DEPARTMENT OF THE ARMY
U.S. ARMY GARRISON WHITE SANDS
100 Headquarters Avenue
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5000

REPLY TO
ATTENTION OF

JUN 2 7 2007

Directorate of Public Works

RECEIVED
JUL 2007
NMED Hazardous
Waste Bureau

Mr. James Bearzi
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Subject: Closure and Accelerated Corrective Action Completion Reports for the Oscura Range Center Landfills A (SWMU 157), B (SWMU 158, LDU-19), and C (SWMU 159)

Dear Mr. Bearzi:

Enclosed you will find one hard copy and 1 CD of each of the following reports:

Closure Report for the Oscura Range Center Landfill "B" (SWMU 158) (LDU-19), June 2007

Accelerated Corrective Action Completion Report: Oscura Range Center Landfill C WSMR-05 Landfill A (SWMU 157) and Landfill C (SWMU 159) May 2007.

The Closure Report summarizes corrective measures conducted at SWMU 158 and includes a Closure Certification and Plat of Survey as required due to its listing as an operating unit (LDU-19) in the 2006 Annual Fee letter for WSMR. The Accelerated Corrective Measures Report presents the results of the Accelerated Corrective Action conducted at SWMU 159 during 2006 and a summary of remediation activities conducted previously at SWMU 157 during 1998.

The following certification is provided as required by our permit and according to NMAC 20.4.1.900, incorporating 40 CFR 270.11:

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

Copies furnished, with enclosure (1 print copy w/CD), to Ms. Cheryl Frischkorn, NMED-HWB; Mr. Chuck Hendrickson, Region VI EPA; Mr. Bill Davis, U.S. Army Environmental Command; and, without enclosure, to Mr. John Kieling, NMED-HWB and White Sands Technical Services, LLC.

Should you have any questions regarding this matter, please contact Mr. Jose Gallegos of our Environmental Compliance office at (505) 678-1007.

Sincerely,

Thomas A. Ladd

THOMAS A. LADD
Director, Public Works

Enclosures

LIBRARY COPY

WSMR Environmental Document ES-EC-TO-026-07-196

CLOSURE REPORT

Oscura Range Center Landfill "B"
(SWMU 158) (LDU-19)

WHITE SANDS MISSILE RANGE
INSTALLATION RESTORATION PROGRAM

June 2007

White Sands Missile Range
Directorate of Public Works - Environmental Division
White Sands Missile Range, New Mexico 88002
EPA ID# NM 2750211235

WHITE SANDS TECHNICAL SERVICES

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503.
PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE *(DD-MM-YYYY)*
June 2007

2. REPORT TYPE
Final

3. DATES COVERED *(From - To)*
1995-2007

4. TITLE AND SUBTITLE
Closure Report for the Oscura Range Center Landfill "B" (SWMU 158) (LDU-19).

5a. CONTRACT NUMBER
W9124Q-04-D-0012

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Bradley Davis

5d. PROJECT NUMBER

5e. TASK NUMBER
TO26

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
White Sands Technical Services, LLC
P.O. Box 363
WSMR, NM 88002

5f. WORK UNIT NUMBER

8. PERFORMING ORGANIZATION REPORT NUMBER
ES-EC-TO-026-07-196

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Department of the Army
U.S. Army White Sands Missile Range
100 Headquarters Avenue
ATTN: IMSW-WSM-DPW-E-EC (Jose Gallegos)
White Sands Missile Range, NM 88002

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSORING/MONITORING AGENCY REPORT NUMBER
ES-EC-TO-026-07-196

12. DISTRIBUTION AVAILABILITY STATEMENT

13. SUPPLEMENTARY NOTES

14. ABSTRACT

WSMR conducted corrective measures activities at SWMU 158, the ORC Landfill "B", WSMR-05, during June of 1998. The objective of the corrective measures activities and this Closure Report is to obtain clean closure of SWMU-158. Confirmation samples indicate that no contamination above residential soil screening levels is present at the former landfill location. This Closure Report summarizes corrective measures conducted at SWMU 158 and includes a Closure Certification and Plat of Survey as required due to its listing as an operating unit (LDU-19) in the 2006 Annual Fee letter for WSMR.

15. SUBJECT TERMS
Closure Report, Oscura Range Center (ORC), landfill, excavation, landfill "B", SWMU 157, SWMU 158, SWMU 159, WSMR-05, VOC, SVOC, PCB, RCRA metals, NMED, HWB, clean closure.

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified		8	19b. TELEPHONE NUMBER (*Include area code*)

Prescribed by ANSI-Std Z39-18

Standard Form 298 (Rev. 8-98)

CLOSURE REPORT FOR THE OSCURA RANGE CENTER LANDFILL "B" SWMU 158 (LDU-19)

Submitted to:

U.S. Army
White Sands Missile Range
Directorate of Public Works - Environment Division
White Sands Missile Range, New Mexico 88002-5048

June 2007

Submitted by:

White Sands Technical Services, LLC
Building 126
White Sands Missile Range, New Mexico 88002

EXECUTIVE SUMMARY

The objective of this Closure Report is to summarize corrective measures conducted during June 1998 at the Oscura Range Center (ORC) Landfill "B", Solid Waste Management Unit (SWMU) 158 (WSMR-05), and removal of the landfill from the list of SWMUs designated in the White Sands Missile Range (WSMR) Installation Restoration Program (IRP) and the WSMR Resource Conservation and Recovery Act (RCRA) permit. SWMU 158 is listed as an Operating Unit and was given the further designation of Land Disposal Unit - 19 (LDU-19). SWMU 158 (LDU-19) is located one-half mile south of the ORC cantonment area and consisted of a surface pile of debris. All waste debris was removed from SWMU 158 (LDU-19) in June 1998 by the U.S. Army Corps of Engineers (Radian, 1998).

This Closure Report includes the after action report titled "*Plan of Action Landfill Debris Removal Oscura Range Center,*" prepared by Radian International dated December 1998 (Radian, 1998). This after action report details corrective measures conducted at SWMU 158. Additionally, a Closure Certification and Plat of Survey as required due to SWMU 158's listing as an operating unit (LDU-19) in the 2006 Annual Fee letter for WSMR is appended to this Closure Report.

The objective of the corrective measures conducted by WSMR was to obtain clean closure of the ORC Landfill "B" (SWMU 158) and removal of the landfill from the list of SWMUs designated in the WSMR Installation Restoration Program and the WSMR RCRA permit. Results of the corrective measures indicate that the SWMU 158 landfill debris was removed and disposed off-site at an approved landfill. Confirmation sample results indicate no contamination present at the former landfill site. Results indicate that the site should be recommended for clean closure.

TABLE OF CONTENTS

EXECUTIVE SUMMARY II

LIST OF ACRONYMS IV

1.0 INTRODUCTION 1

1.1 Regulatory Requirements 1
1.2 Facility Description 1
1.2.1 White Sands Missile Range Background and Description 1
1.2.2 Environmental Setting 3

2.0 CORRECTIVE MEASURES AT LANDFILL B (SWMU 158; LDU-19) 4

3.0 CLOSURE CERTIFICATION 7

4.0 CONCLUSIONS 7

REFERENCES 8

APPENDIX A PLAN OF ACTION LANDFILL DEBRIS REMOVAL OSCURA RANGE CENTER (RADIAN, 1998)
APPENDIX B SWMU 158 CLOSURE CERTIFICATION AND PLAT OF SURVEY

List of Figures

Figure 1. Location of the Former Oscura Range Center Landfills (SWMUs 157-159). 2

List of Photographs

Photograph 1. SWMU 158 (LDU-19) Debris Prior to Corrective Measures. 5
Photograph 2. Current View of SWMU 158. 5
Photograph 3. Septic Area Prior to Corrective Measures. 6
Photograph 4. Current View of Septic Area. 6

List of Tables

Table 1. SWMU 158 (LDU-19) Confirmation Sample Results. Taken from Radian (1998) 7

LIST OF ACRONYMS

bgs	Below Ground Surface
COPC	Contaminant of Potential Concern
DAF	Dilution Attenuation Factor
DOT	Department of Transportation
DQO	Data Quality Objectives
DRO	Diesel Range Organics
EPA	Environmental Protection Agency
F	Fahrenheit
FT	Feet
GPS	Global Positioning System
HHSSL	Human Health Specific Screening Level
HSWA	Hazardous and Solid waste Amendment
HWB	Hazardous waste Bureau
IRP	Installation Restoration Program
mg/kg	milligrams per kilogram, equivalent to parts per million
mg/L	milligrams per liter
NM	New Mexico
NMED	New Mexico Environment Department
NMDGF	New Mexico Department of Game and Fish
ORC	Oscura Range Center
PCB	Polychlorinated biphenyl
POC	Point of Contact
RCRA	Resource and Conservation Recovery Act
SSL	Soil Screening Level
SVOC	Semi-volatile Organic Compound
SWMU	Solid Waste Management Unit
TDS	Total Dissolved Solids
TI	Technical Inspector
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound
WSMR	White Sands Missile Range

CLOSURE REPORT FOR THE OSCURA RANGE CENTER LANDFILL "B" SWMU 158 (LDU-19)

1.0 INTRODUCTION

The objective of this Closure Report is to summarize corrective measures conducted during June 1998 at the Oscura Range Center (ORC) Landfill "B", Solid Waste Management Unit (SWMU) 158 (WSMR-05), and removal of the landfill from the list of SWMUs designated in the White Sands Missile Range (WSMR) Installation Restoration Program (IRP) and the WSMR Resource Conservation and Recovery Act (RCRA) permit. WSMR-05 consists of three separate landfill areas (Landfills A, B, and C) located near the ORC in the northeastern portion of WSMR. ORC is located just south of Range Road 8 and west of Range Road 11 (see Figure 1). The three landfills are designated as SWMUs 157, 158, and 159 and are regulated under the New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB). All three SWMUs are regulated through WSMR's RCRA Permitting process. SWMUs 157 and 159 are listed as Corrective Action Units under the RCRA permit. SWMU 158 is listed as an Operating Unit and was given the further designation of Land Disposal Unit - 19 (LDU-19) under the 2006 Annual Fee letter for WSMR. The three SWMUs were designated as WSMR-05 under the Army's Installation Restoration Program (IRP).

SWMUs 157 (Landfill A) and 158 (LDU-19; Landfill B) were remediated in 1998. SWMU 157 is located south of the communications building at the ORC cantonment area. Waste at SWMU 157 consisted of insulated wire, scrap metal, wood, tires, paper and miscellaneous office debris. SWMU 158 (LDU-19) is located one-half mile south of the ORC cantonment area and consisted of a surface pile of debris similar to SWMU 157 but also included spent flare casings. All waste debris was removed from SWMUs 157 and 158 (LDU-19) in June 1998 by the U.S. Army Corps of Engineers (Radian, 1998). SWMU 159, the ORC Landfill C, is located approximately 2 miles north of the ORC cantonment area. Beginning in February 1987, ORC disposed of scrap metal from spent missiles, concrete foundations and other construction debris in a landfill trench. WSMR conducted an Accelerated Corrective Action (ACA) in June-July 2006 which included removal of debris from the determined extent of the SWMU 159 trench followed by confirmation soil sampling.

