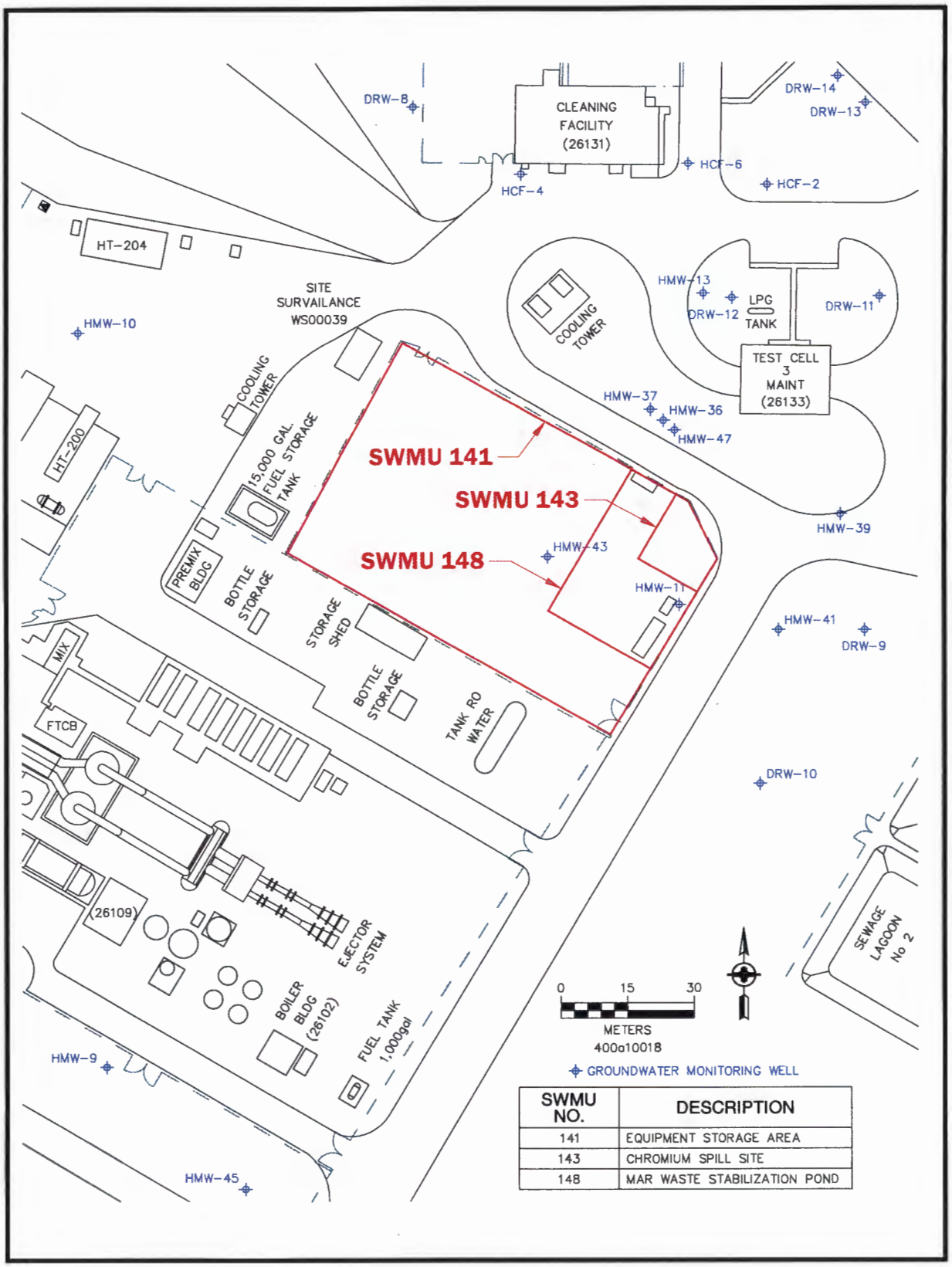
9.2.1 Site Description

The Multifunctional Array Radar (MAR) site Waste Stabilization Pond was a surface impoundment that received sanitary sewer effluent during the 1960's. Part of the current HELSTF operations occupies buildings constructed in the early 1960's that comprised the former MAR site. The MAR Waste Stabilization Pond's purpose was to treat (by facultative microbes) and dispose of (by evaporation) wastewater. The impoundment was unlined and had estimated dimensions of 130 by 110 feet (40 x 33.5 m) and 7 feet (2 m) deep. Subsequently the impoundment was back-filled, regraded, and paved. The site of the Waste Stabilization Pond was designated SWMU 148 and placed in the HSWA module (Module VIII) of the White Sands RCRA Part B permit. The paved-over SMWU 148 site is currently beneath the southeast end of the HELSTF Equipment Storage Area (SWMU 141). The location of the SWMU 148/141 site is shown in Figure 9-1 on the following page.

9.2.2 Operational History

The Waste Stabilization Pond was operated from the time of construction in the 1960's until the conclusion of the MAR project in the 1970's (exact dates unavailable). Design capacity and actual daily discharges of wastewater to the facility are unknown. The site was unused for a number of years before the treatment pond was backfilled and paved over during the construction of HELSTF. The current appearance of the site is shown in Photograph 9-1.

Photograph 9-1. Current view looking northwest of the SWMU 148 site, which is paved over by the Equipment Storage Area (SWMU 141).



SWMU NO.	DESCRIPTION
141	EQUIPMENT STORAGE AREA
143	CHROMIUM SPILL SITE
148	MAR WASTE STABILIZATION POND

Figure 9-1. Site plan of SWMU 148 and SWMU 141.

9.3 Previous Investigations

9.3.1 Summary

The site of the former MAR Waste Stabilization Pond was characterized during the Phase I (IT Corp, 1992b) and Phase II (Sverdrup Environmental, 1994) RFIs. The RFI results suggest that corrective measures are not necessary at the site.

9.3.2 Investigation #1: Phase I-RCRA Facility Investigation

The Phase I RFI was conducted to characterize potentially hazardous constituents released from the MAR Waste Stabilization Pond. Characterization of the site included chemical analysis of soil and groundwater associated with the construction of monitoring well HMW-11. The investigators attributed hexavalent chromium found in the groundwater to SWMU 143 and not to SWMU 148 (IT Corp, 1992b).

9.3.2.1 Non-sampling Data Collection

A greenish-yellow tint to the groundwater was noted during HMW-11 well development. Based on this observation, investigators determined that the sample should be analyzed for hexavalent chromium.

9.3.2.2 Sampling Data Collection

Seven soil samples and one groundwater sample were analyzed to determine the chemical components. Six soil samples were collected from 5 locations within the HMW-11 boring. The depths from which the sample was collected are 10, 20, 25, 30, and 37 feet (3, 6, 7.6, 9, and 11.3 m). The seventh soil sample was collected from a location thought to be representative of background conditions. After completion and development of the well, groundwater samples were collected. The samples were analyzed for VOCs, SVOCs, total RCRA toxicity characteristic metals, and TPH. In addition, the groundwater sample was analyzed for hexavalent chromium (IT Corp, 1992b).

9.3.2.3 Data Gaps

No data gaps are identified.

9.3.2.4 Results and Conclusions

Trace concentrations of total chromium (0.031 mg/kg) and arsenic (0.54 mg/kg) were detected in the background soil sample. No other target analytes were above MDLs in this sample.

The soil samples from the HMW-11 borehole contained only metals, no organics above the MDLs. Arsenic was detected in all samples at a maximum concentration of 5.2 mg/kg. The NMED residential SSL for arsenic is 3.9 mg/kg. The NMED industrial SSL for arsenic is 17 mg/kg (NMED, 2000). The maximum barium concentration reported from the soil samples was 57 mg/kg, compared to the residential SSL of 5,200 mg/kg. Lead was detected in three of the six soil samples at a maximum concentration of 6.6 mg/kg. The residential SSL for lead is

400 mg/kg. The report concluded that the metals concentrations detected in the soil samples are consistent with background concentrations seen in the area (IT Corp, 1992b).

The groundwater sample from HMW-11 contained chromium, selenium, 1,1-dichloroethylene (DCE) and trichloroethylene (TCE). Total chromium was measured in the sample at a concentration of 7.1 mg/l, which exceeds the NMWQCC groundwater standard of 0.05 mg/l (WQCC, 2001) and the EPA MCL of 0.1 mg/l (EPA, 1996b). A similar hexavalent chromium concentration of 7.4 mg/l was reported from HMW-11. There is no specific NMWQCC standard or MCL for hexavalent chromium, but the EPA Region 9 PRG for tap water is 0.18 mg/l (EPA, 1998).

The groundwater sample was found to contain 0.031 mg/l DCE. The NMWQCC groundwater standard to DCE is 0.005 mg/l. TCE was detected at a concentration of 0.96 mg/l, in excess of the NMWQCC standard of 0.1 mg/l. The report concluded that the MAR Waste Stabilization Pond is not the source of the groundwater contamination, based on the results of the soil sampling (IT Corp, 1992b).

9.3.3 Investigation #2: Phase II-RCRA Facility Investigation

Revision 1 of the Phase II RFI report was issued December 12, 1994 (Sverdrup Environmental, 1994). Additional soil sampling during monitor well construction was conducted at SWMU 148.

9.3.3.1 Non-sampling Data Collection

The investigation was based on chemical analysis of environmental samples. Non-sampling data is not presented.

9.3.3.2 Sampling Data Collection

As shown in Figure 9-2 on page 109, nine 10 foot (3 m) soil borings were performed at SWMU 148. Samples were collected at 5-foot (1.5 m) intervals for a total of 27 soil samples. Each sample was analyzed for VOCs, SVOCs, total RCRA metals, and total hexavalent chromium (Sverdrup Environmental, 1994).

9.3.3.3 Data Gaps

No data gaps are reported.

9.3.3.4 Results and Conclusions

Five of the 8 RCRA metals were detected in the samples. Tables 9-1, 9-2 and 9-3 present the metals data reported by the laboratory for samples from Soil Borings 1 through 9.

Arsenic was detected in 8 of the 27 samples at a maximum concentration of 4.86 mg/kg. The NMED residential SSL for arsenic is 3.9 mg/kg (NMED, 2000). The industrial SSL for arsenic is 17 mg/kg. Barium was detected in each of the 27 samples. The maximum detected barium concentration reported was 112 mg/kg, compared to the residential SSL of 5,200 mg/kg. Lead was detected in 14 of the 27 at a maximum concentration of 8.17 mg/kg. The NMED residential

SSL for lead is 400 mg/kg. Mercury was detected in a single sample out of the 27 soil samples analyzed. The mercury concentration was determined to be 0.0474 mg/kg, below the NMED residential SSL of 23 mg/kg. Silver was detected in 10 of the 27 samples. The maximum detected concentration of silver was 74.8 mg/kg, compared to the residential SSL of 380 mg/kg. Hexavalent chromium was not detected in any soil samples above the MDL (Sverdrup Environmental, 1994).

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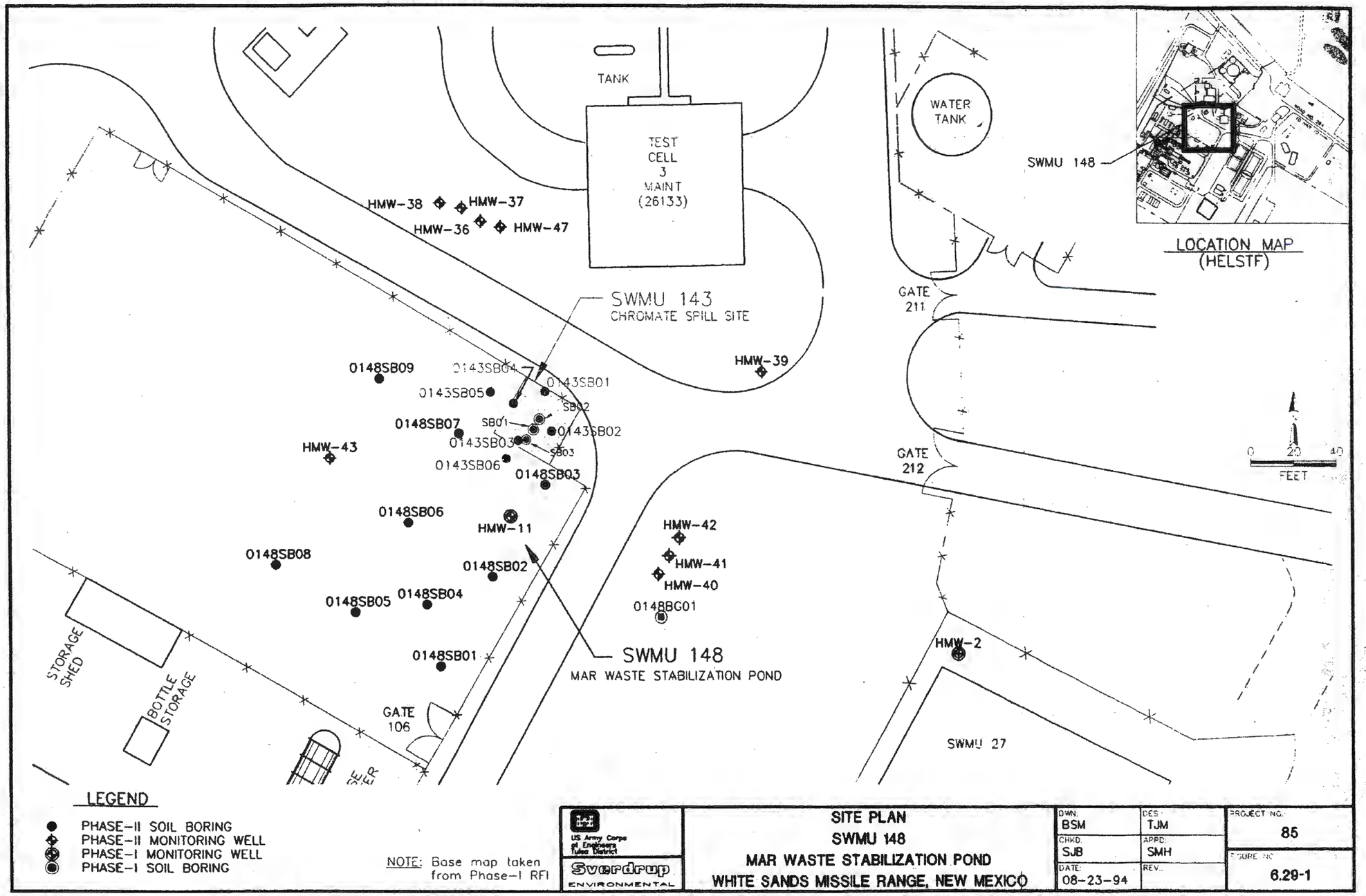

Figure 9-2. Location of Samples at SWMU 148.

