



DEPARTMENT OF THE AIR FORCE
27TH SPECIAL OPERATIONS MISSION SUPPORT GROUP (AFSOC)
CANNON AIR FORCE BASE NEW MEXICO

DEC 07 2015

Colonel Douglas W. Gilpin
Commander, 27th Special Operations Mission Support Group
110 E Alison Avenue Suite 1098
Cannon AFB NM 88103

Mr. John E. Kieling
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Bldg 1
Santa Fe NM 87505-6063



Dear Mr. Kieling,

Cannon Air Force Base is pleased to submit the "*Final Corrective Action Complete Proposal for SWMU 48A and 49*". If you have any questions regarding this submittal, please contact Ms. Brandy Chavez, Chief, Environmental Element at (575) 904-6747.

Sincerely,

DOUGLAS W. GILPIN, Colonel, USAF

Attachments:

1. Final Corrective Action Complete Proposal for SWMU 48A and 49

cc:

NMED, Dave Cobrain
NMED, Gabriel Acevedo
NMED, Neelam Dhawan

FINAL

CORRECTIVE ACTION COMPLETE PROPOSAL
SOLID WASTE MANAGEMENT UNIT 48A and
SOLID WASTE MANAGEMENT UNIT 49
(SITE ST-26)

CANNON AIR FORCE BASE
NEW MEXICO

Contract Number: FA8903-15-F-0029

Prepared for



AIR FORCE CIVIL ENGINEER CENTER
2261 Hughes Ave., Suite 163
Joint Base San Antonio Lackland, Texas 78236-9853

November 2015

Prepared by:

FPM Remediations, Inc.

181 Kenwood Avenue
Oneida, NY 13421

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LIST OF ABBREVIATIONS AND ACRONYMS

AAR	After Action Report
AFB	Air Force Base
ARAR	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
BTEX	Benzene Toluene Ethylbenzene and Xylene
CAC	Corrective Action Complete
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMI	Corrective Measures Implementation
DRO	TPH-Diesel Range Organic
FPM	FPM Remediations, Inc.
ft	feet
GRO	TPH-Gasoline Range Organics
HSWA	Hazardous and Solid Waste Amendments
IRP	Installation Restoration Program
mg/kg	milligram per kilogram
µg/kg	microgram per kilogram
NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NPL	National Priority List
O&M	Operations and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
POL	Petroleum Oil Lubricants
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SVOC	Semi-Volatile Organic Compound
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit

LIST OF ABBREVIATIONS AND ACRONYMS

U.S.	United States
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

INTRODUCTION

The United States Air Force (USAF) and Cannon Air Force Base (AFB) (Permittee) are requesting Corrective Action Complete (CAC) Without Controls status for two Solid Waste Management Units (SWMUs) from the New Mexico Environment Department (NMED) in accordance with the New Mexico Hazardous Waste Act (Section 74-4-1 et seq., New Mexico Statutes Annotated 1978, as amended, 1992) and the New Mexico Hazardous Waste Management Regulations 20.4.1 New Mexico Administrative Code (NMAC). SWMU 48A and SWMU 49 are listed in the Permittee's Resource Conservation and Recovery Act (RCRA) Part B Permit pursuant to 40 Code of Federal Regulations 270.42(c) of the Hazardous and Solid Waste Amendments of 1984.

If approved, the Permittee requests NMED to initiate a modification of Cannon AFB's RCRA permit to adjust the content of the three corrective action tables (Attachment 1 of Cannon AFB's RCRA Permit). The tables list the status of the SWMUs at the Base, and their content is as follows:

- **Table 1** – List of SWMUs Requiring Corrective Action (corrective action may be necessary to characterize and/or remediate past releases of hazardous wastes or hazardous constituents).
- **Table 2** – List of SWMU's with Corrective Action Complete, With Controls (corrective action has been completed, and further corrective action is not currently required; controls are required).
- **Table 3** – List of SWMUs with Corrective Action Complete, Without Controls (corrective action has been completed, and further corrective action is not currently required; no controls are required).

The proposed modification would grant CAC Without Controls status for two SWMUs. The following SWMUs addressed by this document would move from Table 1 to Table 3 of the RCRA Permit.

Section C Sub-section	SWMU / AOC	USAF Site Name	Name / Description
1	SWMU 48A	ST-26	Underground Waste Oil Tank
2	SWMU 49	ST-26	Inactive Petroleum Oil Lubricants (POL) Storage Tank No. 4028a

A. FACILITY DESCRIPTION

Cannon AFB is located in Curry County, New Mexico, approximately 7 miles west of the City of Clovis. The Base encompasses approximately 4,320 acres of land. Cannon AFB is situated in a nearly flat plain sloping gently (10 to 15 feet per mile) to the east and southeast. Elevations in the vicinity of Cannon AFB range from 4,250 feet to 4,350 feet above mean sea level.

Cannon AFB dates to 1929, when Portair Field was established on the site as a civilian passenger terminal for early commercial transcontinental flights. In 1942 the Army Air Corps took control of the civilian airfield and it became known as the Clovis Army Air Base. In early 1945, the Base was renamed Clovis Army Air Field, where flying, bombing, and gunnery classes continued until the Base was de-activated in May 1947.