This Closure Report includes as Appendix A the after action report titled "*Plan of Action Landfill Debris Removal Oscura Range Center,*" prepared by Radian International dated December 1998 (Radian, 1998). This after action report details corrective measures conducted at SWMU 158. Additionally, a Closure Certification and Plat of Survey as required due to SWMU 158's listing as an operating unit (LDU-19) is included as Appendix B to this Closure Report.

1.1 Regulatory Requirements

The corrective measures conducted at SWMU 158 are subject to the requirements of the New Mexico Hazardous Waste Act (New Mexico Statutes Annotated [NMSA], 1978, Chapter 74-4-1 through 14), Title 20 of the New Mexico Administrative Code (NMAC), Chapter 4.1 (NMED, 1998) and Title 40 of the Code of Federal Regulations (CFR) Parts 260-273. Site closure decisions are based on comparisons of total contaminant concentrations with NMED Soil Screening Levels (NMED, 2006).

1.2 Facility Description

1.2.1 White Sands Missile Range Background and Description

WSMR is a Department of Defense test facility administered by the U.S. Army. WSMR is the largest land-area military installation in the United States and occupies approximately 3,400 square miles in five South Central New Mexico Counties: Dona Ana, Socorro, Lincoln, Otero, and Sierra.

SWMU 158 was an inactive surface disposal site labeled as a "landfill". The landfill was located approximately 0.5 miles south of the ORC complex. The undisturbed area surrounding the site is populated by sparse waist-high vegetation including creosote and honey mesquite bushes along with grasses. Wood survey stakes were noted as still present at the site from previous field work.

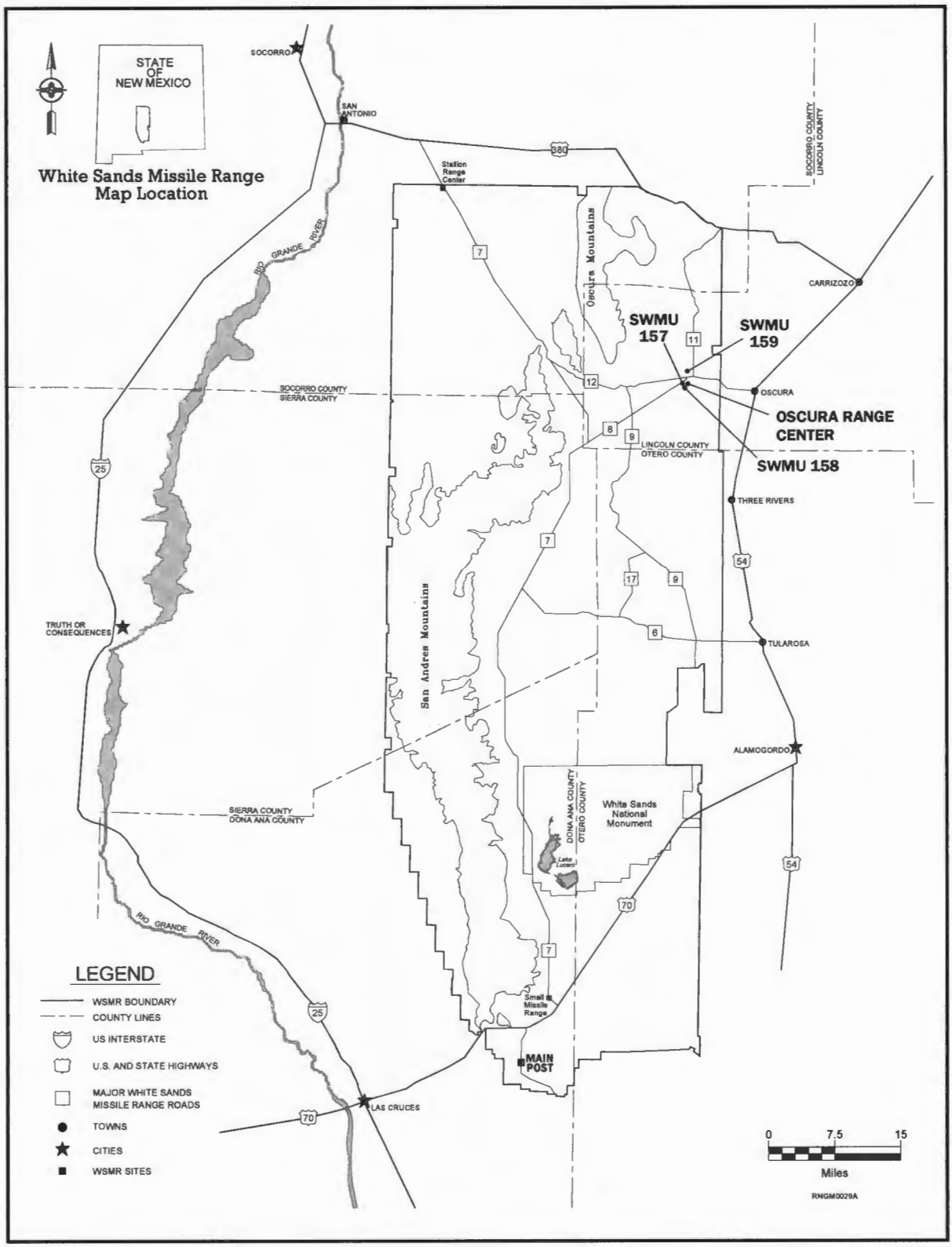


FIGURE 1.
LOCATION OF THE FORMER OSCURA RANGE CENTER LANDFILLS (SWMUS 157-159).

1.2.2 Environmental Setting

Regional Geology

WSMR lies within the Mexican Highland Section of the Basin and Range Province. This province is characterized by a series of tilted fault blocks forming longitudinal, asymmetric ridges, or mountains, and broad intervening basins. The WSMR geology consists predominantly of the Tularosa Basin and surrounding mountain ranges. The San Andres Mountains, San Augustin, and Oscura Mountains border the Tularosa Basin on the west while the Sacramento Mountains form the eastern border. A narrow region of north-south-trending, large-displacement normal faulting separates the mountains from the basin resulting in the change in relief across the missile range. The average elevation of the Tularosa Basin is 4,000 ft above mean sea level. The majority of WSMR property including most test facilities is located within the Tularosa Basin (WSMR, 1998).

The Tularosa Basin contains thick sequences of Tertiary and Quaternary age alluvial and bolson fill deposits. These sediments, more than 5,000 ft thick in some areas, consist mainly of silt, sand, gypsum and clay weathered from the surrounding mountain ranges. The average elevation of the basin floor is 4,000 ft above mean sea level and surface features consist of flat sandy areas, sand dunes, basalt flows, and playas (dry lake beds).

The nature of the bolson-fill deposits varies both laterally and vertically throughout the Tularosa Basin. Coarse-grained, poorly sorted sediments deposited near mountain fronts grade into fine-grained, well sorted sediments towards the center of the basin (Kelly, 1973). Sediments further from the mountain fronts also contain a greater percentage of clay and gypsum. Vertically, the sediments are reported to become finer-grained and more consolidated until reaching a laterally continuous clay unit at about 1,000 ft below ground surface (Kelly and Hearne, 1976).

In general, the stratigraphy is represented by unconsolidated to partially consolidated, fine to medium-grained sand with subordinate amounts of clay. Caliche is present as discrete layers and nodules throughout the stratigraphic section. Although no faults within the basin fill are mapped within the immediate area, quaternary faulting is known to exist within the region. These faults are reported to occur within the unconsolidated bolson sediments, trend north to south, and are most common near the mountain fronts. Orr and Myers (1986) divide the Tularosa Basin fill deposits into 5 distinct mappable units which include:

- Coarse to fine-grained deposits occur in gently sloping alluvial fans along the basin margin. The alluvial fans spread outward from the surrounding mountain slopes and coalesce into flat alluvial plains toward the basin interior. These fan deposits interfinger with lacustrine (lake) and alluvial deposits of the central part of the Tularosa Basin.
- Fine-grained sediments formed from lacustrine deposition extend throughout most of the Tularosa Basin. These deposits consist mainly of clay and evaporites with minor sand beds and occur near surface in the northern part of the basin and at depth in the southern part of the basin.
- Fluvial-eolian sand, gravel, and clay deposits occur in the southern part of the basin, near Fort Bliss, extending from the Organ and Franklin Mountains and south to the Hueco Mountains.
- Gypsiferous evaporite deposits of the Lake Lucero-White Sands area occupy the White Sands National Monument (WSNM) and areas administered by WSMR including the Lake Lucero area and the alkali flats north of Lake Lucero. These deposits occur as dense recrystallized gypsum, gypsum sand dunes, and alluvial deposits. Hard caliche (cemented with recrystallized gypsum) is present at or near surface in the dry lake gypsum deposits of the central portion of the basin.
- The last depositional unit is described as composed of coarse-grained deposits saturated with saline water in the central portion of the Tularosa Basin.

ORC Geology/Lithology

The ORC is located within the Tularosa Basin. The site specific lithology in the immediate area of the ORC was obtained from the WTS field geologist's soil boring logs for the SWMU 159 RFI (BAE Systems, 2004). The interval from ground surface to 10 ft bgs is characterized as unconsolidated fine sand, silt, and red clay. From 10 ft bgs to 15 ft bgs, the interval is characterized as dark reddish brown clay with silt and gypsum.

The interval from 15 ft bgs to 20 ft bgs is characterized as dark reddish brown sandy-, silty-clay with minor dark black organic material. From 20 ft bgs to 24 ft bgs, the interval is characterized as silty, fine-grained sand and reddish brown clay. The interval from 24 ft bgs to 25 ft bgs is characterized as dark brown clay with gypsum. From 25 ft bgs to 30 ft bgs, the interval is characterized as fine sand, silt, and red clay. The lithology described above is typical of basin fill sediments in the Tularosa Basin associated with alluvial-fluvial deposition interfingered with lacustrine deposits.

Climate

2005 annual precipitation at a gauging station located at ORC is 11.1 inches. About one-half of the annual precipitation in southern New Mexico falls during the months of July through September. The average high temperature in the summer is about 92 degrees Fahrenheit (°F), while the average low temperature dips overnight to 65 °F. During the winter months, the average high is 57 °F and the average low is about 36 °F. Average annual relative humidity is 37 percent. Wind is a significant climatic factor at WSMR from February to May, with westerly winds occasionally gusting over 40 miles per hour.

Surface Water

Natural surface waters on WSMR are primarily ephemeral due to the semi-arid climate. Most watercourses flow intermittently during and shortly after often intense, localized storm events (Mevatec, 2002). These arroyos are incised on the alluvial fans extending from the base of the San Andres Mountain Range carrying silt laden water down into the Tularosa and Jornada del Muerto Basins where the water that escapes evaporation may percolate into silty subsurface soil. No surface water bodies are present at or near to SWMU 158.

Groundwater

The fault-bounded basins of the Basin and Range Physiographic Province are filled with sediments eroded from the surrounding mountains as the basins subside (Mevatec, 2002). Groundwater flows from the mountainous recharge areas toward the central portions of the basins. The groundwater flows in unconsolidated basin sediments, also known as bolson deposits. As groundwater travels through and resides in the bolson deposits, it dissolves the susceptible minerals such as calcium sulfates and carbonates, and becomes increasingly salty. Groundwater near the center of the Tularosa Basin is generally non-potable due to high total dissolved solids (TDS).