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Table 9-1.
Summary of RCRA metals results of soil sampling at Soil Borings –01, -02 and –03, collected in November 1993. Sample depth (in feet) included as part of the sample ID# (in parentheses). Location of the soil borings are shown in Figure 9-2.

Analyte	EPA SW-846	Analytical Results (mg/kg)for RCRA Metals in Soil Samples from SWMU 148										
		0148SB01 (001.0)	0148SB01 (004.0)	0148SB01 (004.0)QC	0148SB01 (008.0)	0148SB02 (002.0)	0148SB02 (004.0)	0148SB02 (008.0)	0148SB03 (001.0)	0148SB03 (004.0)	0148SB03 (004.0)QC	0148SB03 (008.0)
Arsenic	7060	3.74	ND (3.19)	ND (3.10)	ND (3.33)	4.86	ND (3.20)	ND (3.35)	3.51	3.42	ND (3.23)	ND (3.34)
Barium	6010	97.8	37.0	36.0	70.6	108.	74.3	89.7	97.8	102.	63.3	77.4
Cadmium	6010	ND (5.97)	ND (6.38)	ND (6.21)	ND (6.66)	ND (5.94)	ND (6.40)	ND (6.69)	ND (3.06)	ND (6.08)	ND (6.46)	ND (6.68)
Chromium	6010	ND (29.8)	ND (31.9)	ND (31.0)	ND (33.3)	ND (29.7)	ND (32.0)	ND (33.5)	ND (15.3)	ND (30.4)	ND (32.3)	ND (33.4)
Lead	7421	8.17	ND (3.19)	ND (3.10)	ND (3.33)	6.84	ND (3.20)	ND (3.35)	6.00	ND (3.04)	ND (3.23)	ND (3.34)
Mercury	7470	ND (0.0239)	ND (0.0255)	ND (0.0248)	ND (0.0266)	ND (0.0238)	ND (0.0256)	ND (0.0268)	ND (0.0244)	ND (0.0243)	ND (0.0258)	ND (0.0267)
Selenium	7740	ND (2.98)	ND (3.19)	ND (3.10)	ND (3.33)	ND (2.97)	ND (3.20)	ND (3.35)	ND (3.06)	ND (3.04)	ND (3.23)	ND (3.34)
Silver	6010	ND (29.8)	ND (31.9)	39.8	74.6	ND (29.7)	38.4	40.2	ND (15.3)	35.3	49.1	74.8

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

Table 9-2.
Summary of RCRA metals results of soil sampling at Soil Borings –04, -05 and –06, collected in November 1993. Sample depth (in feet) included as part of the sample ID# (in parentheses). Location of the soil borings are shown in Figure 9-2.

Analyte	EPA SW-846	Analytical Results (mg/kg)for RCRA Metals in Soil Samples from SWMU 148									
		0148SB04 (001.0)	0148SB04 (004.0)	0148SB04 (009.0)	0148SB05 (001.0)	0148SB05 (004.0)	0148SB05 (009.0)	0148SB06 (001.0)	0148SB06 (001.0)QC	0148SB06 (004.0)	0148SB06 (009.0)
Arsenic	7060	ND (3.10)	ND (3.15)	ND (3.46)	ND (2.96)	ND (3.20)	ND (3.41)	3.57	3.60	3.38	ND (3.43)
Barium	6010	94.4	41.6	111.	72.2	55.1	95.5	112.	110.	97.2	92.0
Cadmium	6010	ND (6.21)	ND (6.30)	ND (3.46)	ND (2.96)	ND (12.8)	ND (6.82)	ND (6.22)	ND (5.77)	ND (5.92)	ND (6.87)
Chromium	6010	ND (31.0)	ND (31.5)	ND (17.3)	ND (14.8)	ND (32.1)	ND (34.1)	ND (31.1)	ND (28.8)	ND (29.6)	ND (34.3)
Lead	7421	4.30	ND (3.15)	ND (3.46)	6.12	3.92	ND (3.41)	6.30	5.94	5.44	4.48
Mercury	7470	ND (0.0248)	ND (0.0252)	ND (0.0277)	ND (0.0237)	ND (0.0256)	ND (0.0273)	ND (0.0249)	ND (0.0231)	ND (0.0237)	ND (0.0275)
Selenium	7740	ND (3.10)	ND (3.15)	ND (3.46)	ND (2.96)	ND (3.20)	ND (3.41)	ND (3.11)	ND (2.88)	ND (2.96)	ND (3.43)
Silver	6010	ND (48.4)	66.8	ND (17.3)	ND (14.8)	ND (32.1)	46.4	54.7	70.4	ND (29.6)	ND (34.3)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

Table 9-3.
Summary of RCRA metals results of soil sampling at Soil Borings –07, -08 and –09, collected in November 1993. Sample depth (in feet) included as part of the sample ID# (in parentheses). Location of the soil borings are shown in Figure 9-2.

Analyte	EPA SW-846	Analytical Results (mg/kg) for RCRA Metals in Soil Samples from SWMU 148								
		0148SB07 (001.0)	0148SB07 (004.0)	0148SB07 (009.0)	0148SB08 (001.0)	0148SB08 (004.0)	0148SB08 (009.0)	0148SB09 (001.0)	0148SB09 (004.0)	0148SB09 (009.0)
Arsenic	7060	ND (3.12)	3.46	ND (3.47)	ND (2.96)	ND (3.27)	ND (3.36)	3.57	ND (3.33)	ND (3.33)
Barium	6010	47.4	70.5	94.3	85.4	45.8	68.4	112.	62.7	62.7
Cadmium	6010	ND (6.23)	ND (6.08)	ND (6.93)	ND (5.93)	ND (6.54)	ND (6.71)	ND (6.22)	ND (6.67)	ND (6.67)
Chromium	6010	ND (31.2)	ND (30.4)	ND (34.7)	ND (29.6)	ND (32.7)	ND (33.6)	ND (31.1)	ND (33.3)	ND (33.3)
Lead	7421	3.65	6.63	4.20	5.22	ND (3.27)	ND (3.36)	6.30	ND (3.33)	ND (3.33)
Mercury	7470	0.0474	ND (0.0243)	ND (0.0277)	ND (0.0237)	ND (0.0261)	ND (0.0268)	ND (0.0249)	ND (0.0267)	ND (0.0267)
Selenium	7740	ND (3.12)	ND (3.04)	ND (3.47)	ND (2.96)	ND (3.27)	ND (3.36)	ND (3.11)	ND (3.33)	ND (3.33)
Silver	6010	ND (31.2)	ND (30.4)	ND (34.7)	72.4	ND (32.7)	ND (33.6)	54.7	ND (33.3)	ND (33.3)

ND (000.0) – non detect (MDL)
mg/kg – milligrams per kilogram

Several detections of organic compounds were reported from the soil sample analyses. Acetone was measurable in one of the 27 samples. An acetone concentration of 0.0374 mg/kg was reported from a sample collected at 9 feet (2.7 m). There is no SSL established by NMED for acetone, but the PRG listed by EPA Region 9 for residential land use is 1,400 mg/kg (EPA, 1998). Analysis positively identified DCE in one of the 27 soil samples. The concentration of DCE in the sample collected from a 1-foot (30-cm) depth was quantified at 0.00672 mg/kg. The NMED residential SSL for DCE is 8.1 mg/kg (NMED, 2000). Methylene chloride was detected in 4 of the 27 samples. The maximum concentration reported was 0.009 mg/kg. However, methylene chloride was also detected in the method blank for those samples. The EPA Region 9 residential soil PRG for methylene chloride is 8.5 mg/kg. NMED has not established a SSL for methylene chloride. A phthalate compound was detected in one of the 27 samples. A concentration of 0.592 mg/kg di-n-butyphthalate was detected in a sample collected at a depth of 8 feet (2.4 m). The NMED residential SSL for dibutyphthalate is 6,100 mg/kg.

The report of the Phase II RFI concluded that a release from SWMU 148 is not evident from the soil data. It reiterated that the ground-water contamination detected in the nearby well (HMW-11) was attributable to the SWMU 143 Chromate Spill Site (Sverdrup Environmental, 1994).

9.4 Site Conceptual Model

9.4.1 Nature and Extent of Contamination

Lasting environmental effects of the MAR Waste Stabilization Pond are not apparent from data collected. Soils at the former site of the SWMU cannot be considered a source for contaminant migration according to analytical results. Metals and organics detected in the soil samples are below the applicable soil screening action levels. Several of the detected VOCs are not persistent in soils and likely have a source other than SWMU 148. The low concentrations of organic compounds detected are consistent with introduction during the sampling and/or analysis procedures.

Groundwater contamination in the well (HMW-11) drilled at SWMU 148 cannot be attributed to the MAR Waste Stabilization Pond operation based on the RFI soil sampling results. Hexavalent chromium is present in the groundwater, but not in the soil at SWMU 148. The source of the chromium is believed to be SWMU 143, the Chromate Spill Site. Similarly, the solvents detected in groundwater at HMW-11 do not have a corresponding source at the SWMU 148 site. Although the SWMU is not suspected of being a contaminant source, the monitor well drilled during the RFI remains as a data collection point in the wider investigation of other SWMUs at HELSTF.

The DCE detected in near-surface soil during the Phase II RFI (see Section 9.3.3.4) is more likely a recent release from SWMU 141 (overlapping SWMU 148) than residual from wastewater treatment operations in the 1960's and 1970's. The isolated DCE detection in soil is far below the screening action level. A volatile solvent like DCE is not expected to persist at that shallow depth over decades, but would likely be oxidized or volatilized.

9.4.2 Environmental Fate

The MAR Waste Stabilization Pond was backfilled and paved, effectively preventing migration of waste materials by surface water runoff or groundwater infiltration. In addition, soil sampling at the treatment pond site indicates that hazardous contaminants are not present at the site in excess of the screening action levels, which are developed to be protective of human health and the environment.

9.5 Site Assessments

9.5.1 Screening Assessments

Human and ecological screening assessments appear in the White Sands RFI (see Section 9.4) (IT Corp, 1992; Sverdrup, 1994). The sampling analyses indicate that the risk-based screening action levels established by state and federal regulatory agencies were not exceeded at SWMU 148.

9.5.2 Risk Assessments

A formal human and/or ecological risk assessment has not been completed for SWMU 148 because the results of the screening analyses did not exceed action thresholds.

9.5.3 Other Applicable Assessments

A screening assessment for soil erosion potential at the site was conducted according to the procedure developed by the NMED Surface Water Quality Bureau. A copy of the completed assessment worksheet is presented in Appendix C. The erosion potential survey found that the risk of contaminant migration with stormwater is low (the site scored 15.6 on a scale of 100).

9.6 No Further Action Proposal

On the basis of the results of previous investigations, application is hereby made to perform a Class III modification to remove SWMU 148 from the White Sands Missile Range Part B permit HSWA module (Permit #NM2750211235, Module VIII), in accordance with 40 CFR 264.514 and 270.42, and 20 NMAC 4.1.

9.6.1 Rationale

The results of previous investigations at the SWMU 148 site indicate that the environmental effects of the MAR Waste Stabilization Pond do not pose a threat to human health or the environment, nor affect the projected land use. Groundwater contamination in the area cannot be related to the wastewater treatment operation based on the site soil sampling results. Soil analyses from the site do not exceed screening action levels. The investigation of the groundwater contamination at HELSTF continues in conjunction with other SWMUs.

9.6.2 Criterion

Contaminants in concentrations potentially hazardous to human health and the environment are not present at the SWMU 148 site. Criterion 5 (see Appendix A) of the NMED-HRMB Standard Operating Procedures Manual, Volume 1, Section II.B.4.a.(4).(b)., is applicable (NMED, 1998). The SWMU was "characterized or remediated in accordance with current applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use."

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DEI, 1997a. *Close Out Report, SWMU 8 – Waste Oil Tank, White Sands Missile Range, New Mexico.* USACE Contract DACA56-93-D-0016, Dow Environmental Inc., Project No. 6015.

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DEI, 1997d. *Close Out Report, SWMU 147 – Underground Waste Tank (Sump), White Sands Missile Range, New Mexico.* USACE Contract DACA56-93-D-0016, Dow Environmental Inc., Project No. 6015.

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ESE, 1996. *Groundwater Quality Investigation for the Monitoring Well Program at White Sands Missile Range, New Mexico.* prepared for USACE by Environmental Science & Engineering, Inc., Phoenix, October 1996.

IT Corp, 1992a. *Final RCRA Facility Investigation Report, Appendix I Sites, White Sands Missile Range, New Mexico, Volume 1.* USACE, Huntsville, Alabama, Contract No. DACA 87-90-D-0015, International Technology Corporation Project No. 42-1552.

IT Corp, 1992b. *Final RCRA Facility Investigation Report, Appendix II, III, IV Sites, White Sands Missile Range, New Mexico, Volume 1.* USACE, Huntsville, Alabama, Contract No. DACA 87-90-D-0015, International Technology Corporation Project No. 42-1671.

Kearney, 1988. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection Report, White Sands Missile Range.* USEPA Contract No. 68-01-7374.

MEVATEC, 1997. *SWMU Groundwater Monitoring Program, White Sands Missile Range.* Prepared for the Directorate of Environment and Safety, Environmental Services Division; 300SS/96/002F, April 1997.

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NMED, 2000. *Technical Background Document for Development of Soil Screening Levels.* Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, December 18, 2000.

NM Environmental Improvement Board, 1995. *New Mexico Solid Waste Management Regulations.* Title 20, New Mexico Administrative Code, Chapter 9, Part 1.

Radian, 1997. *Close Out Report, SWMU 14 & 15 – Used Battery Accumulation Areas, White Sands Missile Range, New Mexico.* USACE Contract DACA56-93-D-0016, Radian International, LLC, Project No. 006015.

Sverdrup Environmental, Inc., 1994. *Phase-II RCRA Facility Assessment, Appendix I, II, III, IV Sites, White Sands Missile Range, New Mexico, Revision 1.* USACE, Tulsa District, Contract No. DACA56-93-D-0002/0001.

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EPA, 1996b. *Drinking Water Regulations and Health Advisories.* Office of Water, EPA 822-B-96-002, October.

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WQCC, 2001. *New Mexico Water Quality Control Commission Regulations.* Title 20, New Mexico Administrative Code, Chapter 6, Part 2, January 15, 2001.

APPENDIX A

CRITERIA FOR NO FURTHER ACTION PROPOSALS

NO FURTHER ACTION (NFA) PROPOSALS
CRITERIA

NFA Criterion 1 The Solid Waste Management Unit/Area of Concern (SWMU/AOC) cannot be located, does not to exist or is a duplicate SWMU/AOC.

NFA Criterion 2 The SWMU/AOC has never been used for the management (i.e., generation, treatment, storage and/or disposal) of Resource Conservation and Recovery Act (RCRA) solid waste or hazardous wastes and/or constituents or other Comprehensive Environmental Response, Conservation and Liability Act (CERCLA) hazardous substances.

NFA Criterion 3 No release to the environment has occurred or is likely to occur in the future from the SWMU/AOC.

NFA Criterion 4 A release from the SWMU/AOC to the environment has occurred, but the SWMU/AOC was characterized and/or remediated under another authority (such as the New Mexico Environment Department's Underground Storage Tank or Ground Water Quality Bureaus), which adequately addressed RCRA corrective action, and documentation, such as a closure letter, is available.

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

APPENDIX B

8/6/99 ANNUAL UNIT AUDIT LETTER FROM NMED

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous & Radioactive Materials Bureau
2044 Galisteo Street
P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-1557
Fax (505) 827-1544

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

CERTIFIED MAIL # Z 433 931 507
RETURN RECEIPT REQUESTED

COPY

August 6, 1999

Thomas A. Ladd, Director
Environmental and Safety
Department of the Army
U.S. Army White Sands Missile Range
White Sands Missile Range, New Mexico 88002

RE: WSMR ANNUAL UNIT AUDIT
EPA ID NO. NM2750211235

Dear Mr. Ladd:

The New Mexico Environment Department (NMED) Hazardous and Radioactive Materials Bureau (HRMB) has received the White Sands Missile Range (WSMR) letter dated July 29, 1999, regarding WSMR's 1998 Annual Unit Audit (AUA). HRMB has completed its review of the additional information provided by WSMR concerning removal of various Solid Waste Management Units (SWMU) from its Annual Hazardous Waste Management Business Fee (AHWMBF) assessment.

The following is HRMB's assessment of WSMR's aforementioned response, and HRMB's final determination on the status of those Corrective Action Units to be included in the AHWMBF assessment for 1998 (i.e., billable SWMUs). HRMB has organized its response to correspond with WSMR's July 29, 1999 letter:

1. **Non-existence of a unit- SWMU 17**, Waste Underground Injection Pipe (WSMR- 73):

   WSMR and HRMB **(Both Parties)** agree that SWMU 17 will remain on the WSMR 1998 AUA.

2. **Unit operated by another facility-** SWMU 132, Sewage Lagoon at Oro Grande Range Camp (WSMR-76):

   Both Parties agree that SWMU 132 will be removed from the WSMR 1998 AUA.

   HRMB has determined that WSMR is the owner of SWMU 132, and that it may erroneously be listed on the Ft. Bliss Operating Permit. Before December 31, 1999, HRMB will make a determination as to which facility Operating Permit this unit will remain in.

3. **Units with dual regulation-** SWMU 79, Sludge Drying Beds (WSMR-29); SWMU 85, STP Discharge Site and Playa Lake (WSMR-42); and SWMUs 27-30, HELSTF STP Lagoons (WSMR- 44):

   Both Parties agree that SWMUs 79, 85, and 27-30 will remain on the WSMR 1998 AUA.

4. **Units that can be combined- SWMUs 8-9,** Former Waste Oil Tank and Sump, Bldg. 1794 (WSMR-36); **SWMUs 10-11,** Vehicle Wash Pad and Drains/Sump and Oil/Water Separator, Bldg. 1794 (WSMR-74); **SWMUs 12-13,** Vehicle Wash Ramp and Drains/Sump and Oil/Water Separator, Bldg. 1778 (WSMR-60); **SWMUs 19-20,** Wash Pad, Drains, and Oil/Water Separator, Bldg. 1753 (WSMR-80); and **SWMUs 66-78,** Main Post Sewage Treatment Plant (WSMR-17):

   Both Parties agree: SWMUs 8-9 should become SWMU 8; SWMUs 10-11 should become SWMU 10; SWMUs 12-13 should become SWMU 12; SWMUs 19-20 should become SWMU 19; SWMU 66 should remain SWMU 66; and SWMUs 67-78 should become SWMU 67.

   Both Parties agree that SWMUs 8, 10, 12, 19, 66, and 67 will remain on the WSMR 1998 AUA.

5. **Units processed for NFA by EPA Region VI- SWMUs 18, 62, 79, 33, 34, 61, 92a, 93, 95-100, 121-123, 137, 141, 149, 151, 152, and 153:**

   Both Parties agree that SWMUs 18, 62, 79, 137, and 141 will be removed from the WSMR 1998 AUA.

Both Parties agree that SWMU 18 is, and should be listed as, a Satellite Accumulation Point (SAP).

SWMUs 33 and 34, HELSTF Holding Tanks (WSMR-49):

HRMB has determined that SWMUs 33 and 34 will remain on the WSMR 1998 AUA based upon the following:

i) WSMR has failed to provide documentation to HRMB that will verify that EPA Region VI has formally approved in writing this No Further Action (NFA).

ii) WSMR's July 29, 1999, letter states: "We believe this site should be removed from the AUA as originally proposed, since it produces no hazardous or regulated constituents." This statement does not disqualify a site from SWMU status. 20 NMAC 4.2.107.29 defines a SWMU as follows:

> 107.29 "Solid Waste Management Unit" or "SWMU" means any discernable unit at which *solid wastes* have been placed at any time, *irrespective of whether the unit was intended for the management of solid or hazardous waste*. Such units include any area at a facility at which *solid wastes* have been routinely and systematically released (emphasis added). [12-31-98]

SWMU 61, Tula Peak Burial Site Incinerator, (WSMR- 24):

HRMB has determined that SWMU 61 will remain on the WSMR 1998 AUA based upon the following:

i) WSMR has failed to provide documentation to HRMB that will verify that EPA Region VI has formally approved in writing this NFA.

ii) WSMR has failed to provide documentation to determine dates of operation for this SWMU. Dates of operation are critical to determine whether this unit was managing hazardous wastes after the date of regulation and should pursue RCRA closure with waste in place and Post-Closure Care.

SWMUs 92a, 93, and 95-100, Liquid Propellant Storage Area (WSMR-11):
Both Parties agree that these SWMUs 92a, 93, and 95-100 will remain on the WSMR 1998 AUA.

SWMUs 121-123, Stallion Asphalt Tanks (WSMR-67):

HRMB has determined that SWMUs 121-123 will remain on the WSMR 1998 AUA based upon the following:

i) WSMR has failed to provide documentation to HRMB that will verify that EPA Region VI has formally approved in writing this NFA.

ii) WSMR's July 29, 1999, letter stated that these SWMUs "...were removed and clean closed in 1993. Closure records are on file with the UST Bureau." A follow-up telephone conversation between Robin Smith of WSMR and Phillip Solano of HRMB, held on August 4, 1999, determined that these closure actions were, in fact, not co-ordinated through the UST Bureau.

SWMUs 149, 151, and 152, HELSTF Septic Systems (WSMR-46):

HRMB has determined that SWMUs 149, 151, and 152 will remain on the WSMR 1998 AUA based upon the following:

i) WSMR has failed to provide documentation to HRMB that will verify that EPA Region VI has formally approved in writing this NFA.

ii) WSMR's July 29, 1999, letter states that selenium levels were detected that exceed the *New Mexico Water Quality Control Commission (WQCC) Regulations* and the *USEPA Region VI Current And Proposed National Primary And Secondary Drinking Water Regulations*. The Phase I RFI reference data indicates that high concentrations of selenium are naturally occurring in the ground water at WSMR. Additionally, WSMR's HELSTF preliminary ground water model has also verified that high concentrations of selenium exist in the HELSTF area, thus indicating that this situation still exists. The HELSTF ground water model, once finalized, will need to be reviewed by HRMB.

iii) Finally, WSMR's July 29, 1999, letter stated that these SWMUs "... are active units. Only sanitary wastewater is treated." This statement does not disqualify a site from SWMU status. 20 NMAC 4.2.107.29 defines a SWMU as follows:

> 107.29 "Solid Waste Management Unit" or "SWMU" means any discernable unit at which *solid wastes* have been placed at any time, *irrespective of whether the unit was intended for the management of solid or hazardous waste*. Such units include any area at a facility at which *solid wastes* have been routinely and systematically released (emphasis added). [12-31-98]

SWMU 153, Vandal Burial Site (WSMR-58):

HRMB has determined that SWMU 153 will remain on the WSMR 1998 AUA based upon the following:

i) WSMR has failed to provide documentation to HRMB that will verify that EPA Region VI has formally approved in writing this NFA.

ii) WSMR's 1999 Installation Action Plan states that SWMU 153 is also known as the "Talos and Tarter Terrier Site". WSMR has determined that perchlorate is not a contaminant of concern at this site based upon its statement:

> "... extensive groundwater monitoring in the vicinity of this site (tied to the Open Burning/Open Detonation facility) does not show the presence of any contaminate of concern which can be linked to the Vandal Burial Site."

This is not justification for the removal of this site through the NFA process. HRMB will require a Sampling and Analysis Plan that will address any soils contamination at this site.

This letter constitutes WSMR's amended AUA, incorporating the above discussion. WSMR's Annual Hazardous Waste Management Business Fee is now $30,250. A summary work sheet used for the calculation of this fee is enclosed.

Payment is due within sixty (60) days of your receipt of this letter, as required by 20 NMAC 4.2.401. Should the Return Receipt be sent back to HRMB without a date of receipt, the fees are due sixty (60) days from the date of this letter. Payment should be made by certified check or money order payable to the New Mexico Environment Department Hazardous Waste Fund #339. Should you need to request an extension of the sixty (60) day period, the request must be received a minimum of fourteen (14) calendar days prior to the end of the sixty (60) day period. This fourteen (14) calendar day period is necessary to ensure that the facility receives written approval or denial prior to the expiration of the sixty (60) day payment period.

Should you or your staff wish to discuss the Annual Unit Audit Invoice during this extension period, please do not hesitate to contact me at (505) 827-1567, or Phillip Solano HRMB's WSMR Project Leader at (505) 827-1561 ext. 1021.

Sincerely,

James P. Bearzi
Chief
Hazardous and Radioactive Materials Bureau

cc.: Norma Silva, Manager, HRMB Financial & Data Management Program
Robert S. Dinwiddie, Manager, HRMB RCRA Permits Management Program
Cindy Abeyta, Management Analyst 3, HRMB Financial & Data Management Program
Steve Pullen, WRES I, HRMB RCRA Permits Management Program
Phillip Solano, Environmental Specialist, HRMB RCRA Permits Management Program

File: Red.WSMR.99
Track: WSMR.08/06/99.WSMR/Ladd.HRMB/JPB.RE
lr990806.auarspns

E N C L O S U R E

Received: 8/ 9/99 7:59; 6068271644 -> NRES BLDG 103; Page 2
08/09/99 07:45 FAX 5058271544 HRMB 002

ANNUAL UNIT AUDIT
INVOICE WORKSHEET SUMMARY

FACILITY: White Sands Missile Range

Unit Type/Description	Fee/Unit	No. of Units	Total Unit Fee
Land Disposal	$2,000.00	1	$2,000.00
Post Closure Care with Corrective Action	$2,000.00	1	$2,000.00
Post Closure Care w/o Corrective Action	$2,000.00	0	$0.00
Land Treatment	$1,500.00	0	$0.00
Surface Impoundment - Treatment	$1,500.00	0	$0.00
Incinerator	$1,500.00	0	$0.00
Boiler or Industrial Furnace	$1,500.00	0	$0.00
Subpart X - Treatment	$1,500.00	3	$4,500.00
Treatment in Tanks	$1,500.00	1	$1,500.00
Treatment in Containers	$1,500.00	0	$0.00
RD & D Treatment	$1,500.00	0	$0.00
Waste Pile	$1,000.00	0	$0.00
Surface Impoundment - Storage	$1,000.00	0	$0.00
Storage in Tanks	$1,000.00	0	$0.00
Storage in Containers	$1,000.00	1	$1,000.00
RD & D Storage	$1,000.00	0	$0.00
Corrective Action	$250.00	77	$19,250.00
TOTAL AHWMBF UNIT FEE			$30,250.00

APPENDIX C

SURFACE WATER SITE ASSESSMENT FOR EROSION POTENTIAL

Environmental Restoration Program
CONSTITUENT ASSESSMENT

SITE INFORMATION

1. SWMU/IRP# SWMU 8 + 9
2. Date/Time (M/D/Y H:M am/pm) 09/07/99 8:40am
3. ER Point of Contact R Smith
4. OU-Other/POC
5. ✓ HSWA Area of Concern (AOC) (check both if AOC is on HSWA Permit)
6. Site Ranking Score 15.6
7. Description of the historical operations of this SWMU/IRP:

SWMU 8 was a 5,000-gallon UST that collected waste motor oil for recycling. The UST was pulled in 1990. SWMU 9 is the funnel for pouring waste oil into the tank.

8. Description of the current operations of this SWMU/IRP (if any):

The SWMU 9 is connected to the AST that replaces SWMU 8.

PRS STATUS

Action/Status to Date (check all that apply)

		Date Completed or Anticipated
☐ None		
Field Investigation	✓ Phase I ✓ Phase II	P1 - 1992, P2 - 1994
Interim Measures	☐ IM ☐ BMPs	
Accelerated Cleanup	☐ VCA ☐ VCM	
Other	☐ Monitoring ✓ CMs	tank pull 1990
Report Status	☐ RFI Report ☐ SAP	
Other		

✓ NFA/DOU. If checked, supply criteria number(s): 5

SAMPLE INFORMATION

Y / N

✓ ☐ 10. Have surface/sediment (depth less than 12 inches) samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, sample ID, SAL, depth, & media (soil, tuff, etc.)
3) Please attach existing map, showing where samples were taken, if available.

} see Section 2 of Class III mod. petition

☐ ✓ 11. Have surface water samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, filtered/non-filtered, & flow data, if available.
3) Please attach existing map, showing where samples were taken, if available.

☐ ✓ 12. Is data pending? If yes: 1) List date data are anticipated:
2) Provide list of COPCs identified in RFI Work Plan as an attachment.

Chris Whitman

13. Signature of OU/Other Representative

SURFACE WATER SITE ASSESSMENT

SITE INFORMATION

1a) SWMU/ IRP # SWMU 8+9 1b) Structure Number [ ] 1c) OU Number [ ]

2. Date/Time (M/D/Y H:M am/pm) [ ]

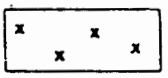
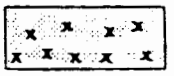
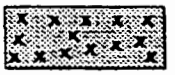
SITE SETTING (check all that apply)

3. ○ On mesa/hill top (a). ☑ In the canyon floor/drainage basin, but not in an established channel (c).

○ Within a bench of a canyon or drainage basin (b). ○ Within established channel in the canyon floor or drainage basin (d).