Groundwater monitoring wells have not been installed at SWMU 158. However, the depth to groundwater at the ORC (monitoring wells OMW-1, OMW-2A, OMW-3 and OMW-4), is approximately 200 ft below ground surface (bgs). Groundwater at the ORC has been sampled on a periodic basis and TDS at this location ranges between 3,000 mg/l and 4,000 mg/l. Analysis of the potentiometric surface, as measured within completed WSMR wells and piezometers, indicate groundwater flow in the area to be in a south-southwest direction (BAE SYSTEMS, 2004).

2.0 CORRECTIVE MEASURES AT LANDFILL B (SWMU 158; LDU-19)

Landfill B (Photograph 1) came to attention of WSMR Environmental Compliance in May 1997 following a site visit to ORC. The description of the landfill was first given in an internal memorandum from MEVATEC Corporation and was described as Landfill #1. A description of materials at the site included wood debris, tires, metallic debris, and a trailer with spent flares. Landfill #1 later became known as Landfill B in the WSMR Installation Restoration Program. Landfill B is regulated under WSMR's RCRA Permit as SWMU 158 (LDU-19). This landfill was located 0.5 miles south of the ORC. Accounts from facility personnel indicate that the debris was dumped at this site until the early 1980's.

In June 1998, debris from the Landfill B site (reported by Radian as Landfill #1) and contaminated soil was excavated and removed off site to an approved landfill. Details of the corrective measures are included in the after action report titled "*Plan of Action Landfill Debris Removal Oscura Range Center,*" prepared by Radian International dated December 1998 (Radian, 1998). The Radian (1998) action report is included as Appendix A to this report. Prior to debris removal, an archaeological resources survey was conducted at the site and submitted to the New Mexico State Historic Preservation Office for approval (HSR, May 1998).

PHOTOGRAPH 1. SWMU 158 (LDU-19) DEBRIS PRIOR TO CORRECTIVE MEASURES.

Radian (1998) excavated debris in a 20 yard X 20 yard area of the landfill and extended their surface debris removal to 100 yards north, 50 yards south, and 30 yards east and west of the main landfill site (Photograph 2). All debris was transported to the municipal landfill in Alamogordo, NM. Confirmation samples were collected and analyzed for TPH, PCBs, and total RCRA metals. Neither TPH nor PCBs were detected. Several metals were detected at concentrations which are below the current NMED SSLs for residential land use. Table 1 below, presents confirmation results reported by Radian International. The table presents the RCRA metals analytical results compared to current NMED SSLs.

PHOTOGRAPH 2. CURRENT VIEW OF SWMU 158.

Additionally, Radian (1998) completed confirmation sampling at a septic area (Photograph 3) located 30 yards west of Landfill #1. Barbed wire and wood posts surrounding the septic area were removed (Photograph 4). Four confirmation samples were collected with results shown in Table 2, below, as samples S-39 through S-42.

Based on confirmation sample results collected in 1998 at the time of excavation, no analytes of concern were detected at concentrations above current NMED SSLs.

PHOTOGRAPH 3. SEPTIC AREA PRIOR TO CORRECTIVE MEASURES.

PHOTOGRAPH 4. CURRENT VIEW OF SEPTIC AREA.

TABLE 1.
SWMU 158 (LDU-19) CONFIRMATION SAMPLE RESULTS. TAKEN FROM RADIAN (1998).

Sample ID	Arsenic mg/kg	Barium mg/kg	Cadmium mg/kg	Chromium mg/kg	Lead mg/kg	Mercury mg/kg	Selenium mg/kg	Silver mg/kg
Detection Limit	2.0	2.0	0.50	5.0	1.2 – 4.8	2.0	2.0	2.0
NMED Residential SSL	3.9	15,600	39	234*	400	23	391	391
ORC-16JUN98-S-29	ND	240	ND	20	3.8	0.31	ND	ND
ORC-16JUN98-S-30	ND	220	ND	20	8.2	0.31	ND	ND
ORC-16JUN98-S-31	ND	260	ND	21	4.9	0.52	ND	ND
ORC-16JUN98-S-32	ND	260	ND	25	ND	0.92	ND	ND
ORC-16JUN98-S-33	ND	230	ND	22	5.7	0.19	ND	ND
ORC-16JUN98-S-34	ND	230	ND	24	3.7	0.15	ND	ND
ORC-16JUN98-S-35	ND	250	1.3	24	8.2	0.13	ND	ND
ORC-16JUN98-S-36	ND	260	ND	22	1.4	0.29	ND	ND
ORC-16JUN98-S-37	ND	200	ND	21	3.2	0.10	ND	ND
ORC-16JUN98-S-38	ND	230	ND	26	ND	0.53	ND	ND
ORC-16JUN98-S-39	ND	290	ND	29	ND	0.18	ND	ND
ORC-16JUN98-S-40	ND	250	ND	28	ND	0.14	3.3	ND
ORC-16JUN98-S-41	ND	260	ND	22	4.6	0.16	ND	ND
ORC-16JUN98-S-42	ND	270	ND	24	ND	0.11	4.2	ND

ND Not Detected

* NMED SSL for Hexavalent Chromium

3.0 CLOSURE CERTIFICATION

A Closure Certification is required for SWMU 158 (LDU-19) due to its listing as an Operating Unit in the 2006 Annual Fee letter for WSMR. A Closure Certification and Plat of Survey have been completed for SWMU 158 (LDU-19) and is included as Appendix B of this Report.

4.0 CONCLUSIONS

The objective of the corrective measures conducted by WSMR was to obtain clean closure of the ORC Landfill "B" (SWMU 158) and removal of the landfill from the list of SWMUs designated in the WSMR Installation Restoration Program and the WSMR RCRA permit. In June 1998, debris from SWMU 158 (LDU-19) and contaminated soil was excavated and removed off site to an approved landfill. Radian (1998) excavated debris in the 20 yard X 20 yard area of the landfill and extended their surface debris removal to 100 yards north, 50 yards south, and 30 yards east and west of the main landfill site. All debris was transported to the municipal landfill in Alamogordo, NM. Confirmation samples were collected and analyzed for TPH, PCBs, and total RCRA metals. Neither TPH nor PCBs were detected. Several metals were detected at concentrations which are below the current NMED SSLs for residential land use. Based on confirmation sample results collected in 1998 at the time of excavation, no analytes of concern were detected at concentrations above current NMED SSLs at SWMU 158 (LDU-19).

Results of the corrective measures indicate that the SWMU 158 landfill debris was removed and disposed off-site at an approved landfill. Confirmation sample results indicate no contamination present at the former landfill site. Results indicate that the site should be recommended for clean closure.

REFERENCES

BAE SYSTEMS, 2004. *RCRA Facility Investigation Report Former Oscura Range Center Construction Landfill*

HSR, 1998. *Preliminary Letter Report Concerning the Archaeological Monitoring of Oscura Range Camp Solid Waste Management Unit, Site LA 121,612, on White Sands Missile Range in Lincoln County, South-Central New Mexico.*

Kelly, T.E., 1973. *Summary of Ground-water Data at Post Headquarters and Adjacent Areas, White Sands Missile Range.* USGS Open File Report 72-308.

Kelly, T.E. and Hearne, G.A., 1976. *The Effects of Groundwater Development on the Water Supply in the Post Headquarters Area, White Sands Missile Range, New Mexico.* USGS Open File Report 76-277.

Kottlowski, F.E., Flower, R.H., Thompson, M.L., and Foster, R.W., 1956. *Stratigraphic Studies of the San Andres Mountains, New Mexico.* Socorro, NM: New Mexico Bureau of Mines and Mineral Resources.

Mevatec, 2002. *Sampling and Analysis Work Plan for the Former Oscura Range Center Construction Landfill, Solid Waste Management Unit 159, Revision 1* (DSERTS WSMR-05).

NMED, 2006. *Technical Background Document for Development of Soil Screening Levels. Rev. 4.0.* June 2006.

Orr, B.R. and Myers, R.G., 1986. *Water Resources in Basin-fill Deposits in the Tularosa Basin, New Mexico.* USGS Investigations Report 85-4219.

Radian, 1998. *Plan of Action Landfill Debris Removal Oscura Range Center.* USACE Contract DACA56-93-D-0016.

Seager, W.R., 1981. *Geology of Organ Mountains and Southern San Andres Mountains, New Mexico.* Socorro, NM. New Mexico Bureau of Mines and Mineral Resources.

U.S. Army, 1998. *White Sands Missile Range Range-Wide Environmental Impact Statement.*

APPENDIX A

PLAN OF ACTION LANDFILL DEBRIS REMOVAL
OSCURA RANGE CENTER (RADIAN, 1998)

WSMR-05

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 61
TULSA, OKLAHOMA 74121-0061

CESWT-EC-EF

5 January 1999

MEMORANDUM FOR Commander, U.S. Army White Sands Missile Range
ATTN: STEWS-RES-E/Ms. Robin Smith, White Sands Missile Range, NM 88002

SUBJECT: Landfill Debris Removal at Oscura Range Center

1. Reference memorandum, CESWT-EC-EF, dated 30 September 1998, subject: Request for Project Funding for FY 1999.

2. Debris and contaminated soil were removed from several sites near the Oscura Range Center in June 1998 in accordance with the work plan approved in May 1998. Soil samples were collected at the conclusion of the removal to determine if any residual contamination exists. The samples were chemically analyzed in accordance with the same approved work plan. A summary of the results of the chemical analyses is found in the enclosed plan of action report prepared by Radian International, the remediation contractor for this work.

3. The plan of action reports that some soil samples collected from the landfill sites had higher cadmium, lead and silver concentrations than the corresponding concentrations found in the background samples. Further comparisons of these same sample results with the U.S. Environmental Protection Agency (USEPA) Region III risk-based concentration (RBC) values for industrial/commercial land use and the USEPA soil screening levels (SSL) for assessing the impact of soil constituents upon groundwater quality, showed that all sample constituent concentrations were less than the respective RBC values and that the silver concentration in one sample exceeded the respective SSL value. Since the site closure criteria, described in the work plan was that all soil constituent concentrations be less than background levels as determined from the chemical analyses of soil background samples, the plan of action delineates areas where additional soil may be excavated and resampled for chemical analyses. But since all of the soil samples had constituent concentrations less than the USEPA Region III RBC values, the plan of action report recommends that no further remedial excavation and resampling be done and that the sites be landscaped and contoured as originally planned.

CESWT-EC-EF 5 January 1999
SUBJECT: Landfill Debris Removal at Oscura Range Center

4. Your review of the enclosed plan of action report is requested. Please send your comments and your response to the plan's recommendation by no later than 5 February 1999. The contractor can be mobilized to the site with a 3-week notice pending your approval and receipt of funds to cover supervision and administration of the contract as requested in the referenced memorandum.

5. If you need further information concerning these memoranda, the Tulsa District's technical point of contact is Mr. Walter Kneib at 918-669-7045.