Explanation:

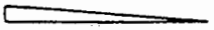
4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

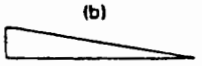
(illustration) (a)  (b)  (c) 

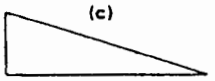
Estimated % of ground/canopy cover: ○ 0% to 25% ○ 25% to 75 ☑ 75% to 100

Explanation:
Site is within asphalt-paved equipment maintenance area.

5. Steepest slope at the area impacted:

(a)  ☑ Less than 10%

(b)  ○ 10% to 30%

(c)  ○ 30% and greater

Explanation:
Uniform grade across site. Significantly less than 10% slope.

RUNOFF FACTORS

Y / N

☐ ☑ 6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:

☐ ☐ 6a) Is runoff channelized? If yes, describe ○ Man-made channel. ○ Natural channel.

Explanation: SWMU 8 was underground and is now paved over. SWMU 9 is built on legs and suspended off of the ground.

SURFACE WATER SITE ASSESSMENT

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ Drainage or wetland (name) [ ]
- ○ Within bench of canyon setting (name) [ ]
- ○ Other (i.e., retention pond, meadow, mesa top) [ ]

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below ○ Sheet ○ Rill ○ Gully

Explanation:

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ 7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation:

☐ ☑ 8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☐ ☑ 9. Are natural drainage patterns directing stormwater onto site?

Explanation:

ASSESSMENT FINDING:

☐ ☑ 10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)

11. Signature of ER Representative

Initials of independent reviewer.

Check here when information is entered in database: ☐

SURFACE WATER SITE ASSESSMENT

This page is for Notes, recommendations, and photos.

	Y	N	
12 a)	O	✓	Is there visible trash/debris on the site?
b)	C	✓	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

SWMU 9 surface area is great enough to prevent waste oil releases during pouring. Any releases can be detected visually and remediated immediately.

✓ O Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

✓ O Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Recommended BMPs (Best Management Practices) for this site:

Environmental Restoration Program
CONSTITUENT ASSESSMENT

SITE INFORMATION

1. SWMU/IRP# SWMUs 12 and 13 2. Date/Time (M/D/Y H:M am/pm) 09/07/99 9:00 am
3. ER Point of Contact R. Smith 4. OU-Other/POC
5. ✓ HSWA Area of Concern (AOC) (check both if AOC is on HSWA Permit)
6. Site Ranking Score 15.6
7. Description of the historical operations of this SWMU/IRP:

The Vehicle Wash Ramp and Drains (SWMU 12) collected washwater from vehicle cleaning. The Sump and Oil/Water Separator (SWMU 13) provided pretreatment before discharging to the sanitary sewer system.

8. Description of the current operations of this SWMU/IRP (if any):

The facility is closed and inactive. The ramp was dismantled.

PRS STATUS

Action/Status to Date (check all that apply)

		Date Completed or Anticipated
☐ None		
Field Investigation	✓ Phase I ✓ Phase II	P1 - 1992, P2 - 1994
Interim Measures	☐ IM ☐ BMPs	
Accelerated Cleanup	☐ VCA ☐ VCM	
Other	☐ Monitoring ☐ CMs	
Report Status	☐ RFI Report ☐ SAP	
Other		

✓ NFA/DOU. If checked, supply criteria number(s): 5

SAMPLE INFORMATION

Y / N

✓ ☐ 10. Have surface/sediment (depth less than 12 inches) samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, sample ID, SAL, depth, & media (soil, tuff, etc.)
3) Please attach existing map, showing where samples were taken, if available.

} see Section 3 of Class III mod. petition

☐ ✓ 11. Have surface water samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, filtered/non-filtered, & flow data, if available.
3) Please attach existing map, showing where samples were taken, if available.

☐ ✓ 12. Is data pending? If yes: 1) List date data are anticipated:
2) Provide list of COPCs identified in RFI Work Plan as an attachment.

Chris Wilman

13. Signature of OU/Other Representative

SURFACE WATER SITE ASSESSMENT

SITE INFORMATION

1a) SWMU/ IRP # SWMUs 12+13 1b) Structure Number [ ] 1c) OU Number [ ]

2. Date/Time (M/D/Y H:M am/pm) [ ]

SITE SETTING (check all that apply)

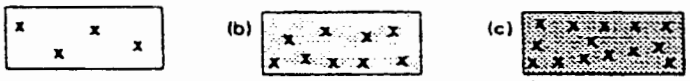
3. ○ On mesa/hill top (a). ☑ In the canyon floor/drainage basin, but not in an established channel (c).

○ Within a bench of a canyon or drainage basin (b). ○ Within established channel in the canyon floor or drainage basin (d).

Explanation:

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a) (b) (c)

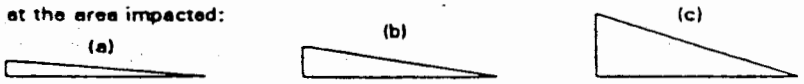


Estimated % of ground/canopy cover: ○ 0% to 25% ○ 25% to 75 ☑ 75% to 100

Explanation:
Site is within asphalt-paved equipment maintenance area.

5. Steepest slope at the area impacted:

(a) (b) (c)



☑ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation:
Uniform grade across site. Significantly less than 10% slope.

RUNOFF FACTORS

Y / N

☐ ☑ 6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:

☐ ☐ 6a) Is runoff channelized? If yes, describe ○ Man-made channel. ○ Natural channel.

Explanation:
Storm water drains to the sanitary sewer system.

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

○ Drainage or wetland (name)

○ Within bench of canyon setting (name)

○ Other (i.e., retention pond, meadow, mesa top)

Explanation:

Y / N

☐ ☐ 6c) Has runoff caused visible erosion at the site? If yes, explain below ○ Sheet ○ Rill ○ Gully

Explanation:

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ 7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation:

☐ ☑ 8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☐ ☑ 9. Are natural drainage patterns directing stormwater onto site?

Explanation:

ASSESSMENT FINDING:

☐ ☑ 10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)

11. Signature of ER Representative

Initials of independent reviewer.

Check here when information is entered in database: ☐

SURFACE WATER SITE ASSESSMENT

This page is for Notes, recommendations, and photos.

	Y	N	
12 a)	○	✓	Is there visible trash/debris on the site?
b)	○	✓	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

Site drained to sanitary sewer.

✓ ○ Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

✓ ○ Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Recommended BMPs (Best Management Practices) for this site:

Environmental Restoration Program
CONSTITUENT ASSESSMENT

SITE INFORMATION

1. SWMU/IRP# SWMUs 14 + 15 2. Date/Time (M/D/Y H:M am/pm) 09/07/99 9:25 am
3. ER Point of Contact R. Smith 4. OU-Other/POC
5. ✓ HSWA Area of Concern (AOC) (check both if AOC is on HSWA Permit)
6. Site Ranking Score 46.6
7. Description of the historical operations of this SWMU/IRP:

Both SWMUs on either side of Building 1776 were used to stockpile used vehicle batteries prior to recycling.

8. Description of the current operations of this SWMU/IRP (if any):

Battery storage at the site(s) was discontinued in 1990. A new facility was constructed for the purpose of storing used batteries. The new facility has a roof to prevent exposure to storm water.

PRS STATUS

Action/Status to Date (check all that apply)

		Date Completed or Anticipated
☐ None		
Field Investigation	✓ Phase I ✓ Phase II	P1-1992, P2-1994
Interim Measures	☐ IM ☐ BMPs	
Accelerated Cleanup	☐ VCA ☐ VCM	
Other	☐ Monitoring ☐ CMs	
Report Status	☐ RFI Report ☐ SAP	
Other		

✓ NFA/DOU. If checked, supply criteria number(s): 5

SAMPLE INFORMATION

Y / N

✓ ☐ 10. Have surface/sediment (depth less than 12 inches) samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, sample ID, SAL, depth, & media (soil, tuff, etc.)
3) Please attach existing map, showing where samples were taken, if available.

} see Section 4 of Class III mod. petition

☐ ✓ 11. Have surface water samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, filtered/non-filtered, & flow data, if available.
3) Please attach existing map, showing where samples were taken, if available.

☐ ✓ 12. Is data pending? If yes: 1) List date data are anticipated:
2) Provide list of COPCs identified in RFI Work Plan as an attachment.

Chris Whitman

13. Signature of OU/Other Representative

SURFACE WATER SITE ASSESSMENT

SITE INFORMATION

1a) SWMU/ IRP # _____ 1b) Structure Number _____ 1c) OU Number _____

2. Date/Time (M/D/Y H:M am/pm) _____

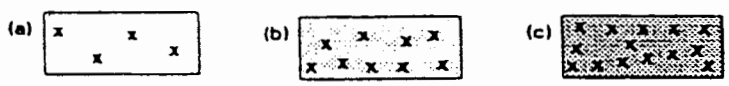
SITE SETTING (check all that apply)

3.
- ○ On mesa/hill top (a).
- ○ Within a bench of a canyon or drainage basin (b).
- ☑ In the canyon floor/drainage basin, but not in an established channel (c).
- ○ Within established channel in the canyon floor or drainage basin (d).

Explanation:

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

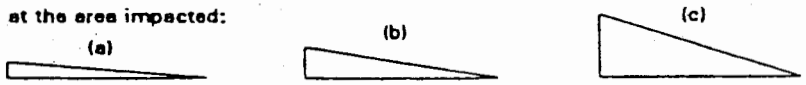
(illustration)



Estimated % of ground/canopy cover: ○ 0% to 25% ○ 25% to 75 ☑ 75% to 100

Explanation: Site is within the asphalt-paved equipment maintenance area.

5. Steepest slope at the area impacted:



☑ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation: Uniform grade across site. Significantly less than 10% slope.

RUNOFF FACTORS

Y / N

☑ ☐ 6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:

☑ ☐ 6a) Is runoff channelized? If yes, describe ☑ Man-made channel. ○ Natural channel.

Explanation: Paved area is sloped to a concrete-lined storm water drainage channel. Visible evidence consists of wind-blown sand redistributed with water-borne gravel and redeposited as sediment near the outfall to the drainage channel.

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- (✓) Drainage or wetland (name) un-named arroyo
- ( ) Within bench of canyon setting (name)
- ( ) Other (i.e., retention pond, meadow, mesa top)

Explanation: Post Headquarters storm water is channeled to natural arroyos.

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below ( ) Sheet ( ) Rill ( ) Gully

Explanation: Site is paved.

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☑ ☐ 7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: Parking lot drains across site.

☐ ☑ 8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☐ ☑ 9. Are natural drainage patterns directing stormwater onto site?

Explanation: Drainage of storm water is under engineered control.

ASSESSMENT FINDING:

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Ron E Powell

11. Signature of ER Representative

Initials of independent reviewer.

Check here when information is entered in database: ☐

SURFACE WATER SITE ASSESSMENT

This page is for Notes, recommendations, and photos.

Y / N

12 a) O ✓ Is there visible trash/debris on the site?

b) C ✓ Is there visible trash/debris in a watercourse?

Description of existing BMPs:

N/A site is no longer used for storage of materials.

C O Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

G O Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Recommended BMPs (Best Management Practices) for this site:

Site Assessment
Erosion Matrix Score Sheet

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential: Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top / hill	1	Defined based on topographic setting			
Within bench of canyon / drainage basin	4				
Within the canyon floodplain but not watercourse / drainage basin	13				13
Within bottom of canyon channel in watercourse / drainage basin	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	1.3
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			5
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	19
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	
		If no, score as 0. If yes, calculate as appropriate.			0
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			7
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0			0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Select either structures or natural drainages.					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**			**Total Score**	46.6

Environmental Restoration Program
CONSTITUENT ASSESSMENT

SITE INFORMATION

1. SWMU/IRP# SWMU 21 2. Date/Time (M/D/Y H:M am/pm) 09/07/89 10:10 am
3. ER Point of Contact R. SMITH 4. OU-Other/POC
5. ✓ HSWA Area of Concern (AOC) (check both if AOC is on HSWA Permit)
6. Site Ranking Score 20.8
7. Description of the historical operations of this SWMU/IRP:

VOLUMES OF FUEL (ie. DIESEL, JP-4, GASOLINE, & WASTE OIL) WERE BURNED BURNED AT VARIOUS TIMES IN OPEN PITS AND/OR OVER AREAS FOR 20 YRS. FIRE FIGHTING TRAINING CREWS EXTINGUISHED FLAMES USING CONVENTIONAL METHODS

8. Description of the current operations of this SWMU/IRP (if any):

FACILITY WAS CLOSED IN 1982 & HAS NOT BEEN USED FOR ANY OTHER PURPOSE SINCE.

PRS STATUS

Action/Status to Date (check all that apply)

	Date Completed or Anticipated
None	
Field Investigation ✓ Phase I ✓ Phase II	P1-1992, P2-1994
Interim Measures IM BMPs	
Accelerated Cleanup VCA VCM	
Other Monitoring CMs	
Report Status RFI Report SAP	
Other	

✓ NFA/DOU. If checked, supply criteria number(s): 5

SAMPLE INFORMATION

Y / N

✓ 10. Have surface/sediment (depth less than 12 inches) samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, sample ID, SAL, depth, & media (soil, tuff, etc.)
3) Please attach existing map, showing where samples were taken, if available.

SEE SECTION 5 OF CLASS III MOD. PETITION

✓ 11. Have surface water samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, filtered/non-filtered, & flow data, if available.
3) Please attach existing map, showing where samples were taken, if available.

✓ 12. Is data pending? If yes: 1) List date data are anticipated:
2) Provide list of COPCs identified in RFI Work Plan as an attachment.

Chris Whitman

13. Signature of OU/Other Representative

SURFACE WATER SITE ASSESSMENT

SITE INFORMATION

1a) SWMU/ IRP # SWMU 21 1b) Structure Number [ ] 1c) OU Number [ ]

2. Date/Time (M/D/Y H:M am/pm) [ ]

SITE SETTING (check all that apply)

3. ○ On mesa/hill top (a). ☑ In the canyon floor/drainage basin, but not in an established channel (c).

○ Within a bench of a canyon or drainage basin (b). ○ Within established channel in the canyon floor or drainage basin (d).

Explanation:

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a) (b) (c)

Estimated % of ground/canopy cover: ○ 0% to 25% ☑ 25% to 75 ○ 75% to 100

Explanation: Site covered with pea gravel and sparse grasses.

5. Steepest slope at the area impacted:

(a) (b) (c)

☑ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation: Uniform grade across site. Nearly level.

RUNOFF FACTORS

Y / N

☐ ☑ 6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:

☐ ☐ 6a) Is runoff channelized? If yes, describe ○ Man-made channel. ○ Natural channel.