FOR THE COMMANDER:

Encl

ELIZABETH N. HERMAN, P.E.
Chief, Army Section
HTRW Design Center

Copy Furnished:
Mr. Jerry Warner, Construction Representative
U. S. Army Corps of Engineers, Fort Worth District
P.O. Drawer J
White Sands Missile Range, NM 88002-5507

PLAN OF ACTION

LANDFILL DEBRIS REMOVAL
OSCURA RANGE CENTER

Prepared for:

UNITED STATES ARMY CORPS OF ENGINEERS
TULSA DISTRICT

Prepared by:

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

DECEMBER 22, 1998
USACE CONTRACT DACA56-93-D-0016
DELIVERY ORDER NO. 0010
RADIAN PROJECT NO. 006015

TABLE OF CONTENTS

Section		Page No.
1.0	INTRODUCTION	1-1
1.1	General	1-1
1.2	Facility Location	1-1
1.3	Facility Description	1-1
1.4	Site Description	1-1
1.5	Area Descriptions	1-4
	1.5.1 Landfill No. 1	1-4
	1.5.1.1 Landfill No. 1 Activities	1-4
	1.5.2 Septic Area	1-6
	1.5.2.1 Septic Area Activities	1-6
	1.5.3 Landfill No. 2	1-6
	1.5.3.1 Landfill No. 2 Activities	1-6
	1.5.4 Oil Change Area	1-7
	1.5.4.1 Oil Change Area Activities	1-7
	1.5.5 Background Soil Sampling	1-8
2.0	DATA PRESENTATION	2-1
2.1	Background UTL Values	2-1
2.2	Sample Results for Site Closure	2-1
2.3	Sample Results for Disposal	2-1
3.0	DATA COMPARISONS	3-1
3.1	Background Soil Comparison	3-1
3.2	Risk-Based Criteria	3-1
4.0	CONCLUSIONS	4-1
5.0	PROJECT CHRONOLOGY	5-1

LIST OF FIGURES

Figure No.		Page No.
1-1	General Vicinity Map	1-2
1-2	Area Map Oscura Range Center	1-3
1-3	Site Map Oscura Range Center	1-5
3-1	Site Map Oscura Range Center with Proposed Limits of Excavation	3-2

LIST OF TABLES

Table No.		Page No.
2-1	Background UTL Calculated Values: Oscura Range Center	2-2
2-2	Background Sampling Data Summary: Oscura Range Center	2-3
2-3	Data Comparisons: Oscura Range Center	2-4
2-4	Waste Characterization Sampling Data Summary: Oscura Range Center	2-6

1.0 INTRODUCTION

1.1 General

This Plan of Action provides a narrative account of the work performed to date and recommendations for further activities the two (2) landfills, septic area, and the oil change area located at the Oscura Range Center of White Sands Missile Range (WSMR), New Mexico. All work was performed as described in the Scope of Work for the implementation of remedial activities.

This Plan of Action is submitted by Radian International (Radian) in partial fulfillment of the requirements of Contract No. DACA56-93-D-0016, Delivery Order No. 0010, for the U.S. Army Corps of Engineers (USACE), Tulsa District.

1.2 Facility Location

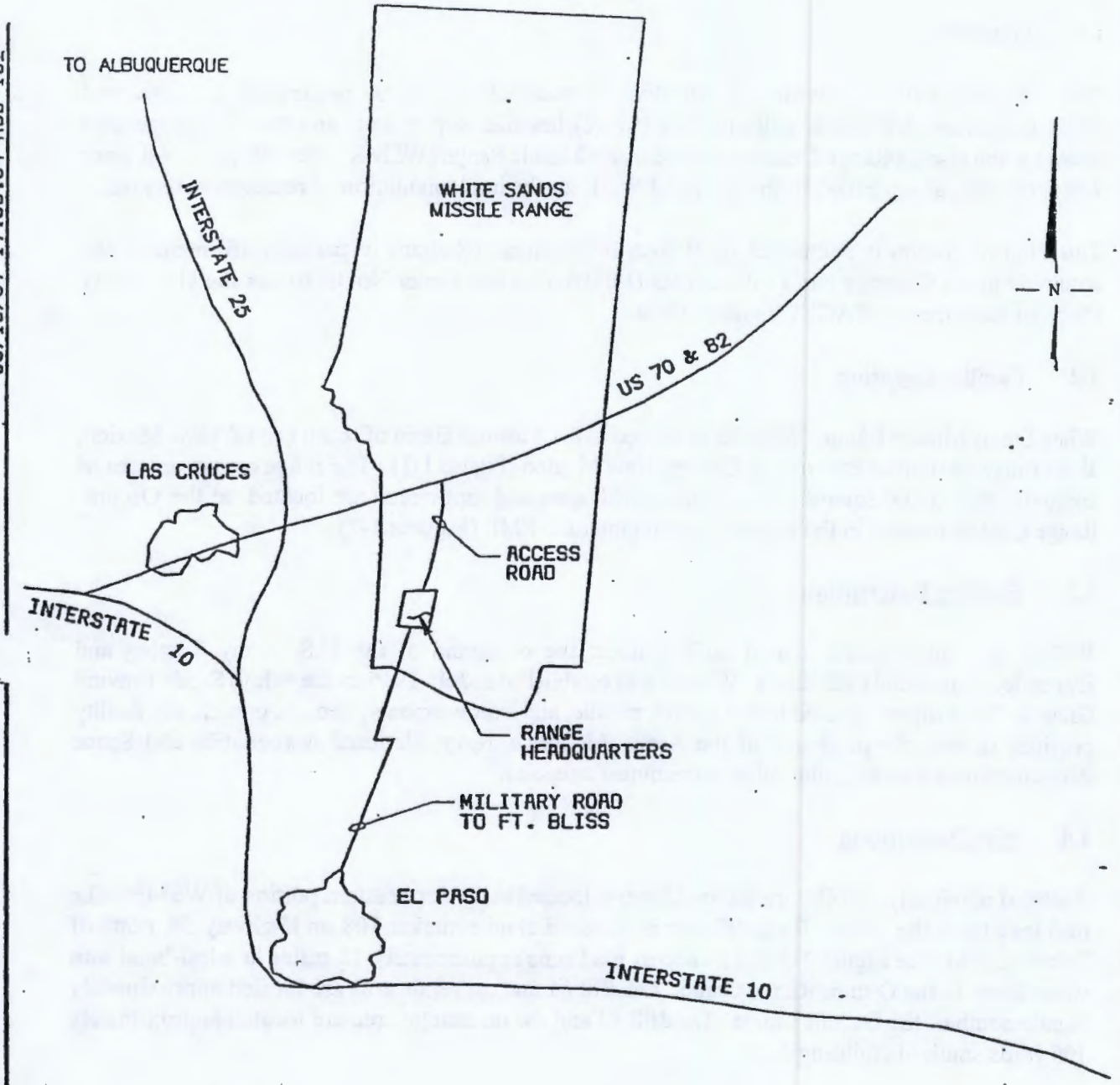
White Sands Missile Range (WSMR) is located in the Tularosa Basin of south central New Mexico, about thirty (30) miles east of Las Cruces, New Mexico (Figure 1-1). The range covers an area of approximately 3,200 square miles. The landfill sites and septic area are located at the Oscura Range Center, located in the northeastern region of WSMR (Figures 1-2).

1.3 Facility Description

WSMR is a government owned facility under the command of the U.S. Army Testing and Evaluation Command (TECOM). WSMR was established in July 1945 as the White Sands Proving Ground. The property is used to test rocket, missile, and laser weapon systems. As such, the facility provides support for programs of the Army, Air Force, Navy, National Aeronautics and Space Administration (NASA), and other government agencies.

1.4 Site Description

As stated previously, the Oscura Range Center is located in the northeastern portion of WSMR. The road leading to the Oscura Range Center is accessed at mile marker 108 on Highway 54, north of Tularosa, NM (see Figure 1-2). The access road runs approximately 12 miles to a left-hand turn which leads to the Oscura Range Camp. Landfill #1 and the septic area are located approximately ½ mile south of the Oscura Range. Landfill #2 and the oil change area are located approximately 100 yards south of Building 31775.



US Army Corps
of Engineers
Tulsa District

RADIAN INTERNATIONAL LLC

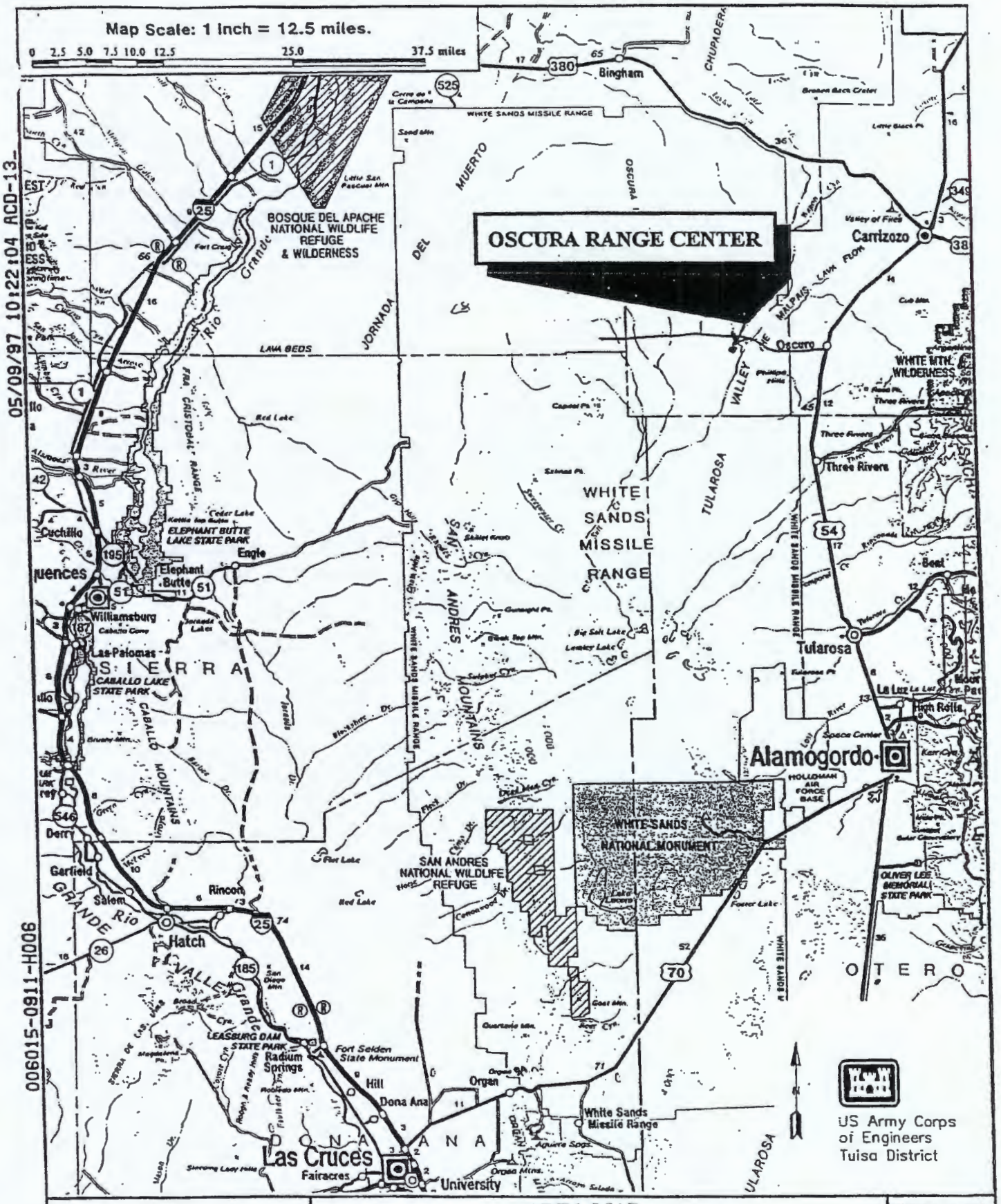
GENERAL VICINITY MAP
WHITE SANDS MISSILE RANGE

WHITE SANDS MISSILE RANGE	PROJECT NUMBER: 006015	
SCALE: N.T.S.	DATE: 03/13/97	DELIVERY:

FIGURE 1-1

03/13/97 17:38:34 ACD-13_

006015-CBA003



RADIAN INTERNATIONAL LLC

AREA MAP
OSCURA RANGE CENTER

WHITE SANDS MISSILE RANGE	PROJECT NUMBER: 006015	FIGURE
SCALE: N.T.S.	DATE: 05/09/97	DELIVERY: 0010	1-2

05/09/97 10:22:04 ACD-13_

006015-0911-H006

CBA003

1.5 Area Descriptions

1.5.1 Landfill No. 1

This landfill site is located approximately ½ mile south of the Oscura Range Camp complex (Figure 1-3). Situated near the area of an arroyo, the site is subject to periodic inundation and erosion. Materials contained in the landfill were exposed and without soil cover. The materials contained in the landfill consisted predominantly of wood and metal debris, tires, flare casings, and part of an old trailer. All materials were considered non-hazardous. Volume of the waste materials prior to excavation was estimated at approximately 60 cubic yards, excluding the trailer structure.

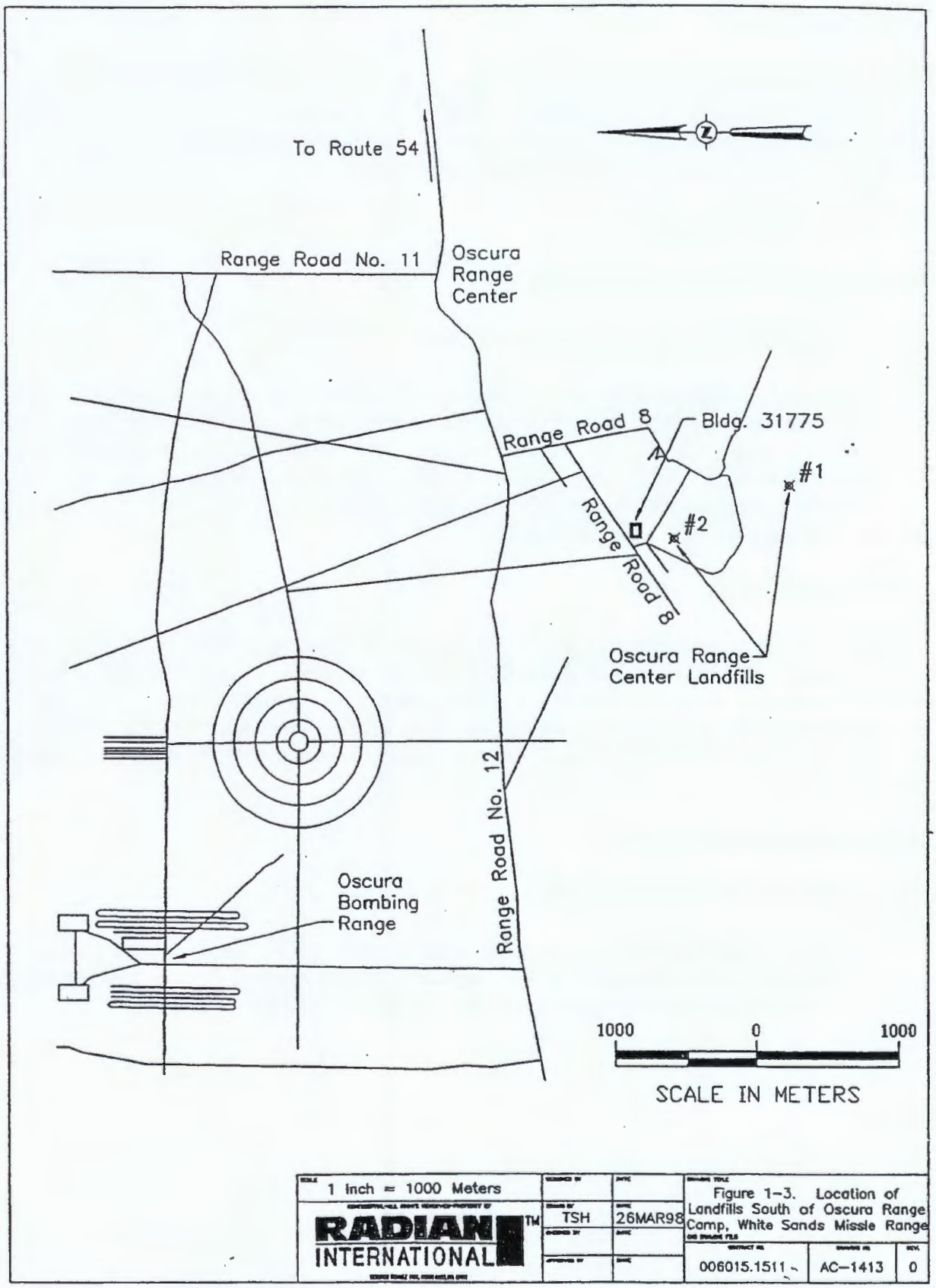
1.5.1.1 Landfill No. 1 Activities

Radian performed the following activities:

- Excavated and removed debris within the main area of the landfill (approximately 20 yards X 20 yards) and extending outward to encompass surrounding debris. The surrounding debris extended approximately 100 yards north, 50 yards south, and 30 yards east and west of the main landfill site.

- No debris were deemed recyclable for the WSMR DRMO. Thus, the non-recyclable debris was transported to the municipal landfill located in Alamogordo, NM for disposal. The trailer structure was removed by Oscura Bombing Range personnel.

- Confirmation soil samples were collected after all debris were removed from the area. The exact location of each sample was determined in the field based on a biased sampling approach. All samples were collected from specific points within each area where chemical contamination was thought most likely found (refer to Section 4.0 of the CDAP). These samples were analyzed for total petroleum hydrocarbons (TPH, both gas and diesel range) using Method 8015M, polychlorinated biphenyls (PCBs) using Method 8080, and total RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium, silver and mercury) using Methods 6010, 7060, 7470 and 7740.


To Route 54
Range Road No. 11
Oscura
Range
Center
Range Road 8
Bldg. 31775
#1
#2
Range Road 8
Oscura Range
Center Landfills
Range Road No. 12
Oscura
Bombing
Range
1000
0
1000
SCALE IN METERS
1 inch = 1000 Meters
RADIAN
INTERNATIONAL
TSH
26MAR98
Figure 1-3. Location of Landfills South of Oscura Range Camp, White Sands Missle Range
006015.1511
AC-1413
0

1.5.2 Septic Area

This site is also located approximately ½ mile south of the Oscura Range Camp complex, approximately 30 yards west of Landfill No. 1 (Figure 1-3). The area was enclosed with old barbed wire strung on small wooden posts. The area consisted of a small longitudinal pit approximately 15 feet by 25 feet in area, and is suspected of being a septic dump.

1.5.2.1 Septic Area Activities

Radian performed the following activities:

- Removed and disposed of the barbed wire and wooden posts.

- Collected soil samples after removal the barbed wire and wooden posts. The exact location of each sample was determined in the field based on a biased sampling approach. All samples were collected from specific points where chemical contamination was thought most likely found (refer to Section 4.0 of the CDAP). These samples were analyzed for total RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium, silver and mercury) using Methods 6010, 7060, 7470 and 7740.

1.5.3 Landfill No. 2

This landfill occupied a small pit in a cleared area located approximately 100 yards south of Building 31775 (Figure 1-3). Materials contained in the landfill were exposed and without soil cover. The materials contained in the landfill consisted predominantly of wooden pallets, metal spools of communications wire, old appliances, and general trash debris. All materials were considered non-hazardous. Volume of the waste materials was estimated at approximately 50 cubic yards prior to excavation.

1.5.3.1 Landfill No. 2 Activities

Radian performed the following activities

- Excavated and loaded debris within the main area of the landfill (approximately 10 yards X 10 yards) and extending outward to encompass surrounding debris. The surrounding debris extended approximately 50 yards in all directions from the main landfill pit.

- No debris were deemed recyclable for the WSMR DRMO. Thus, non-recyclable debris were transported to the municipal landfill located in Alamogordo, NM for disposal.

- Confirmation soil samples were collected after all debris were removed from the area. The exact location of each sample was determined in the field based on a biased sampling approach. All samples were collected from specific points where chemical contamination was thought most likely be found (refer to Section 4.0 of the CDAP). These samples were analyzed for total petroleum hydrocarbons (TPH, both gas and diesel range) using Method 8015M, polychlorinated biphenyls (PCBs) using Method 8080, and total RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium, silver and mercury) using Methods 6010, 7060, 7470 and 7740.

1.5.4 Oil Change Area

This area, also known as the "jiffy-lube pit" occupied a large longitudinal pit located behind Building 31775 (Figure 1-3). The pit was equipped with a wooden pole ramp for servicing vehicles. Previous soil sampling in the area of the ramp had shown total lead concentrations as high as 400 mg/Kg and total petroleum hydrocarbon concentrations as high as 180 mg/Kg.

1.5.4.1 Oil Change Area Activities

Radian performed the following activities:

- Removed and disposed of the wooden pole ramp.

- Excavated and removed of the upper six (6) inches of soil in the immediate area of the wooden pole ramp. Soils were containerized into five (5) 55-gallon steel drums and sampled for disposal characterization. These samples were analyzed for pH using Method 9041, flashpoint using Method 1020, corrosivity using Method 1110, TPH using Method 8015 gas and diesel ranges, and full TCLP analysis for VOCs using Method 1311/8260, SVOCs using Method 1311/8270, PCBs and pesticides using Method 1311/8080, herbicides using Method 1311/8150, and the eight RCRA metals using Methods 1311/6010, 1311/7060, 1311/7470, and 1311/7740.

Collected confirmation soil samples after all debris were removed from the area. The exact location of each sample was determined in the field based on a biased sampling approach. All samples were collected from specific points where chemical contamination was thought most likely be found (refer to Section 4.0 of the CDAP). These samples were analyzed for total petroleum hydrocarbons (TPH, both gas and diesel range) using Method 8015M, polychlorinated biphenyls (PCBs) using Method 8080, total RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium, silver and mercury) using Methods 6010, 7060, 7470 and 7740, and TCLP RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium, silver and mercury) using Methods 1311/6010, 1311/7060, 1311/7470 and 1311/7740.

1.5.5 Background Soil Sampling

Ten (10) samples were collected at discrete non-contaminated locations in the vicinity of the sites. These samples were analyzed for total RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium, silver and mercury) using Methods 6010, 7060, 7470 and 7740. Based on these results, the 95% Upper Tolerance Limit (UTL) was calculated for comparison to confirmation soil sample results.