Explanation:

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

○ Drainage or wetland (name)

○ Within bench of canyon setting (name)

○ Other (i.e., retention pond, meadow, mesa top)

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below ○ Sheet ○ Rill ○ Gully

Explanation:

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ 7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation:

☐ ☑ 8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☐ ☑ 9. Are natural drainage patterns directing stormwater onto site?

Explanation:

ASSESSMENT FINDING:

☐ ☑ 10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)

11. Signature of ER Representative

Initials of independent reviewer.

Check here when information is entered in database: ☐

This page is for Notes, recommendations, and photos.

Y / N

12 a) ○ ☑ Is there visible trash/debris on the site?

b) ○ ☑ Is there visible trash/debris in a watercourse?

Description of existing BMPs:

Native vegetation is re-established. Grasses do not require maintenance.

○ ○ Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

☑ ○ Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Recommended BMPs (Best Management Practices) for this site:

Site Assessment
Erosion Matrix Score Sheet

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top / hill	1	Defined based on topographic setting			
Within bench of canyon / drainage basin	4				
Within the canyon floodplain but not watercourse / drainage basin	13				13
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	6.5
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section. If yes, score 5 and proceed with section.			0
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Select either structures or natural drainages.					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**			**Total Score**	20.8

Environmental Restoration Program
CONSTITUENT ASSESSMENT

SITE INFORMATION

1. SWMU/IRP# SWMU 22 2. Date/Time (M/D/Y H:M am/pm) 09/07/99 10:30 am
3. ER Point of Contact R. SMITH 4. OU-Other/POC
5. ✓ HSWA Area of Concern (AOC) (check both if AOC is on HSWA Permit)
6. Site Ranking Score 20.8
7. Description of the historical operations of this SWMU/IRP:

OPERATIONAL HISTORY UNKNOWN. USE OF THE PIT WAS NOT RECORDED & IS ONLY SUSPECTED TO BE ASSOCIATED WITH THE FIRE FIGHTER TRAINING AREA DUE TO ITS PROXIMITY.

8. Description of the current operations of this SWMU/IRP (if any):

SITE IS CURRENTLY DESCRIBED AS AN "ABANDONED PIT"

PRS STATUS

Action/Status to Date (check all that apply)

	Date Completed or Anticipated
None	
Field Investigation ✓ Phase I ✓ Phase II	P1-1992, P2-1994
Interim Measures IM BMPs	
Accelerated Cleanup VCA VCM	
Other Monitoring CMs	
Report Status RFI Report SAP	
Other	

✓ NFA/DOU. If checked, supply criteria number(s): 5

SAMPLE INFORMATION

Y / N

✓ 10. Have surface/sediment (depth less than 12 inches) samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, sample ID, SAL, depth, & media (soil, tuff, etc.)
3) Please attach existing map, showing where samples were taken, if available.

} SEE SECTION 6 OF CLASS III MOD. PETITION.

✓ 11. Have surface water samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, filtered/non-filtered, & flow data, if available.
3) Please attach existing map, showing where samples were taken, if available.

✓ 12. Is data pending? If yes: 1) List date data are anticipated:
2) Provide list of COPCs identified in RFI Work Plan as an attachment.

Chris Whitman
13. Signature of OU/Other Representative

SURFACE WATER SITE ASSESSMENT

SITE INFORMATION

1a) SWMU/ IRP # SWMU 22 1b) Structure Number _____ 1c) OU Number _____

2. Date/Time (M/D/Y H:M am/pm) _____

SITE SETTING (check all that apply)

3. ○ On mesa/hill top (a). ☑ In the canyon floor/drainage basin, but not in an established channel (c).

○ Within a bench of a canyon or drainage basin (b). ○ Within established channel in the canyon floor or drainage basin (d).

Explanation:

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a) (b) (c)

Estimated % of ground/canopy cover: ☑ 0% to 25% ☑ 25% to 75 ○ 75% to 100

Explanation:
ENTIRE SITE COVERED W/SOIL & NATURAL NATIVE VEGETATION

5. Steepest slope at the area impacted:

(a) (b) (c)

☑ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation:
UNIFORM GRADE ACROSS SITE. SIGNIFICANTLY LESS THAN 10% SLOPE.

RUNOFF FACTORS

Y / N

☐ ☑ 6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:

☐ ☐ 6a) Is runoff channelized? If yes, describe ○ Man-made channel. ○ Natural channel.

Explanation:

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ Drainage or wetland (name)
- ○ Within bench of canyon setting (name)
- ○ Other (i.e., retention pond, meadow, mesa top)

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below ○ Sheet ○ Rill ○ Gully

Explanation:

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ 7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation:

☐ ☑ 8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☐ ☑ 9. Are natural drainage patterns directing stormwater onto site?

Explanation:

ASSESSMENT FINDING:

☐ ☑ 10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)

11. Signature of ER Representative

BM Initials of independent reviewer.

Check here when information is entered in database: ☐

SURFACE WATER SITE ASSESSMENT

This page is for Notes, recommendations, and photos.

Y / N

12 a) O ✓ Is there visible trash/debris on the site?

b) O ✓ Is there visible trash/debris in a watercourse?

Description of existing BMPs:

Native vegetation is re-established since site closure. Maintenance of native grasses is not necessary.

O O Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

✓ O Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Recommended BMPs (Best Management Practices) for this site:

Site Assessment
Erosion Matrix Score Sheet

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top / hill	1	Defined based on topographic setting			
Within bench of canyon / drainage basin	4				
Within the canyon floodplain but not watercourse / drainage basin	13				13
Within bottom of canyon channel in watercourse / drainage basin	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	6.5
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section. If yes, score 5 and proceed with section.			0
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	0
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	
		If no, score as 0. If yes, calculate as appropriate.			0
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0			0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Select either structures or natural drainages.					
MAX. POSSIBLE EROSION MATRIX SCORE:	100			**Total Score**	20.8

Environmental Restoration Program
CONSTITUENT ASSESSMENT

SITE INFORMATION

1. SWMU/IRP# SWMU 145 2. Date/Time (M/D/Y H:M am/pm) 09/08/99 9:25am
3. ER Point of Contact R. SMITH 4. OU-Other/POC
5. ✓ HSWA Area of Concern (AOC) (check both if AOC is on HSWA Permit)
6. Site Ranking Score 15.6
7. Description of the historical operations of this SWMU/IRP:

USED ONLY ONCE IN 1989. A 30,000gal DISCHARGE OF WASTEWATER CONTAINING SODIUM FLUORIDE WAS DISCHARGED INTO THE LINED LAGOON. (LINER INTEGRITY WAS DETERMINED TO HAVE BEEN COMPROMISED).

8. Description of the current operations of this SWMU/IRP (if any):

NOT IN USE. SWMU site was closed and paved with asphalt. Lagoon liner and subsoils were removed. Area is currently unused except for groundwater monitoring well access.

PRS STATUS

Action/Status to Date (check all that apply)

		Date Completed or Anticipated
☐ None		
Field Investigation	✓ Phase I ✓ Phase II	P1-1992, P2-1994
Interim Measures	☐ IM ☐ BMPs	
Accelerated Cleanup	☐ VCA ☐ VCM	
Other	☐ Monitoring ☐ CMs	
Report Status	☐ RFI Report ☐ SAP	
Other		

✓ NFA/DOU. If checked, supply criteria number(s): 5

SAMPLE INFORMATION

Y / N

✓ ☐ 10. Have surface/sediment (depth less than 12 inches) samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, sample ID, SAL, depth, & media (soil, tuff, etc.)
3) Please attach existing map, showing where samples were taken, if available.

SEE SECTION 7 OF CLASS III MOD. PETITION.

☐ ✓ 11. Have surface water samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, filtered/non-filtered, & flow data, if available.
3) Please attach existing map, showing where samples were taken, if available.

☐ ✓ 12. Is data pending? If yes: 1) List date data are anticipated:
2) Provide list of COPCs identified in RFI Work Plan as an attachment.

Chris Whitman

13. Signature of OU/Other Representative

SURFACE WATER SITE ASSESSMENT

SITE INFORMATION

1a) SWMU/ IRP # SWMU 145 1b) Structure Number [ ] 1c) OU Number [ ]

2. Date/Time (M/D/Y H:M am/pm) [ ]

SITE SETTING (check all that apply)

3. ○ On mesa/hill top (a).
   ○ Within a bench of a canyon or drainage basin (b).
   ☑ In the canyon floor/drainage basin, but not in an established channel (c).
   ○ Within established channel in the canyon floor or drainage basin (d).

Explanation:

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a) (b) (c)

Estimated % of ground/canopy cover: ○ 0% to 25% ○ 25% to 75 ☑ 75% to 100

Explanation:
ENTIRE SITE PAVED OR IMPERVIOUS AREA.

5. Steepest slope at the area impacted:

(a) (b) (c)

☑ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation:
UNIFORM GRADE ACROSS SITE. SIGNIFICANTLY LESS THAN 10% SLOPE.

RUNOFF FACTORS

Y / N

☐ ☑ 6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:

☐ ☐ 6a) Is runoff channelized? If yes, describe ○ Man-made channel. ○ Natural channel.

Explanation:

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ Drainage or wetland (name) [ ]
- ○ Within bench of canyon setting (name) [ ]
- ○ Other (i.e., retention pond, meadow, mesa top) [ ]

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below ○ Sheet ○ Rill ○ Gully

Explanation:

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ 7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: SWMU site is paved-over.

☐ ☑ 8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☐ ☑ 9. Are natural drainage patterns directing stormwater onto site?

Explanation:

ASSESSMENT FINDING:

☑ ☐ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Ron E Paul

11. Signature of ER Representative

BM Initials of independent reviewer.

Check here when information is entered in database: ☐

This page is for Notes, recommendations, and photos.

Y / N

12 a) ○ ✓ Is there visible trash/debris on the site?

b) ○ ✓ Is there visible trash/debris in a watercourse?

Description of existing BMPs:

Asphalt pavement caps SWMU site.

✓ ○ Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

✓ ○ Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Recommended BMPs (Best Management Practices) for this site:

Site Assessment
Erosion Matrix Score Sheet

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top / hill	1	Defined based on topographic setting			
Within bench of canyon / drainage basin	4				
Within the canyon floodplain but not watercourse / drainage basin	13				13
Within bottom of canyon channel in watercourse / drainage basin	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	1.3
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	0
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	
		If no, score as 0. If yes, calculate as appropriate.			0
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Select either structures or natural drainages.					
MAX. POSSIBLE EROSION MATRIX SCORE:	100			Total Score	15.6

Environmental Restoration Program
CONSTITUENT ASSESSMENT

SITE INFORMATION

1. SWMU/IRP# SWMU 147 2. Date/Time (M/D/Y H:M am/pm) 09/08/99 10:15am
3. ER Point of Contact R. Smith 4. OU-Other/POC
5. ✓ HSWA Area of Concern (AOC) (check both if AOC is on HSWA Permit)
6. Site Ranking Score 15.6
7. Description of the historical operations of this SWMU/IRP:

The SWMU was a concrete sump that collected washwater from the HELSTF Cleaning Facility Decontamination Pad. Contents were pumped out as necessary for disposal.

8. Description of the current operations of this SWMU/IRP (if any):

None. The concrete sump was cemented (filled with concrete).

PRS STATUS

Action/Status to Date (check all that apply)

		Date Completed or Anticipated
☐ None		
Field Investigation	✓ Phase I ✓ Phase II	P1 - 1992, P2 - 1994
Interim Measures	☐ IM ☐ BMPs	
Accelerated Cleanup	☐ VCA ☐ VCM	
Other	☐ Monitoring ☐ CMs	
Report Status	☐ RFI Report ☐ SAP	
Other		

✓ NFA/DOU. If checked, supply criteria number(s): 5

SAMPLE INFORMATION

Y / N

✓ ☐ 10. Have surface/sediment (depth less than 12 inches) samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, sample ID, SAL, depth, & media (soil, tuff, etc.)
3) Please attach existing map, showing where samples were taken, if available.

} see Section 8 of Class III mod. petition

☐ ✓ 11. Have surface water samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, filtered/non-filtered, & flow data, if available.
3) Please attach existing map, showing where samples were taken, if available.

☐ ✓ 12. Is data pending? If yes: 1) List date data are anticipated:
2) Provide list of COPCs identified in RFI Work Plan as an attachment.

Chris Whitman

13. Signature of OU/Other Representative

SURFACE WATER SITE ASSESSMENT

SITE INFORMATION

1a) SWMU/ IRP # SWMU 147 1b) Structure Number [ ] 1c) OU Number [ ]

2. Date/Time (M/D/Y H:M am/pm) [ ]

SITE SETTING (check all that apply)

3. ○ On mesa/hill top (a). ☑ In the canyon floor/drainage basin, but not in an established channel (c).

○ Within a bench of a canyon or drainage basin (b). ○ Within established channel in the canyon floor or drainage basin (d).

Explanation: Located at HELSTF.

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a) (b) (c)

Estimated % of ground/canopy cover: ○ 0% to 25% ○ 25% to 75 ☑ 75% to 100

Explanation: Concrete with metal lid during operation. Filled with concrete as a corrective measure.

5. Steepest slope at the area impacted:

(a) (b) (c)

☑ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation: Uniform grade across site. Nearly flat.

RUNOFF FACTORS

Y / N

☐ ☑ 6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:

☐ ☐ 6a) Is runoff channelized? If yes, describe ○ Man-made channel. ○ Natural channel.

Explanation:

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ Drainage or wetland (name)
- ○ Within bench of canyon setting (name)
- ○ Other (i.e., retention pond, meadow, mesa top)

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below ○ Sheet ○ Rill ○ Gully

Explanation:

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ 7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation:

☐ ☑ 8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation: SWMU site is encapsulated in concrete.

☐ ☑ 9. Are natural drainage patterns directing stormwater onto site?

Explanation:

ASSESSMENT FINDING:

☐ ☑ 10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)

11. Signature of ER Representative

Initials of independent reviewer.

Check here when information is entered in database: ☐

SURFACE WATER SITE ASSESSMENT

This page is for Notes, recommendations, and photos.

	Y	N	
12 a)	○	✓	Is there visible trash/debris on the site?
b)	○	✓	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

SWMU site is encapsulated in concrete.

✓ ○ Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

✓ ○ Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Recommended BMPs (Best Management Practices) for this site:

Site Assessment
Erosion Matrix Score Sheet

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top / hill	1	Defined based on topographic setting			
Within bench of canyon / drainage basin	4				
Within the canyon floodplain but not watercourse	13				13
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	1.3
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Select either structures or natural drainages.					
MAX. POSSIBLE EROSION MATRIX SCORE:	100			Total Score	15.6

Environmental Restoration Program
CONSTITUENT ASSESSMENT

SITE INFORMATION

1. SWMU/IRP# SWMU 148 2. Date/Time (M/D/Y H:M am/pm) 09/08/99 11:20 am
3. ER Point of Contact R. Smith 4. OU-Other/POC
5. ✓ HSWA Area of Concern (AOC) (check both if AOC is on HSWA Permit)
6. Site Ranking Score 15.6
7. Description of the historical operations of this SWMU/IRP:

The SWMU was the former sewage effluent treatment lagoon that served the Multi-function Array (MAR) site in the 1960's. HELSTF was later built on the MAR site and new sewage treatment facilities were built.