2.0 DATA PRESENTATION

2.1 Background UTL Values

Background Upper Tolerance Limits (UTLs) were calculated to contain 95% of all possible sample measurements with a probability of 95%. UTLs were calculated following the statistical methods described in "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance" (USEPA, April 1989), "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Addendum to Interim Final Guidance" (USEPA, June 1992), and "Guidance Document for Verification of Soil Remediation" (Michigan DEQ, April 1994).

The UTL calculated values from the background soil sample analyses and the confirmation soil sample detection limits are presented in Table 2-1. The analytical data results for the background samples are presented in Table 2-2.

2.2 Sample Results for Site Closure

Confirmation soil samples were collected to show if sufficient remedial action had been accomplished. The Work Plan calls for the confirmatory samples to be compared to background sample results.

The data results for the detected analytes in the confirmation soil samples from Landfill No. 1, Landfill No. 2, the "jiffy lube" site, and the septic area are presented in Table 2-3. No TPH or PCBs were detected in any confirmation sample.

2.3 Sample Results for Disposal

Upon completion of data validation requirements, analytical data results of the samples collected were compared to criteria based on the intended use of the sample data. To that end, samples collected for disposal characterization were compared to the Universal Treatment Standards 40 CFR, Part 268.48, Table UTS.

The analytical data results for the disposal of the containerized soils excavated from the "jiffy-lube" site are presented in Table 2-4.

TABLE 2-1
BACKGROUND UTL CALCULATED VALUES: OSCURA RANGE CENTER

Analyte	Calculated UTL Value (mg/Kg)	Confirmation Soil Sample Detection Limits (mg/Kg)
Arsenic	4.07	<2.7
Barium	301.76	<0.19
Cadmium	1.02	<0.40
Chromium	29.66	<0.56
Lead	5.70	<0.64
Mercury	0.54	<0.1
Selenium	4.07	<0.32
Silver	4.07	<0.40

TABLE 2-2
BACKGROUND SAMPLING DATA SUMMARY: OSCURA RANGE CENTER

Sample No.	Total Barium (6010B)	Total Chromium (6010B)	Total Mercury (7471A)	Total Silver (6010B)	Total Arsenic (7060)	Total Cadmium (7131)	Total Lead (7421)	Total Selenium (7740)
Background Samples								
Detection Limit Ranges	<2.0 mg/Kg	<5.0 mg/Kg	<2.0 mg/Kg	<2.0 mg/Kg	<2.0 mg/Kg	<0.50 mg/Kg	<1.2-4.8 mg/Kg	<2.0 mg/Kg
ORC-19JUN98-S-19	180 mg/Kg	19 mg/Kg	0.22 mg/Kg	ND	ND	ND	ND	ND
ORC-19JUN98-S-20	170 mg/Kg	20 mg/Kg	0.34 mg/Kg	ND	ND	ND	ND	ND
ORC-19JUN98-S-21	180 mg/Kg	21 mg/Kg	0.18 mg/Kg	ND	ND	ND	ND	ND
ORC-19JUN98-S-22	210 mg/Kg	25 mg/Kg	0.18 mg/Kg	ND	ND	ND	1.8 mg/Kg	ND
ORC-19JUN98-S-23	190 mg/Kg	21 mg/Kg	0.24 mg/Kg	ND	ND	ND	ND	ND
ORC-19JUN98-S-24	240 mg/Kg	21 mg/Kg	0.12 mg/Kg	ND	ND	ND	1.5 mg/Kg	ND
ORC-19JUN98-S-25	230 mg/Kg	15 mg/Kg	0.17 mg/Kg	ND	ND	ND	4.8 mg/Kg	ND
ORC-19JUN98-S-26	240 mg/Kg	15 mg/Kg	ND	ND	ND	ND	2.4 mg/Kg	ND
ORC-19JUN98-S-27	260 mg/Kg	14 mg/Kg	0.42 mg/Kg	ND	ND	ND	2.6 mg/Kg	ND
ORC-19JUN98-S-28	220 mg/Kg	22 mg/Kg	ND	ND	ND	ND	2.4 mg/Kg	ND

Notes: ND = Not Detected above the detection limit range.

TABLE 2-3
DATA COMPARISONS: OSCURA RANGE CENTER

Sample No.	Detected Analyte (mg/Kg)	UTL Value (mg/Kg)	RBC Value (mg/Kg)	SSL Value (mg/Kg)	Exceedances	Remedial Option
ORC-19JUN98-S-7	Se 3.4 Ba 220 Cr 27 **Pb 9.5**	Se 4.07 Ba 301.76 Cr 29.66 Pb 5.70	Se 10,000 Ba 14,000 Cr 1,000 Pb (NA)	Se 5 Ba 1,600 Cr 38 Pb 400	Se = None Ba = None Cr = None Pb = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-8	Se 3.7 Ba 230 Cr 21 Hg 0.33 **Pb 150**	Se 4.07 Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Se 10,000 Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Se 5 Ba 1,600 Cr 38 Hg 2.0 Pb 400	Se = None Ba = None Cr = None Hg = None Pb = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-9	**Ag 250** Ba 200 **Cd 3.9** Cr 20 **Pb 27**	Ag 4.07 Ba 301.76 Cd 1.02 Cr 29.66 Pb 5.70	Ag 10,000 Ba 14,000 Cd 1,000 Cr 1,000 Pb (NA)	Ag 34 Ba 1,600 Cd 8 Cr 38 Pb 400	Ag = UTL, SSL Ba = None Cd = UTL Cr = None Pb = UTL	Excavate Additional Soil
ORC-19JUN98-S-10	Pb 3.7 Ba 81 Cr 7.4	Pb 5.7 Ba 301.76 Cr 29.66	Pb (NA) Ba 14,000 Cr 1,000	Pb 400 Ba 1,600 Cr 38	Pb = None Ba = None Cr = None	Site Restoration
ORC-19JUN98-S-11	Ba 270 **Cd 3.6** Cr 23 **Pb 60**	Ba 301.76 Cd 1.02 Cr 29.66 Pb 5.70	Ba 14,000 Cd 1,000 Cr 1,000 Pb (NA)	Ba 1,600 Cd 8 Cr 38 Pb 400	Ba = None Cd = UTL Cr = None Pb = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-12	Cd 1.0 Se 3.9 Ba 250 Cr 26 **Pb 15**	Cd 1.02 Se 4.07 Ba 301.76 Cr 29.66 Pb 5.70	Cd 1,000 Se 10,000 Ba 14,000 Cr 1,000 Pb (NA)	Cd 8 Se 5 Ba 1,600 Cr 38 Pb 400	Cd = None Se = None Ba = None Cr = None Pb = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-13	Cd 1.0 Ba 250 Cr 23 Hg 0.54 **Pb 11**	Cd 1.02 Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Cd 1,000 Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Cd 8 Ba 1,600 Cr 38 Hg 2.0 Pb 400	Cd = None Ba = None Cr = None Hg = None Pb = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-14	Pb 4.2 Ba 170 Cr 16 Hg 0.24	Pb 5.70 Ba 301.76 Cr 29.66 Hg 0.54	Pb (NA) Ba 14,000 Cr 1,000 Hg (NA)	Pb 400 Ba 1,600 Cr 38 Hg 2.0	Pb = None Ba = None Cr = None Hg = None	Site Restoration
ORC-19JUN98-S-15	Ba 240 Cr 20 Hg 0.20 **Pb 7.4**	Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Ba 1,600 Cr 38 Hg 2.0 Pb 400	Ba = None Cr = None Hg = None Pb = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-16	Ag 3.5 Ba 200 Cr 25 Hg 0.22 Pb 5.4	Ag 4.07 Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Ag 10,000 Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Ag 34 Ba 1,600 Cr 38 Hg 2.0 Pb 400	Ag = None Ba = None Cr = None Hg = None Pb = None	Site Restoration
ORC-19JUN98-S-17	Pb 2.9 Ba 230 Cr 20	Pb 5.70 Ba 301.76 Cr 29.66	Pb (NA) Ba 14,000 Cr 1,000	Pb 400 Ba 1,600 Cr 38	Pb = None Ba = None Cr = None	Site Restoration
ORC-19JUN98-S-18	Ba 230 Cr 22 Hg 0.12 Pb 4.4	Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Ba 1,600 Cr 38 Hg 2.0 Pb 400	Ba = None Cr = None Hg = None Pb = None	Site Restoration
ORC-19JUN98-S-29	Pb 3.8 Ba 240 Cr 20 Hg 0.31	Pb 5.70 Ba 301.76 Cr 29.66 Hg 0.54	Pb (NA) Ba 14,000 Cr 1,000 Hg (NA)	Pb 400 Ba 1,600 Cr 38 Hg 2.0	Pb = None Ba = None Cr = None Hg = None	Site Restoration

TABLE 2-3
DATA COMPARISONS: OSCURA RANGE CENTER

Sample No.	Detected Analyte (mg/Kg)	UTL Value (mg/Kg)	RBC Value (mg/Kg)	SSL Value (mg/Kg)	Exceedances	Remedial Option
ORC-19JUN98-S-30	Ba 220 Cr 20 Hg 0.31 **Pb 8.2**	Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Ba 1,600 Cr 38 Hg 2.0 Pb 400	Ba = None Cr = None Hg = None Pb = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-31	Ba 260 Cr 21 Hg 0.52 Pb 4.9	Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Ba 1,600 Cr 38 Hg 2.0 Pb 400	Ba = None Cr = None Hg = None Pb = None	Site Restoration
ORC-19JUN98-S-32	Ba 260 Cr 25 **Hg 0.92**	Ba 301.76 Cr 29.66 Hg 0.54	Ba 14,000 Cr 1,000 Hg (NA)	Ba 1,600 Cr 38 Hg 2.0	Ba = None Cr = None Hg = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-33	Ba 230 Cr 22 Hg 0.19 Pb 5.7	Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Ba 1,600 Cr 38 Hg 2.0 Pb 400	Ba = None Cr = None Hg = None Pb = None	Site Restoration
ORC-19JUN98-S-34	Pb 3.7 Ba 230 Cr 24 Hg 0.15	Pb 5.70 Ba 301.76 Cr 29.66 Hg 0.54	Pb (NA) Ba 14,000 Cr 1,000 Hg (NA)	Pb 400 Ba 1,600 Cr 38 Hg 2.0	Pb = None Ba = None Cr = None Hg = None	Site Restoration
ORC-19JUN98-S-35	**Cd 1.3** Ba 250 Cr 24 Hg 0.13 Pb 8.2	Cd 1.02 Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Cd 1,000 Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Cd 8 Ba 1,600 Cr 38 Hg 2.0 Pb 400	Cd = UTL Ba = None Cr = None Hg = None Pb = UTL	Excavate Additional Soil or Site Restoration
ORC-19JUN98-S-36	Pb 1.4 Ba 260 Cr 22 Hg 0.29	Pb 5.70 Ba 301.76 Cr 29.66 Hg 0.54	Pb (NA) Ba 14,000 Cr 1,000 Hg (NA)	Pb 400 Ba 1,600 Cr 38 Hg 2.0	Pb = None Ba = None Cr = None Hg = None	Site Restoration
ORC-19JUN98-S-37	Pb 3.2 Ba 200 Cr 21 Hg 0.10	Pb 5.7 Ba 301.76 Cr 29.66 Hg 0.54	Pb (NA) Ba 14,000 Cr 1,000 Hg (NA)	Pb 400 Ba 1,600 Cr 38 Hg 2.0	Pb = None Ba = None Cr = None Hg = None	Site Restoration
ORC-19JUN98-S-38	Ba 230 Cr 26 Hg 0.53	Ba 301.76 Cr 29.66 Hg 0.54	Ba 14,000 Cr 1,000 Hg (NA)	Ba 1,600 Cr 38 Hg 2.0	Ba = None Cr = None Hg = None	Site Restoration
ORC-19JUN98-S-39	Ba 290 Cr 29 Hg 0.18	Ba 301.76 Cr 29.66 Hg 0.54	Ba 14,000 Cr 1,000 Hg (NA)	Ba 1,600 Cr 38 Hg 2.0	Ba = None Cr = None Hg = None	Site Restoration -
ORC-19JUN98-S-40	Se 3.3 Ba 250 Cr 28 Hg 0.14	Se 4.07 Ba 301.76 Cr 29.66 Hg 0.54	Se 10,000 Ba 14,000 Cr 1,000 Hg (NA)	Se 5.0 Ba 1,600 Cr 38 Hg 2.0	Se = None Ba = None Cr = None Hg = None	Site Restoration
ORC-19JUN98-S-41	Ba 260 Cr 22 Hg 0.16 Pb 4.6	Ba 301.76 Cr 29.66 Hg 0.54 Pb 5.70	Ba 14,000 Cr 1,000 Hg (NA) Pb (NA)	Ba 1,600 Cr 38 Hg 2.0 Pb 400	Ba = None Cr = None Hg = None Pb = None	Site Restoration
ORC-19JUN98-S-42	Se 4.2 Ba 270 Cr 24 Hg 0.11	Se 4.07 Ba 301.76 Cr 29.66 Hg 0.54	Se 10,000 Ba 14,000 Cr 1,000 Hg (NA)	Se 5.0 Ba 1,600 Cr 38 Hg 2.0	Se = None Ba = None Cr = None Hg = None	Site Restoration

NA = Not Available

TABLE 2-4
WASTE CHARACTERIZATION SAMPLING DATA SUMMARY: OSCURA RANGE CENTER

Sample No.	TCLP VOCs (1311/8260)	TCLP SVOCs (1311/8270)	TCLP Pesticides & PCBs (1311/8080)	TCLP Herbicides (1311/8150)	TCLP RCRA Metals (1311/6000-7000)	TPH (8015M)	Regulatory Limits	Remedial Option
Excavated Soil at "Jiffy-Lube" Site								
Detection Limit Ranges	<0.025-0.034 mg/L	<0.020-<0.060 mg/L	<0.00010-<0.0010 mg/L <0.050 mg/Kg	<0.0010 mg/L	<0.0050-1.2 mg/L	<10 mg/Kg		
ORC-19JUN98-S-1	2-Butanone 0.026 mg/L						2-Butanone (36 mg/kg)[1]	Landfill Cover
ORC-19JUN98-S-2	2-Butanone 0.034 mg/L						2-Butanone (36 mg/kg)[1]	Landfill Cover
ORC-19JUN98-S-3	2-Butanone 0.025 mg/L						2-Butanone (26 mg/kg)[1]	Landfill Cover
ORC-19JUN98-S-4	ND						No Detections	Landfill Cover
ORC-19JUN98-S-5	ND						No Detections	Landfill Cover
ORC-19JUN98-S-6 pH=7.6 @ 22 C Corrosivity=0.012 mm/yr Flashpoint=>200 F		ND	ND	ND	Ba 1.2 mg/L	ND	Ba (7.6 mg/L TCLP)[1]	Landfill Cover

Notes: Shaded areas indicate analyses not performed.
ND = Not Detected.
(1) Universal Treatment Standards 40 CFR, Part 268.48, Table UTS.

3.0 DATA COMPARISONS

3.1 Background Soil Comparison

As presented in Table 2-3, the analytical results exceeding background UTL values are shown in bold. Based on the comparison to background UTLs, additional excavation may be required to achieve background concentrations in the soils. Figure 3-1 presents the estimated limits of excavation and estimated volume for each of the areas.

3.2 Risk-Based Criteria

An alternative to excavate further is to evaluate whether the current condition of each site potentially poses a significant risk to the human health and the environment. This can be preliminarily done by comparing the analytical results of the confirmation soil samples to USEPA Region III Risk Based Concentration (RBC) values for industrial/commercial land use. The area occupied by the Oscura site is part of a military facility and has been historically used for industrial purposes. Future land use would also be industrial. Consequently, the RBCs for industrial land use are appropriate for comparison at this site.

Another consideration for deciding about the current condition is the impact of the soil constituent concentrations upon the quality of the surface water runoff and the underlying groundwater. To assess the potential for impacts to groundwater resulting from constituents leaching from the soil, maximum constituent concentrations may be compared to their respective USEPA Soil Screening Level (SSL). The SSL considers the extent to which each constituent is likely to leach to groundwater based on specific attributes of the site soil and the constituent in question as well as the potential health risk to receptors ingesting the groundwater. The SSL value presented in USEPA's 1996 Soil Screening Guidance designated as 20 DAF applies a default dilution/attenuation factor of 20 to account for natural processes that reduce constituent concentrations in the subsurface. Because no water wells are located on site the 20 DAF SSL is the appropriate criterion for comparison at Oscura. The concentration for each detected constituent in each sample, the USEPA Region III industrial RBC and the appropriate USEPA SSL (20DAF) for each constituent are shown in Table 2-3.

Based on these risk based criteria, no samples exceed the USEPA Region III Industrial risk based criteria. Sample ORC-19JUN98-S-9 exceeds the SSL for silver.

4.0 CONCLUSIONS

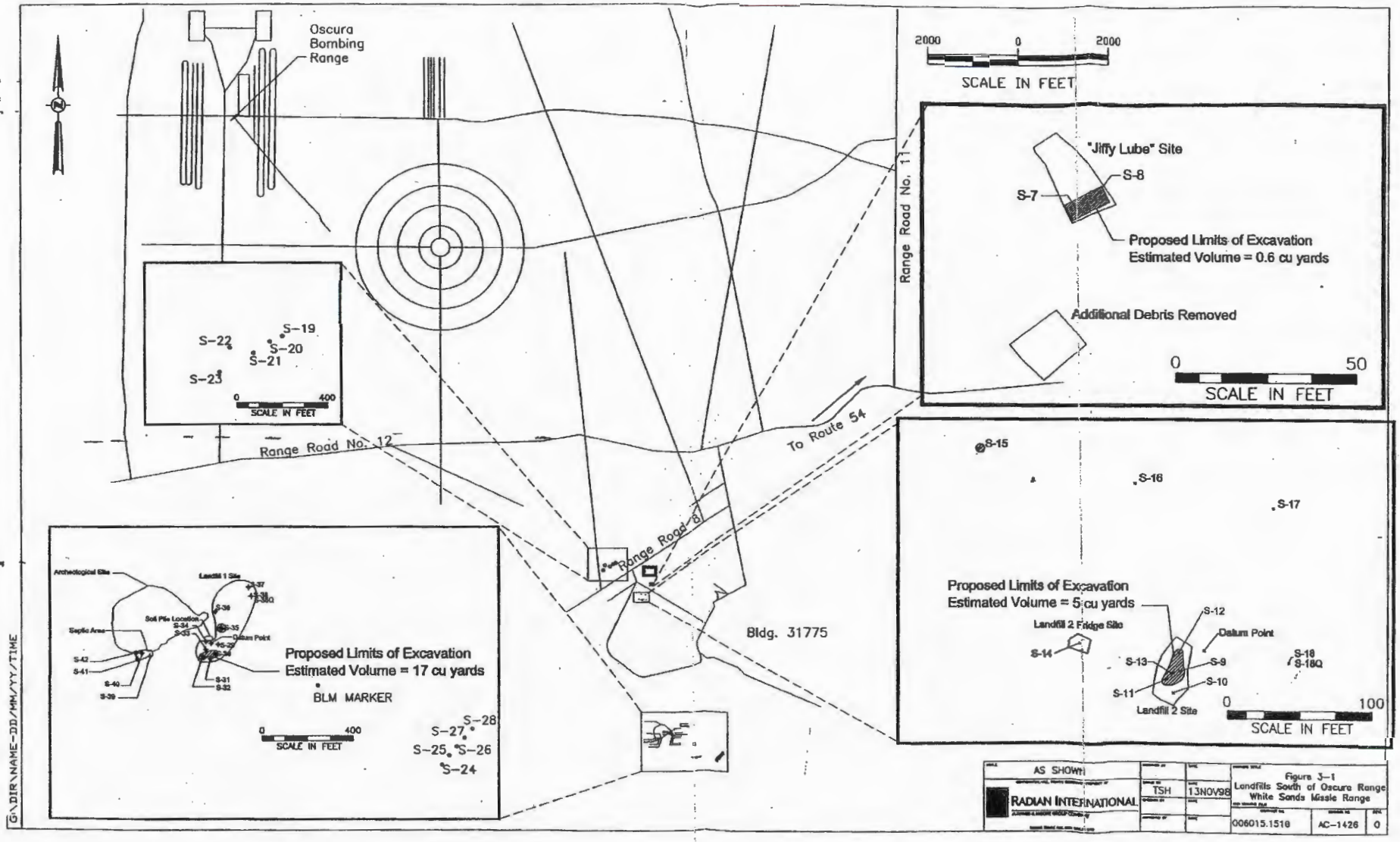
Based on the above data comparisons Radian concludes the following:

1. No samples exceed the USEPA Region III Industrial risk based criteria.
2. One sample exceeds the USEPA soil screening guidelines.
3. Ten samples exceed the calculated background UTLs.

Recommendations

Based on the location of the site areas in a semi-arid, controlled access, industrial location, and the concentration of detected analytes, Radian recommends no further action at all sites. Site landscaping should proceed as described in the Work Plan.

However, if additional remedial action is requested, Radian suggests the excavation of material in the areas shown in Figure 3-1, to a depth of six inches. Radian will collect additional samples and analyze these samples for the 8 RCRA metals and compare these results to the calculated UTLs.