8. Description of the current operations of this SWMU/IRP (if any):

The site was backfilled and paved over for equipment parking and storage.

PRS STATUS

Action/Status to Date (check all that apply)

		Date Completed or Anticipated
☐ None		
Field Investigation	✓ Phase I ✓ Phase II	
Interim Measures	☐ IM ☐ BMPs	
Accelerated Cleanup	☐ VCA ☐ VCM	
Other	☐ Monitoring ☐ CMs	
Report Status	☐ RFI Report ☐ SAP	
Other		

✓ NFA/DOU. If checked, supply criteria number(s): 5

SAMPLE INFORMATION

Y / N

✓ ☐ 10. Have surface/sediment (depth less than 12 inches) samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, sample ID, SAL, depth, & media (soil, tuff, etc.)
3) Please attach existing map, showing where samples were taken, if available.

} see Section 9 of Class III mod. petition

☐ ✓ 11. Have surface water samples been collected that reflect current site conditions?

If yes: 1) Attach data.
2) Include analyte name, value, units, location ID, filtered/non-filtered, & flow data, if available.
3) Please attach existing map, showing where samples were taken, if available.

☐ ✓ 12. Is data pending? If yes: 1) List date data are anticipated: _____
2) Provide list of COPCs identified in RFI Work Plan as an attachment.

Clifford F. Whitman

13. Signature of OU/Other Representative

SURFACE WATER SITE ASSESSMENT

SITE INFORMATION

1a) SWMU/ IRP # SWMU 148 1b) Structure Number [ ] 1c) OU Number [ ]

2. Date/Time (M/D/Y H:M am/pm) [ ]

SITE SETTING (check all that apply)

3. ○ On mesa/hill top (a). ☑ In the canyon floor/drainage basin, but not in an established channel (c).

○ Within a bench of a canyon or drainage basin (b). ○ Within established channel in the canyon floor or drainage basin (d).

Explanation: Located at HELSTF.

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a) (b) (c)

Estimated % of ground/canopy cover: ○ 0% to 25% ○ 25% to 75 ☑ 75% to 100

Explanation: Site is paved.

5. Steepest slope at the area impacted:

(a) (b) (c)

☑ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation: Uniform grade for site drainage. Nearly level.

RUNOFF FACTORS

Y / N

☐ ☑ 6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:

☐ ☐ 6a) Is runoff channelized? If yes, describe ○ Man-made channel. ○ Natural channel.

Explanation:

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ Drainage or wetland (name)
- ○ Within bench of canyon setting (name)
- ○ Other (i.e., retention pond, meadow, mesa top)

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below ○ Sheet ○ Rill ○ Gully

Explanation:

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ 7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: SWMU site is buried and paved.

☐ ☑ 8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☐ ☑ 9. Are natural drainage patterns directing stormwater onto site?

Explanation:

ASSESSMENT FINDING:

☐ ☑ 10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)

11. Signature of ER Representative

Initials of independent reviewer.

Check here when information is entered in database: ☐

SURFACE WATER SITE ASSESSMENT

This page is for Notes, recommendations, and photos.

Y / N

12 a) O ✓ Is there visible trash/debris on the site?

b) O ✓ Is there visible trash/debris in a watercourse?

Description of existing BMPs:

Asphalt pavement covers SWMU site.

✓ O Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

✓ O Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Recommended BMPs (Best Management Practices) for this site:

Si[illegible]sessment
Erosion Matrix Score Sheet

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top / hill	1	Defined based on topographic setting			
Within bench of canyon / drainage basin	4				
Within the canyon floodplain but not watercourse / drainage basin	13				13
Within bottom of canyon/channel in watercourse / drainage basin	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	1.3
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0
Select either structures or natural drainages.					
MAX. POSSIBLE EROSION MATRIX SCORE:	100			**Total Score**	15.6

APPENDIX D

NOTICE OF PUBLIC MEETING

ROOF OF PUBLICATION

vid E. McCollum, being duly sworn, deposes and
s that he is the Publisher of the Las Cruces
ws, a newspaper published daily in the county
Ana, State of New Mexico; that the
ice Display per clipping attached
published once a week/day in regular and entire
e of said newspaper and not in any supplement
reof for 1 consecutive days, the first publication
in the issue dated January 26, 2000 and
last publication was
January 26, 2000.

onent further states this newspaper is duly
lified to publish legal notices or advertisements
hin the meaning of Sec. Chapter 167, Laws of
7.

ned

Publisher
Official Position

TE OF NEW MEXICO

of Dona Ana

scribed and sworn before me this
11th day of February 2000

OFFICIAL SEAL
JUDY M. LUNA
NOTARY PUBLIC—STATE OF NEW MEXICO
My Commission Expires 3-10-03

Notary Public in and for
Dona Ana County, NM

RECEIVED
MAR 08 2000
MEVATEC CORP.

PUBLIC NOTIC

The public is invited to attend an informational meeting on
Wednesday, February 23, 2000

LOCATION: **Branigan Memorial Library,**
200 East Picacho Avenue, Las Cruces
TIME: **7:00 PM**

White Sands Missile Range's Installation Restoration Program will present information regarding environmental clean-up efforts at the facility. Under the requirements of the Resource Conservation and Recovery Act, petitions will be submitted to the New Mexico Environment Department (NMED) to remove 42 waste management sites from the Corrective Action module (Module VIII), of the Hazardous Waste Management Permit (I.D. Number NM 2750211235). The No Further Action petitions include the locations and Solid Waste Management Units (SWMUs) below:

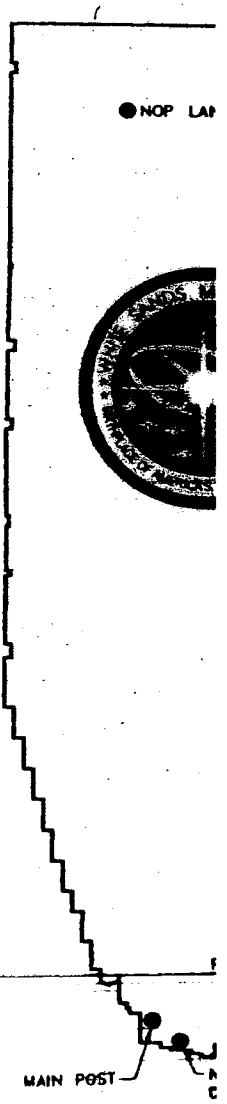
Dona Ana County	SWMUs
Main Post	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19 20, 21, 22, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 80, 85, 156
High Energy Laser Test Facility (HELSTF)	27, 28, 29, 30, 144, 145, 146, 147, 148, 150
Otero County	
Orogrande Range Camp	132
Launch Complex 37	140

Additionally, plans for Voluntary Corrective Measures at two other units will be presented to the public for comment and input. White Sands Missile Range proposes to remove wastes from the former North Oscura Peak Landfill (SWMUs 47-49) and the Nuclear Effects Directorate former Wastewater Pond, which is listed as an Area of Concern in Module VIII of the permit.

A 60-day public comment period commences with the publication of this notice. The permit modification requests may be viewed and/or copied at the White Sands Environment and Safety Directorate at the Post Headquarters, Building 163. Comments can be made verbally and in writing at the meeting, or can be sent directly to New Mexico Environment Department (NMED) at the address below. The permittee's compliance history during the life of the permit being modified is available from the NMED contact person: Mr. Phillip Solano, (505) 827-1561 x 1021

Hazardous and Radioactive Material Bureau
New Mexico Environment Department
PO Box 26110
Santa Fe, NM 87502

The meeting is open to the public. Persons requiring special assistance or facilities are asked to call the permittee's contact person, Ms. Robin Paul, of the Environment and Safety Directorate, (505) 678-8693, or Mr. Chris Whitman of MEVATEC Corporation, (505) 678-0891, at least 72 hours before the meeting.



ROOF OF PUBLICATION

avid E. McCollum, being duly sworn, deposes and
/s that he is the Publisher of the ~~Las Cruces~~ Missile Ranger
~~n News,~~ a newspaper published daily in the county
Dona Ana, State of New Mexico; that the
~~tice~~ Public Notice per clipping attached
s published once a week/day in regular and entire
ue of said newspaper and not in any supplement
ereof for 1 consecutive days, the first publication
s in the issue dated January 28, 2000 and
: last publication was
January 28, 2000.

:ponent further states this newspaper is duly
alified to publish legal notices or advertisements
:hin the meaning of Sec. Chapter 167, Laws of
37.

;ned David E. McCollum

Publisher
Official Position

ATE OF NEW MEXICO

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bscribed and sworn before me this
7th day of February 2000

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JUDY M. LUNA
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MAIN POST-

APPENDIX E

TRANSCRIPT OF 3/23/00 PUBLIC INVOLVEMENT MEETING

1 PUBLIC MEETING
2 PRESENTED BY
3 WHITE SANDS MISSILE RANGE
4 INSTALLATION RESTORATION PROGRAM
5 FOR THE PURPOSE OF
6 INFORMING THE PUBLIC ABOUT
7 PETITION FOR NO FURTHER ACTION/CLASS III MODIFICATION
8 REQUEST TO REMOVE 42 SOLID WASTE MANAGEMENT UNITS
9 FROM PERMIT AND TO DISCUSS
10 FUTURE REMEDIAL ACTIONS AT TWO
11 ADDITIONAL SITES
12
13 February 23, 2000
14 Branigan Memorial Library
15 Las Cruces, New Mexico
16 7:00 p.m.
17
18
19 PRESENTER:
20 ROBIN E. PAUL
21 Remedial Project Manager
22 Installation Restoration Program
23
24
25

MS. PAUL: Welcome, everybody. Thank you very much for coming to our public meeting tonight.

The purpose of this public meeting is to inform the public and also to solicit comments from the public about our Petition For No Further Action/Class III Modification Request that we've submitted for 42 solid waste management units to be removed from our permit. We also want to tell you tonight about two future remedial actions that we would like to perform.

Before we get started into the presentation, let me just call your attention over here to this display. This is really what we like to think we're all about in the restoration program at White Sands Missile Range. We're not only involved in restoration of the environment, but we also try to participate in conservation actions, in pollution prevention, and in compliance wherever we have the opportunity.

We also, up here, have some maps on display. I hope you'll take the opportunity later to look at them in some detail. This is starting right here from the southern portion of the Range, and then going up to the most northern portion of the Range here. They're detailed topographical maps, and you really have to

1 get down to look at them to see them.
2 But what we're really talking about tonight, the
3 sites can be easier seen on this map right here that
4 did appear in the public notice. And as we go through
5 the presentation, I'll point to the different places
6 on the Range where the different sites are located.
7 So our agenda tonight, we're just briefly going to
8 talk about permit requirements, the corrective action
9 process where it applies to the petition that we're
10 talking about tonight, then we will go in detail
11 through the petitions, each site, and we'll talk about
12 those two future remedial actions I told you about.
13 Then we'll summarize it and have questions and
14 comments.
15 So straight into permit requirements. Way back in
16 1989, the New Mexico Environment Department issued our
17 Resource Conservation Recovery Act, Part B permit.
18 Now, we refer to this as the RCRA permit, and the
19 permit is really for our container storage unit at
20 White Sands Missile Range. But the permit is
21 constructed in modules, and Module VIII of our permit
22 includes those solid waste management units that
23 require investigation or corrective action in
24 accordance with that rule right there, which is called
25 the Hazardous and Solid Waste Amendments.

1 The permit originally had 163 solid waste
2 management units and 22 areas of concern. The
3 corrective action process, as it relates to our
4 petition that we're talking about tonight, began with
5 the RCRA facility investigation. We have a copy of
6 that publication right there. This was done in 1988,
7 and the result of that was that it did identify those
8 solid waste management unit areas of concern that went
9 into that HSWA module. And then we had two sets of
10 the RCRA facility investigations, the RFIs.
11 Now, we had a phase one RFI. Here's the documents
12 right here. We also had a phase two RFI. Phase one
13 was done in 1992, phase two in 1994. They were
14 exhaustive investigative efforts at each of the solid
15 waste management units and more that we'll be talking
16 about tonight.
17 The RFIs make recommendations, either for remedial
18 action, which is the next bullet you see there, or
19 they make recommendation that no further action is
20 required at a particular unit for one reason or
21 another, usually because there is nothing of any
22 concern there. And then the next step in this process
23 would be for the installation to petition the
24 regulatory authority for no further action.
25 We did this in January of this year. We have

1 copies over here on this table of the petition. It's
2 in three different volumes. And then the last step in
3 this corrective action process could be that the New
4 Mexico Environment Department would modify our permit
5 with a Class III modification, removing the 42 solid
6 waste management units from our permit.
7 So we'll talk now about our no further action
8 petition that we did submit to the State. There are
9 42 solid waste management units. They can be divided
10 up into six different categories. The first of those
11 is wastewater treatment. You can see that's the bulk
12 of the sites, and you'll see why in just a minute.
13 Then we've got equipment wash racks, material storage
14 and recycling, waste disposal, fire fighting training
15 and process water.
16 The rationale that can be applied to each of these
17 solid waste management units, why we feel that they're
18 ready to come off the permit, are these three bullets
19 that appear at the bottom of the slide. The
20 wastewater discharges are already regulated, and
21 appropriately, by the New Mexico Water Quality Act.
22 They're subject to the same corrective action
23 requirements that solid waste management units that
24 are regulated under the RCRA part B unit are. And
25 they are subject to the Water Quality Control

1 Commission regulations. So what we have here is a
2 case where not only is this wastewater discharge being
3 regulated by RCRA, but it's also being regulated by
4 the Water Quality Control regulations, and they're
5 very, very similar.
6 And then the most important bullet, and the one
7 we'll be talking most about, is the second one here
8 where corrective action has been already performed at
9 these units, or no corrective action was necessary
10 after the exhaustive studies that we did go through.
11 And then one site, kind of our orphan site out
12 here, got on our permit, but it's not our site. It
13 actually belongs to Fort Bliss, and it's operated by
14 Fort Bliss.
15 We'll go straight into our first category, which
16 is wastewater treatment. Again, these are active
17 sites. They're already regulated under the Water
18 Quality Control Commission regulations. They have
19 discharge permits. They require monitoring, just like
20 we do long-term groundwater monitoring at our other
21 sites. And, if necessary, these permits do require
22 remedial action. The regulation of these sites by our
23 RCRA permit we feel is inappropriate and redundant
24 because they already do have permits.
25 The first one we're going to talk about is the

1 Main Post wastewater treatment plant, the sewage
2 treatment plant. As you can see, a bulk of the SWMUs
3 is right there, 66 through 78. However, these were
4 just recently admitted, administratively combined into
5 two different SWMUs, 66 and 67. Again, it's an active
6 site, already regulated. It has its own discharge
7 permit. The potential contaminant of concern there
8 was metals, and you will see this again and again at
9 each of the wastewater sites. The completed actions
10 here, phase one, phase two RFI. Recommendation is for
11 no further action. Nothing above any of the
12 preliminary remediation goals set by the EPA was
13 exceeded in any way, shape or form at this site.
14 Now, we'll go ahead and take a look at kind of an
15 overview drawing here of the wastewater treatment
16 plant. You can see all the SWMUs. What happened is
17 when this was originally assessed, like digester
18 number one is a SWMU. Digester number two is a SWMU.
19 And so we ended up with a lot of different solid waste
20 management units where it was only appropriate to have
21 two.
22 It is located in the Main Post area of White Sands
23 Missile Range. Let's take a look and see what it
24 looks like. Okay.
25 The next site we're going to talk about, SWMU 80,

is the sludge waste pile. This was created in 1978 when there was a large flood at White Sands. And what happened is it tore up the sludge beds there and, you know, piled up that sludge. Again, the potential contaminant of concern is metals. What happened here is that we did do a remedial action in 1995 after we had completed the phase one and phase two RFI. We totally removed the sludge pile. We performed confirmational sampling. Nothing is left of that site. We recommended it for no further action.

And, now, let's take a look at it. There's that pile. That's what happened after the flood. It all got piled up there along with concrete and debris from the sludge beds. You can see the security tape here. It was sampled, characterized, properly disposed of, and today there's nothing left of that site.

The next site we're going to talk about is the wastewater discharge to Davies Tank. This is where the effluent from the wastewater treatment plant is discharged at White Sands Missile Range. It's an active site, already regulated, has its own discharge permit. Those metals, again, is the potential contaminant of concern. We completed a phase one and phase two RFI there. Recommendation for no further action. There's absolutely nothing there that even

1 approaches any of the preliminary remediation goals
2 set by the EPA. And we'll just take a look.
3 This is the aerial view of Davies Tank. It's
4 called Davies Tank because before there was White
5 Sands Missile Range, it was actually a cattle tank out
6 there. And what happens is the effluent line from the
7 wastewater treatment plant, it's underground here, and
8 it discharges into this area right here.
9 And now we're going to move on to the High Energy
10 Laser Systems Test Facility, which is located kind of
11 mid-range at White Sands. Again, it's an active
12 site. It's got its own discharge permit. And again,
13 the contaminant of concern is metals. You're going to
14 see this again and again as we're talking about the
15 wastewater sites.
16 We did a phase one and phase two RFI there.
17 Recommendation for no further action. There's nothing
18 there exceeding any of the PRGs. This system at
19 HELSTF it's specifically designed for the evaporative
20 treatment of wastewater. And you can kind of see a
21 little bit of the HELSTF area over here behind it.
22 And now, this is another site at HELSTF. Before
23 it was HELSTF, it was known as the MAR, which is the
24 Multi Array Radar. That was constructed in the early
25 1960s and was operational through the 1970s. And then

1 the site became the High Energy Laser Systems Test
2 Facility after the 1970s.
3 This SWMU we're going to talk about right now is
4 number 148. It was the old surface impoundment for
5 sanitary wastewater when it was the MAR site, and, of
6 course, it was before the construction of the new
7 sewage lagoon. There's those metals again. And what
8 happened there was a total removal action with
9 backfilling and paving when they converted from the
10 MAR site to the HELSTF site.
11 And let's take a look and see what that looks like
12 today. It's a parking lot. It's been completely
13 cleaned up.
14 Okay, and now we're going to go to that little
15 orphan site, the one that is really operated by Fort
16 Bliss. It's the sewage lagoon, a very small sewage
17 lagoon at Orogrande Range Camp. And that's located in
18 the extreme southeastern portion of the Range. It's
19 actually on the Fort Bliss permit. It was an accident
20 that it got on both permits, and it's undergoing the
21 RCRA facility investigation by Fort Bliss at this
22 time.
23 Potential contaminants of concern, there's those
24 metals again, but also pesticides. And these
25 pesticides here are associated with mosquito control.

1 And what happened at White Sands is we completed a
2 phase one RFI. Extensive sampling was done, and it's
3 recommended for no further action because Fort Bliss
4 is doing the actions there. As you can see, it's a
5 very, very small site, and it's kind of hidden over
6 here in the weeds.
7 And now we're going to go to the next category of
8 solid waste management units tonight, the material
9 storage and recycling. These sites, all the ones
10 we're about to talk about, have been thoroughly
11 characterized and/or remediated in accordance with all
12 regulations. All of the current projected land use
13 goals have been met for these sites. There's only
14 three sites we're going to talk about, but it does
15 comprise five solid waste management units.
16 Okay, this first one, the former waste oil tank
17 and sump, this is at the main motor pool area at White
18 Sands Missile Range in the Main Post area. The
19 potential contaminants of concern, it's what you
20 expect to find at a motor pool. It's what we call the
21 POL--petroleum, oils and lubricants. We did a phase
22 one and phase two RFI there. The underground waste
23 oil tank was removed in 1990. It was replaced with an
24 above-ground tank, and it's clean, and it's
25 recommended for no further action. And we'll take a

1 look at it.

2 Here's the tank being removed in 1990. Here's the
3 new above-ground waste oil tank. It is periodically
4 pumped by Mesa Oil that we have a contract with at
5 White Sands Missile Range. And this is actually SWMU
6 9, which is nothing more than a little sieve that the
7 waste oil is poured into to catch any debris. It's
8 got a little wire-screen-type thing on the top, and
9 then the oil is pumped into the waste oil tank.

10 So you can see if there was to be any problems,
11 they would be readily identified and taken care of
12 right at that time at the motor pool.

13 The next one--again, we're at the main motor
14 pool--was the used battery accumulation area. A very
15 small area around a little building that we'll see a
16 picture of in just a minute. Potential contaminant of
17 concern here is metals. And by this "metals" we mean
18 lead, because it would be associated with the lead
19 acid batteries that had been stored at this site.

20 It did go through phase one and phase two RFI.
21 The batteries are not stored here any longer. They're
22 now stored in a really new state-of-the-art, you know,
23 controlled battery storage area. There is nothing
24 there of any concern that meets anywhere near the
25 preliminary remediation goals, and it's recommended

for no further action.

As I said, it's a really small site. The batteries used to be stored on the little pad over here and right over here. And it is clean now.

The next site we'll talk about is at the golf course. Again, here in the Main Post area of White Sands Missile Range, SWMU 156. Contaminant of concern there, of course, is pesticides. We did a total removal action here in 1995 which consisted of removal of the structure, proper disposal, confirmational sampling. But we also conducted the phase one and phase two RFI prior to that remedial action. It's clean now and recommended for no further action.

We got some nice before and after shots here. This was the foundation of the structure. It's covered here because confirmational sampling has just taken place, and we were protecting the structure from any rain or any other disturbance before we get our samples back. All of this was removed properly and disposed. This site was regraded, and that's what it looks like today.

Okay, the next category is equipment wash racks. These are going to sound a lot of the same. We've got seven different SWMUs at four different sites--two at the main motor pool, two at the heavy equipment shop.

These sites, and you've seen this before, they've been thoroughly characterized and/or remediated, and they meet all of their land use goals.

The first site we'll talk about is in the main motor pool, 1778, SWMUs 10 and 11, 11 being the oil/water separator associated with that SWMU. Again, the contaminants of concern would be what you expect at a motor pool, the POL that we already talked about, the solvents. And solvents here, we don't necessarily mean like methylethylketone or anything bad like that. We could be talking about soap in this instance and also metals associated with the actual vehicles and with unleaded gasoline.

This site did go through phase one and phase two, the RFI. Nothing is there that even approaches the preliminary remedial goals. It's recommended for no further action. And does this look familiar? Here's our above-ground storage tank again, the little sump that we talked about. And this right here is the wash pad with the oil/water separator being right under it.

And then still we're at the main motor pool, Building 1778, right across the parking lot. We had an actual wash ramp where you could pull the heavy equipment up on the ramp and wash it down, and then

1 the pad and drain and the oil/water separator
2 underneath it. The potential contaminants of concern,
3 again, are POL and our soaps and our solvents. Went
4 through the phase one and phase two RFI. The site is
5 clean. Nothing there remotely approaching the PRGs.
6 And let's take a look at that site.
7 Here we have--it's kind of a before and after.
8 This site is no longer in use. This is what the ramp
9 used to look like. This ramp was dismantled and
10 disposed in 1995, I believe it was. No, in 1997.
11 This site is no longer being used, but you can see the
12 remnants of the pad right there.
13 And now, we're going down the street from the main
14 motor pool to the heavy equipment area of the Main
15 Post. This is SWMU 16 at the heavy equipment wash
16 pad. Again, our POL and solvents being the
17 contaminants of potential concern. Went through phase
18 one and phase two RFI. Nothing is left there. I
19 mean, nothing was discovered there, and it's
20 recommended for no further action.
21 And this is simply what it looks like. The
22 vehicles would pull up here inside this fenced area
23 onto the wash ramp, be cleaned, and then pulled back
24 out on the road.
25 And then this is actually located inside the

compound for the heavy equipment shop. It's at the heavy equipment garage. Again, we've got another oil/water separator associated with its wash pad and its drain. POL and solvents, again, for contaminants of concern. Went through the phase one and phase two RFI. No further action. There are no PRGs at this site.

And this is kind of around behind the heavy equipment shop. You can see this is kind of a large pad right here. But when we're talking heavy equipment, we're talking about like the Caterpillars and stuff like that, that they use out there at White Sands.

Okay, now we'll move into the next category, which is waste disposal. We have three sites, three SWMUs that were investigated for reported waste disposal activity. And actually, I should have changed this last one. It says, "Waste was removed each of the sites and properly disposed."

Well, that's true at two of the sites, and we'll see that in just a minute. But what happened at the third site is nothing was ever found, and we'll talk about that when we get to that particular one.

Okay, the first site is located at Launch Complex 37. You can't see this map, but we can look at the

map after the meeting, and I can point out to you where it is on that map. "LC" simply stands for Launch Complex. It's SWMU 140. What this was was a small trench that was dug out in the desert, and we found paint cans and solvent cans out there just dumped into this trench in the middle of the desert. So the contaminants of concern are associated, the metals, like the pigment in the paint, the solvents, the paint thinners, things like that.

They did go through the phase one and phase two RFI to make sure that nothing else was there that was of any concern, and we're recommending it for no further action after the total remedial action did take place at that site.

And in 1996--here's the site. You can see it was a very small site, and there's some pallets and stuff in there, too. In 1996, after the phase one and phase two RFI were accomplished, this site was completely cleaned up. Everything was properly disposed. This site was backfilled and regraded, and that's what it looks like today.

Okay, and then now we're back at the High Energy Laser Systems Test Facility, the MAR before it was the HELSTF. It's SWMU 150. It's a very similar situation. This was a small trench that was dug in

1 the desert. The debris in this trench was associated,
2 actually, with the construction of the MAR, so it
3 dates from the early 1960s. Again, the metals and the
4 solvents were the potential contaminants of concern.
5 Again, it went through the phase one and phase two
6 RFI. A total remedial action was accomplished in
7 1996. And let's just take a look at it.
8 Here's the trench, and here's what it looks like
9 today. Everything was thoroughly investigated,
10 sampled, removed. Confirmational sampling took
11 place. The site is clean. It was backfilled,
12 regraded, and now is recommended for no further
13 action.
14 Now, this site, this is the one that I told you
15 about. We investigated it thoroughly, but nothing was
16 ever found. What happened here--and this is back at
17 the heavy equipment shop. We'll look at it in just a
18 minute. What happened here is that during employee
19 interviews during the 1998 RCRA facility assessment
20 phase of the Installation Restoration Program, an
21 employee recalled that perhaps there was a pipe that
22 was installed near this building that was used for
23 pouring waste oils and solvents and things down. So
24 what we did was a thorough investigation of the site,
25 which was the phase one and phase two RFI. We did

1 extensive excavation after we did like geomagnetometer
2 work out there at the site to try to discover where
3 this pipe might be. We did find a small length of
4 pipe, and I'm talking small length of pipe, that was
5 not connected to anything. There was no evidence and
6 nothing found approaching PRGs at this site. It's
7 recommended for no further action. And I'll show you
8 where--the employee recalled it being installed here.
9 But we did the geomagnetometer work all around, all
10 around, so that we weren't missing anything. And
11 nothing was ever discovered at that site. So again,
12 you know, cases do happen where things get on the
13 permit by mistake.
14 Okay, another category was the fire fighting
15 training that we're going to talk about. There's only
16 two SWMUs associated with these sites, and they're
17 right there at the Main Post area. They've been
18 completely characterized and remediated, and they meet
19 all of their land use goals. The first one, SWMU 21,
20 potential contaminants of concern, POL and metals.
21 This is because waste oils and waste gasolines and
22 things like that were used as the fuel during the
23 training exercises for the fire fighters. And they
24 were stored out there in an above-ground tank. So,
25 you know, the old metals, the old POLs and things like

1 that, that's what you would expect to see. And that
2 is, in fact, what we found in the old tank when it was
3 removed. And it was removed after the phase one and
4 two RFI in 1996. All confirmational samples were
5 taken. There's nothing remaining at this site. It's
6 recommended for no further action.
7 Now, I don't know if everybody can see, it's kind
8 of a dark slide, but this is just prior to the removal
9 of the above-ground waste-oil tank that was associated
10 with this site.
11 And then the next one, which is directly
12 associated with this, was the waste pile. After the
13 training exercises, what they would do is take a
14 bulldozer out there and kind of scrape up the soils
15 after each of the exercises. So what we had here was
16 actually the waste pile of these soils that were
17 associated with the fire fighting training. Same
18 contaminants of concern. Again, completely remediated
19 after the phase two RFI that was in 1996. Again, no
20 further action was necessary. And we'll show you a
21 picture of the pile we're talking about kind of
22 scraped up over here in the weeds. And then that tank
23 that we looked at in the other picture is right about
24 here. Again, it's been completely taken care of.
25 Okay, now we're going to the next category, which

is the process water. Four SWMUs, four different sites, all designed to receive process water, which is different than wastewater. These sites, too, have been completely characterized and remediated. They meet all of their land use goals.