Oscura Bombing Range
Range Road No. 12
Range Road 8
To Route 54
Bldg. 31775
S-22
S-19
S-20
S-21
S-23
0 400
SCALE IN FEET
2000 0 2000
SCALE IN FEET
Range Road No. 11
"Jiffy Lube" Site
S-8
S-7
Proposed Limits of Excavation
Estimated Volume = 0.6 cu yards
Additional Debris Removed
0 50
SCALE IN FEET
S-15
S-16
S-17
Proposed Limits of Excavation
Estimated Volume = 5 cu yards
Landfill 2 Fridge Site
S-14
S-12
Datum Point
S-13
S-9
S-10
S-11
S-18
S-18Q
Landfill 2 Site
0 100
SCALE IN FEET
Archeological Site
Landfill 1 Site
Soil Pile Location
Septic Area
Datum Point
S-42
S-41
S-40
S-39
S-31
S-32
Proposed Limits of Excavation
Estimated Volume = 17 cu yards
BLM MARKER
0 400
SCALE IN FEET
S-28
S-27
S-25
S-26
S-24
AS SHOWN
RADIAN INTERNATIONAL
TSH
13NOV98
Figure 3-1
Landfills South of Oscura Range
White Sands Missile Range
006015.1518
AC-1426
0
G:\DIR\NAME-DD/MM/YY/TIME

5.0 PROJECT CHRONOLOGY

Date	Activity
5 - 9 January 1998	Radian receives information concerning additional task work in the vicinity of Oscura Range Camp at WSMR. The work consists of remediation at two former surface landfills. Radian is in the process of preliminary planning for this work and is working with Walt Kneib (USACE-Tulsa-Army Section) in clearly defining the scope of work.
5 March 1998	While at WSMR performing TTF SVE activities, W. Kneib (USACE-Tulsa-Army Section), J. Warner (USACE-Ft.Worth), R. Bailey (Radian), and C. Smith (Radian) were escorted to the Oscura Range Camp by MEVATEC for a site visit to the two (2) landfill areas requiring remediation.
23 - 26 March 1998	Radian begins preparation of Draft Work Plans for Landfill Excavations at Oscura Range Camp.
30 March - 3 April 1998	Radian completed preparation and submitted to USACE-Tulsa a Draft Work Plan for Landfill Debris Removal at Oscura Range Camp. WSMR to submit Draft Work Plans for Landfill Debris Removal at Oscura Range Camp to NMED for 30 day review period. Upon addressing USACE, WSMR, and NMED comments to the work plan, Radian will begin field mobilization activities.
18 - 22 May 1998	Radian received comments from WSMR to Draft Work Plans for Landfill Debris Removal at Oscura Range Camp. No comments were received from NMED.
25 May - 2 June 1998	Radian addressed WSMR comments and began incorporation into Final Work Plans for Oscura Landfill Debris Removal. Final Work Plans were submitted on 2 June 1998. A field mobilization date of 15 June 1998 was set. Radian began field mobilization / coordination preparations.

8 - 12 June 1998	Per telephone message, Robin Smith (WSMR), will be out of her office next week, during the Oscura Landfill Debris Remediation field activities. She has designated Marvin MaGee (MEVATEC) to handle any issues regarding our field work. Mr. MaGee can be reached at (505)678-7656.
15 - 19 June 1998	Radian completed Mobilization No.1 activities at Oscura Range Center. A total of eight (8) rolloff containers of landfill debris were loaded, transported and disposed of at the Alamogordo landfill. The trailer at Landfill #1 was removed by Oscura Bombing Range personnel. A total of five (5) drums of soil were excavated from the "jiffy-lube" site, and sampled for disposal characterization purposes. A total of ten (10) background samples were collected in areas adjacent to Landfills #1 and #2. A total of twenty (20) samples plus two (2) QC samples were collected from Landfills #1 and #2 for closure purposes. A total of four (4) samples were collected from the septic area for closure purposes.
13 - 17 July 1998	Radian received analytical data reports from Talem Laboratories for analysis of soil samples collected at Oscura Range Center.
10 - 14 August 1998	Radian completed data validation procedures and review of analytical data reports of samples taken at Oscura Range Center. Radian prepares to submit Hazard Determination Report for Oscura Range Center to USACE-Tulsa for review and approval.
7 - 11 September 1998	Upon further review of the analytical data, questions were raised concerning methods used for some of the total RCRA metals analyses with regard to detection limits. The analytical laboratory was contacted for discussion and explanation of the questions raised.

14 - 18 September 1998	Through discussions with the lab, it was determined that the analytical laboratory mistakenly analyzed the RCRA metals arsenic and selenium by 6010 instead of the requested methods 7060 and 7740. The requested methods have a lower detection limit than 6010. The laboratory will reanalyze the ten background samples by the requested methods at their cost. In addition, USACE-Tulsa advised that cadmium and lead be reanalyzed by 7131 and 7421, respectively. This cost will go to the project. Upon receipt of the reanalyzed background data, a decision will be made as to reanalyzing any of the field closure samples.
21 - 24 September 1998	Due to an instrument malfunction, the GPS data for the Oscura Range Center sampling point locations was lost following the last mobilization. After a preliminary review of the closure sampling data, it is anticipated that additional excavation is going to be needed. The GPS data will needed in order to estimate the arial extent of soil that will need to be excavated. Following discussions with USACE-Tulsa, plans have been made for C. Smith and M. Beauchamp of Radian to re-mobilize to WSMR on 30 Sep 98. GPS data will be re-gathered on 01 Oct 98 and downloaded to a laptop computer prior to demobilization.
1 October 1998	GPS data for Oscura Range Center sampling point locations is re-gathered by C. Smith and M. Beauchamp of Radian.
23 - 27 November 1998	Received data results of the re-analyses of the ten background samples from Oscura Range Center. Preliminary review of the results indicated that additional excavation may be required. It was decided that 13 of the 28 field samples should be re-analyzed to see if the area of excavation could be reduced. The analytical lab was contacted concerning this option. However, the samples, originally collect in June, 1998, have already been disposed of. In discussion with USACE-Tulsa, it was decided that a "Plan of Action" should be prepared. The plan will present the existing analytical data, the regulatory limits and calculated upper tolerance limits (UTLs) for each analyte, and will propose additional remedial action options for accomplishing the clean up goals / closure of the site. Following review by USACE-Tulsa, the plan will be submitted to WSMR for discussion and approval.

APPENDIX B

SWMU 158 CLOSURE CERTIFICATION AND
PLAT OF SURVEY

CLOSURE CERTIFICATION FOR THE FORMER OSCURA RANGE LANDFILL SOLID WASTE MANAGEMENT UNIT 158 WHITE SANDS MISSILE RANGE EPA ID NUMBER: NM2750211235

This is to certify that Solid Waste Management Unit (SWMU) 158 (Former Oscura Range Center Landfill) located on White Sands Missile Range, Lincoln County, New Mexico has been clean closed as described in the *Final Work Plan Volumes 1-3 Landfill Debris Removal Oscura Range Center* (Radian International, 1998), and the *Plan of Action Landfill Debris Removal Oscura Range Center* (Radian International, 1998). The site was a surface dump from which the waste material was removed in June 1998. Confirmation soil samples did not detect any hazardous constituents. The SWMU boundaries are noted in the attached plat which is signed by a registered Professional Surveyor. In accordance with 40 CFR 264.111, SWMU 158 has been clean closed and no land use restrictions should apply to this site. The site plat has been filed with the WSMR Real Property and Environmental Compliance offices.

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

Thomas A. Ladd

Thomas A. Ladd
Director, Public Works
White Sands Missile Range

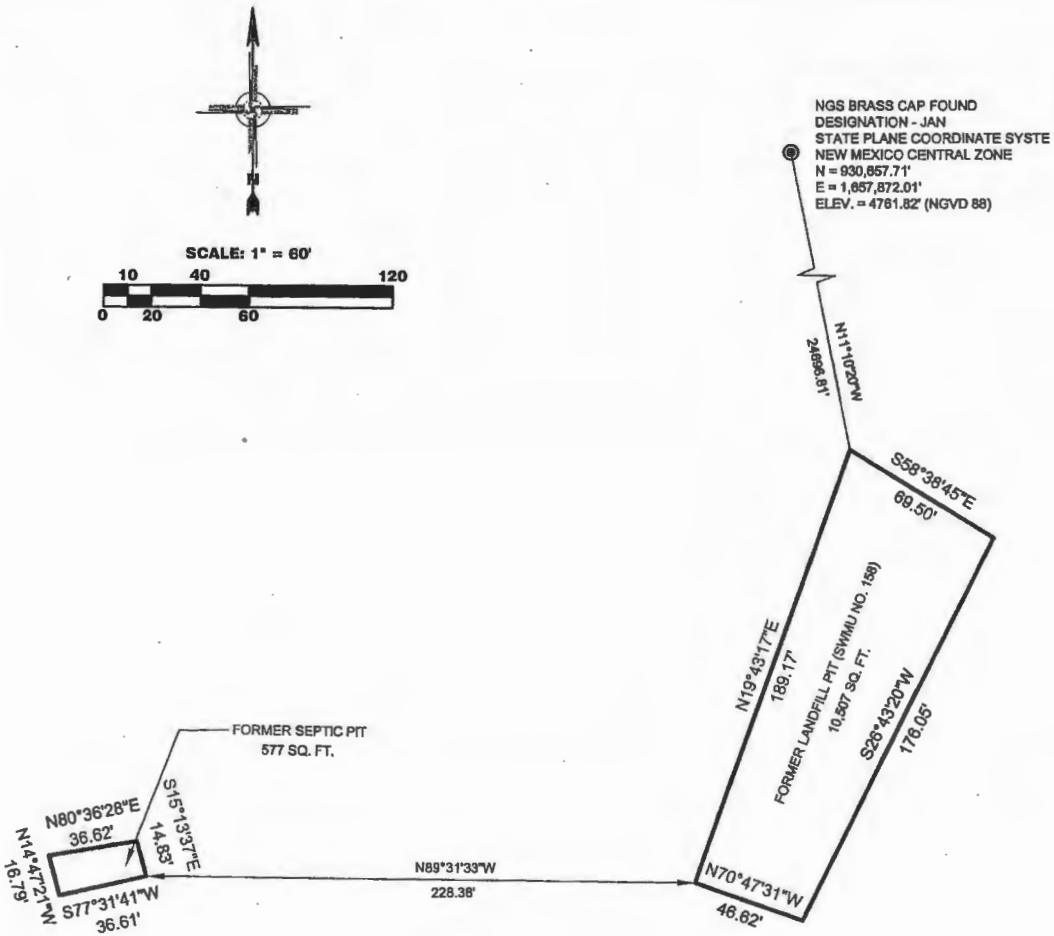
"I certify that I have reviewed the above noted documents and visited the site, and to the best of my knowledge, closure activities were performed in accordance with the closure documents and the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." Provided in accordance with 40 CFR 264.115

JAMES J. THOMPSON
NEW MEXICO
17428

James J. Thompson
2 April 2007

James J. Thompson, P. E.
Civil Engineer
White Sands Technical Services, LLC

PLAT OF SURVEY OF SOLID WASTE MANAGEMENT UNIT NO. 158 LOCATED ON WHITE SANDS MISSILE RANGE, LINCOLN COUNTY, NEW MEXICO AUGUST 31, 2006



SURVEYOR'S CERTIFICATION

I, ROXANNE C. NIMMER, A NEW MEXICO PROFESSIONAL SURVEYOR CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET MINIMUM STANDARDS FOR SURVEYING IN THE STATE OF NEW MEXICO.

ROXANNE C. NIMMER, PS 12800

8/31/06
DATE OF SURVEY

ROXANNE CELESTE NIMMER
NEW MEXICO
12800
REGISTERED PROFESSIONAL SURVEYOR

Zia Engineering & Environmental Consultants, LLC
755 S. Telshor Blvd., Suite F-201
Las Cruces, New Mexico 88011
Phone: (505) 532-1526
Fax: (505) 532-1587

Dwg ID: Oscura Landfill Boundary.dwg