Okay, this first one, LSTC, that stands for the Laser System Test Center. We're back at HELSTF. Potential contaminants of concern here are metals and solvents. What happened at this site, it received the condensate and the cooling water from the LSTC. And metals here would be referring to chromium because the chromium is used as a descaler in the aura of water. The completed actions here, phase one and phase two RFI. Nothing approaching any of the PRGs. Recommended for no further action. And this is the site. It's actually out here in the trees. The discharge pipe is a very small pipe like this. It's a little PVC pipe. It discharges into that group of healthy vegetation out there.

And by the way, this site, since it is an active site, and it's actively discharging, requires a permit. Remember, we talked earlier about the other wastewater treatment sites that had their own permits. A notification of intent has been submitted by White Sands to permit this discharge.

1 Okay, Test Cell 4 lagoon. We're back at HELSTF.
2 This was constructed specially for a test that was
3 going to be held at HELSTF. It was a line to the
4 lagoon. It did receive a one-time release of 30,000
5 gallons of sodium fluoride wastewater in 1989. A
6 phase one and phase two RFI was conducted at that
7 site. Total removal and confirmational sampling did
8 occur. When the test was over--there was that
9 one-time discharge. The test was over. We did all
10 the studies, all the sampling. We removed it, and no
11 further action is necessary there. And we'll take a
12 before-and-after look here. This is Test Cell 4 in
13 the background. Here is a picture of the lagoon.
14 Here it is after remediation, what it looks like
15 today.
16 And this might be interesting to some people. We
17 do active groundwater monitoring at or near most of
18 the sites that you've seen and that I've referred to
19 tonight. These are groundwater monitor wells at the
20 High Energy Laser System Test Facility. And we do
21 that groundwater monitoring on a semi-annual basis
22 just to make sure that we are not experiencing any
23 problems in the groundwater. And not only do we
24 monitor at HELSTF, we monitor all over White Sands
25 Missile Range.

And now we'll talk about the dry pond. This is located directly at the end of the lagoon system at the HELSTF. It's regulated under the permit, the discharge permit for the lagoons. Metals being the contaminant of concern there. A phase one and phase two RFI was conducted. Nothing even approaching the PRGs was seen there. No further action is necessary at this site.

And what we have next is kind of a little drawing for you, because it's really hard to see in the slide. It's never actually been used, because this lagoon system is for total evaporation and it works really well out here in the desert. But the SWMU is located directly at the end of the lagoon system.

And now, let's go on to the photo. You can see it's kind of hard to see; it's just there. It's just this small area at the end of the lagoon system.

Now, we are at the clean facility at HELSTF. And what happens here is they clean the optics in a very controlled environment. The contaminants of concern here were the POLs and the solvents that are associated with cleaning of the optics. This site went through a phase one and phase two RFI. The remedial action that was chosen was closure of the sump after the site was investigated, and the sludge

1 was removed and properly disposed at the site. It is
2 now recommended for no further action.
3 We'll show you before and after. Again, this is
4 not a big site. It's small. It's just this little
5 area right here. And now, this is kind of a misnomer,
6 and the titles that we've shown you on all of these
7 slides are the actual titles of the solid waste
8 management units since the inception of the program.
9 But it is a misnomer, because there is no underground
10 holding tank associated with the SWMU. It was simply
11 this little sump down here, and it was an above-ground
12 tank, kind of like what we saw at the motor pool
13 where, you know, optics were taken out here, and they
14 were washed down. Wastewater then went into the sump
15 and was pumped to the holding tank. So all the
16 sludges were cleaned out of this sump. Everything was
17 sampled, characterized, properly disposed. It was
18 filled in. They no longer do the large optic cleaning
19 at this facility, and HELSTF is no longer used.
20 Okay, so we talked very quickly about the 42 SWMUs
21 that we have proposed for no further action/class III
22 modification request to the New Mexico Environment
23 Department. And now, very briefly, we'll talk about
24 the two sites that we're proposing for future remedial
25 action. Both of these sites will be undergoing what's

1 called a voluntary corrective measure, which is a
2 remedial action that has been reviewed by the New
3 Mexico Environment Department and approved.
4 The first one we'll talk about is at the Nuclear
5 Effects Reactor Facility. It's the two little waste
6 ponds that are associated with that facility, SWMUs
7 160 and 161. The potential contaminant of concern
8 here--what we expected to find was domestic
9 wastewater, because the toilets discharged there, used
10 to discharge there. But what we did find was a
11 surprise. We found very low levels of this PCB-type
12 1254 and very low levels of arsenic. And we'll talk
13 about the low levels in just a minute. But let's take
14 a peek and see what these look like.
15 This is waste pond number one, SWMU 160. It's
16 located right inside the entrance to the facility,
17 near the guard shack to the facility. It's a small
18 site. This is the influent right here.
19 And now, we'll look at the other one. Again,
20 small. There's the influent. And this site you can
21 see is paved with asphalt. And it's way inside the
22 facility there where there's no access permitted.
23 Well, there's no access permitted at this facility
24 whatsoever.
25 So what do we have? We have these two very small

inactive waste ponds. Effluent has not been discharged since the early 1980s at these sites. These are the levels that I was talking about. The PCB 1254 was detected at 5.1 parts per million in the surface soils only. Arsenic was detected at 4.7 parts per million, again, in the surface soils only. But we didn't just sample the surface soil. We did a full investigation here at this site, and we augered over 20 feet, took a full suite of samples. These are the only two hits that we did receive.

What we have proposed to New Mexico Environment Department is to go ahead and totally remove and properly dispose all contaminated soils at this site. What we propose to do is actually remove the soil in two-foot lifts, and then perform confirmational sampling. If it's clean, we stop. If it's not clean, we take another two-foot lift out of there. When we do reach clean, we'll take our full suite of confirmational sampling, send those all to NMED for approval. Once they do approve these samples as being clean, we will restore this site. And what that means is the one that was outside the fence that had the little vines trailing in it, that will simply be backfilled, regraded, revegetated. And the one that was inside the big security fence will be backfilled,

1 and asphalt will be applied over this site.
2 In our very last one, this is a small landfill
3 located at North Oscura Peak, which is way up at the
4 northern end of the Range. I know nobody can see
5 this, but it's way up north. And we'll look at the
6 map later if you want to. It's three different SWMUs
7 which are small little trenches up there. The
8 potential contaminants of concern here are metals and
9 organics. And the organics are associated with this
10 septage disposal pit. Here's kind of an overview of
11 the site. This is an interesting site. See right
12 here where it says "to atom site"? This is what we
13 refer to as Atom Peak. This is the old observation
14 point for the Trinity explosion. It's about 1.3 miles
15 right up the hill from this little landfill. And what
16 happened is the troops that were stationed at the Atom
17 Peak site, this is where they disposed of their
18 waste. Their septage was taken here and disposed, as
19 well as the other waste that was generated at the
20 facility.
21 And you see a couple of mentions here of soil
22 stockpiles. We can see those in the pictures. Okay,
23 right here, this little trench, this is where the
24 septage disposal did take place. Back here in the
25 back--I know you can't really see it--but the other

1 two trenches we're talking about were right there.
2 And here's one of those soil piles. Okay, this is all
3 the waste that is in one of those trenches. What you
4 can see is just the old spools that the telephone
5 cable wire and stuff like that comes on, and pallets.
6 This is one of the covered trenches right here. I
7 know it's hard to see, but we're trying to emphasize
8 here that it is a small site. It's been thoroughly
9 sampled. The only waste that's been found there is
10 strictly nonhazardous. It's what we call solid
11 waste. The septage has been sampled. We have
12 proposed, again, for this site to totally remove it,
13 properly dispose of anything we find, do
14 confirmational sampling. When New Mexico Environment
15 Department agrees with us that it is clean, we will
16 restore this site, which will be with clean soil. And
17 this is really a very beautiful site up there in the
18 northern portion of the Range, and it's got some--I
19 wish I could remember the name of the grass that's
20 growing there. But we're going to reseed it with the
21 native grass that is growing right there at the site,
22 which will be part of the site restoration.
23 So very briefly, in summary, we have completed all
24 the restoration activities at 22 of the sites we
25 talked about tonight. They've been completely

characterized and remediated in accordance with all the regulations. All of their land use goals have been met.

Then we talked about our wastewater treatment sites. These are already regulated, but they've also been completely investigated by this program. So we are requesting that New Mexico Environment Department take a look at these sites, and because they're already regulated by an arm of New Mexico Environment Department, we're asking that they allow the regulation to take place with that arm where it already occurs.

And then we did very briefly discuss the future remedial actions we'd like to do at North Oscura Peak landfill and at the Nuclear Effects Directorate.

That's it for the presentation. I'd like to encourage everybody to make comments, to ask questions, to look at the maps. These are like little tiny maps. And we also have copies of everything, if you would like to take a look at the RCRA facility investigations, at the petitions themselves.

Also--yes, ma'am.

MS. THAELER: I want to make a comment when you're through. Go ahead.

MS. PAUL: I was just going to mention

if anybody hasn't signed in, there is a sign-in place over there. And there's also comment sheets there. If you wouldn't care to make a comment during the meeting, you can take a sheet and fill it out and send it to me.

MS. THAELER: My name is Marianne Thaeler. I wear a number of hats. I'm a member of the Fort Bliss Restoration Advisory Board. I'm the conservation chair for the Southern New Mexico Group of the Sierra Clubs, and I'm a National Sierra Club advisor on military issues.

As some of you may know, I've commented at many of these hearings, including the SWMU hearings, not only here but in other places. I apologize to the reporter that I did not come with prepared comments, because my letter, which I'll present for the record, didn't indicate that comments would be accepted at the meeting, though I did notice that in the revised public notice, which was attached, that it is so noted.

Therefore, I cannot comment formally, and I wish to comment informally. First, because there has been no opportunity for any public access to the sites, or notification that the characterization reports were available to the public sooner than this evening, it

is impossible to make meaningful comments. And without access to the information or the methods and methodology used to do the cleanup, it is impossible to make meaningful comments. Thus, I wish to recommend that White Sands Missile Range take one of two possible actions: Establish a restoration advisory board, as was done at Fort Bliss and has been done at Holloman Air Force Base, or accept the invitation of the Fort Bliss RAB members to act as a joint White Sands Missile Range/Fort Bliss RAB.

To the comments that not enough public interest has been expressed, I can testify that was initially true with the Fort Bliss RAB. And since the RAB was established, public participation at meetings is extremely good. Attendance is 20 to 30 people. Meetings are held in Las Cruces. They here held in El Paso, and they are held in Alamogordo.

The managers of Fort Bliss have indicated that through these public comment opportunities, many different situations that would otherwise potentially be difficult have been avoided. All of which was presented here were the type of thing that came before the RAB meeting for the Fort Bliss installation, as well as the one at Holloman Air Force Base, and so I'm familiar with some of the procedures.

1 And I'll leave my comments at that.
2 MS. PAUL: Thank you. Do you have any
3 more questions or comments? We can refer to the
4 documents. We can take you back through the
5 presentation. We can look at the petitions, whatever
6 you might be interested in doing.
7 MR. USSERY: I have a question for you
8 about the solid waste materials you found up at North
9 Oscura Peak. Were those examined by the Range
10 archaeologist and determined if they were--
11 MS. PAUL: Yes, they were. Dr. Bob
12 wouldn't let me anywhere near the site till he was
13 through with it.
14 MR. USSERY: And what was his finding
15 concerning the wire spools and some of those things?
16 Were they indeed datable back to the Trinity testing?
17 MS. PAUL: I would have to refer back
18 to the archaeology report that was done for that site,
19 because I can't tell you off the top of my head.
20 (The speaker was asked to identify himself.)
21 MR. USSERY: David Ussery,
22 U-S-S-E-R-Y.
23 MS. PAUL: Well, if that's it, I'd like
24 to thank everybody again for coming tonight. Thank
25 you for your participation. Thank you very much for

your comments. And if there's anything we can do for you at White Sands, please give us a call. Please take information on your way out, and our names are on the papers. Thank you again.

(The public hearing adjourned at 7:48 p.m.)

STATE OF NEW MEXICO)
)
COUNTY OF DONA ANA)

I, ELSIE R. PORTER, Certified Court Reporter for the State of New Mexico, hereby certify that I reported, to the best of my ability, the Public Hearing on February 23, 2000; that the pages numbered 1 through 32 inclusive, are a true and correct transcript of my stenographic notes, and were reduced to typewritten transcript through computer-aided transcription; that on the date I reported this public hearing, I was a New Mexico Certified Court Reporter.

Dated at Las Cruces, New Mexico, this 17th day of March, 2000.

ELSIE R. PORTER
New Mexico CCR No. 61
Expires: December 31, 2000

APPENDIX F

COMMENTS FROM NMED DATED 10/13/00 REGARDING JANUARY 2000 SUBMITTAL OF NFA PETITIONS

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2044 A Galisteo, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
Telephone (505) 827-1567
Fax (505) 827-1544

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

PAUL R. RITZMA
DEUPTY SECRETARY

EC Done
Leads Dup
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CERTIFIED MAIL Z 258 648 669
RETURN RECEIPT REQUESTED

October 13, 2000

Thomas A. Ladd, Director
Environmental and Safety
Department of the Army
U.S. Army White Sands Missile Range
White Sands Missile Range, New Mexico 88002

RE: NOTICE OF INITIAL REVIEW

PETITION TO PERFORM CLASS III MODIFICATIONS TO REMOVE SOLID WASTE MANAGEMENT UNITS 8, 9, 12, 13, 14, 15, 21, 22, 145, 147, AND 148 FROM THE WHITE SANDS MISSILE RANGE RCRA PART-B PERMIT, IDENTIFICATION # NM2750211235 JANUARY 2000

EPA ID# NM2750211235

HWB-WSMR-99-013

Dear Mr. Ladd:

The Hazardous Waste Bureau **(HWB)** of the New Mexico Environment Department **(NMED)** has received the White Sands Missile Range's **(WSMR)** *PETITION TO PERFORM CLASS III MODIFICATIONS TO REMOVE SOLID WASTE MANAGEMENT UNITS 8, 9, 12, 13, 14, 15, 21, 22, 145, 147, AND 148 FROM THE WHITE SANDS MISSILE RANGE RCRA PART-B PERMIT, IDENTIFICATION # NM2750211235* dated JANUARY 2000, and referenced by report number WS-ES-EC-003. This corrective action document addresses 11 solid waste management units. The HWB has completed its initial review to determine if all the required parts are contained in the document. HWB has determined that this document is incomplete. Therefore, as prescribed in the NMED Hazardous Waste Fees 20.4.2.301.2 NMAC, HWB is returning the document and is advising WSMR of its missing parts. WSMR must make the required corrections and resubmit the document, before HWB can proceed with its review.