The Base was reassigned to the Tactical Air Command and formally reactivated as Clovis AFB in 1951. The Base was renamed Cannon AFB in 1957. Several Fighter-Bomber Groups and Tactical Fighter Wings have occupied the Base Since 1951. In June 2006, it was announced that Cannon AFB would transfer from the Air Combat Command and become an Air Force Special Operations Command installation.

B. HISTORY OF INVESTIGATION

The United States Environmental Protection Agency (USEPA) issued the Hazardous and Solid Waste Amendments (HSWA) Module IV to Cannon AFB's RCRA Operating Permit effective December 17, 1989. The HSWA module required the investigation of approximately 130 environmental restoration sites, referred to as SWMUs in the permit. In January 1996, NMED received authorization for corrective action under the HSWA and became the administrative authority for this action.

Section C of this document briefly describes the location and history of each SWMU, a summary of relevant information from previous site investigations, and the basis for determination for CAC Without Controls. Detailed descriptions of the investigative results appear in the original reports including: the 1987 Preliminary Review/Visual Site Inspection Report, the 1997 RCRA Facility Investigation (RFI) Appendix II SWMUS-Phase II, the 2000 Corrective Measures Study at SWMUs 31, 48a, 77, and 127, and the 2006 RFI for 21 SWMUs. References for these reports are provided in **Section D**.

C. SWMU DESCRIPTION

This section describes the location, history, and land use conditions for SWMU 48A and SWMU 49. A summary of relevant information from previous investigations and a basis for CAC determination are also presented.

1. SWMU 48A (ST-26) – Underground Waste Oil Tank

Location – SWMU 48A

SWMU 48A was located at the former Facility 4028 location in the Cantonment Area, Cluster E (URS, 2008) (**Figure I-1** in **Attachment I**). A site map is presented in **Figure I-2** in **Attachment I**.

History / Current and Anticipated Future Land Use – SWMU 48A

SWMU 48A was first identified as a 20,000 gallon underground waste oil tank during the 1987 RCRA Facility Assessment (RFA) (A.T. Kearney, Inc., 1987). The tank was estimated to be in use from 1941 until 1985 and used to store various waste oils for the Former Facility 4028 gas station prior to their disposal. This tank served as a gasoline refueling tank from 1941 to 1965 and waste oil storage vessel from 1965 to 1985. The tank and all associated piping were removed in 1988 (Cannon AFB & AFCEC 2014). This site was included in the subsequent Phase I Appendix II RFI Report and the RFI Phase II Appendix II finalized in 1997. During the Phase I, five soil borings were advanced and sampled to a depth of 30ft below ground surface (bgs). Ten (10) surface soil samples and 40 subsurface samples were collected at intervals of 5ft. Samples were analyzed for Benzene Toluene Ethylbenzene and Xylene (BTEX), metals, cyanide, and Volatile Organic Compounds (VOC). Based upon the analytical results, BTEX compounds were detected at 10ft and 20ft bgs. None of the BTEX constituents were detected above residential soil screening levels. The report states that the risk assessment indicated minimal or no risk and therefore no further action was recommended.

During the Phase II investigation, additional soil borings were drilled to 40ft bgs and 9 samples were collected and analyzed for VOCs, Semi-Volatile Organic Compounds (SVOCs), metals, and Total Petroleum Hydrocarbons (TPH) (Cannon AFB & AFCEC 2014). Results indicated that bis(2-ethylhexyl)phthalate and TPH were present in surface soil but below residential soil screening levels. In subsurface soils, ethylbenzene, toluene, xylene, 2-butanone, 1,2-dichlorobenzene, 1,4-dichlorobenzene, phenol, acenaphthene, di-n-butyl phthalate, dibenzofuran, barium, chromium, and TPH were detected. Only TPH was detected above industrial soil screening levels. Although the TPH levels indicated a release occurred at the site, the risk evaluation determined that no unacceptable human health risks were present. The report concluded no further action was recommended for the SWMU 48A.

URS Group Inc., completed a Corrective Measures Study for SWMU 48A in 2000. This study evaluated the potential human health and ecological risks associated with the SWMU 48A site. The results of the risk assessment indicated that there was minimal risk to human health and the environment. Therefore, a no action alternative was chosen as the recommended alternative (Cannon AFB & AFCEC 2014). However, during this study TPH contaminants were not evaluated due to the SWMU's complex nature. Only the major components of TPH were individually evaluated.

In 2007 a RCRA Corrective Measure was initiated. This proposed corrective measure included 14 additional samples to aid in the delineation of the contamination to be followed by a soil removal (Cannon AFB & AFCEC 2014). Seven soil borings were advanced around the perimeter of the former tank location. One boring was placed near the Phase II RFI boring with the highest TPH detection. All borings were completed to refusal (9-22ft bgs). VOCs, SVOCs, metals, pesticides/Polychlorinated Biphenyls (PCB), and TPH were included in the soil analyses. All soil sample detections were below their respective residential screening levels. Therefore, the site was recommended for closure. In February 2009, NMED issued an Approval with Direction to the 2008 Corrective Measures Implementation (CMI) report for SWMU 48A (URS 2008). This letter directed the Air Force to complete additional sampling activities because it was unlikely that the 1997 soil TPH concentration of 17,300 mg/kg detected at one of the soil borings had naturally attenuated to below the screening level of 2,500 mg/kg.

A CMI Work Plan Addendum was completed for SWMU 48A in July 2009. The work plan proposed soil trenching to be completed around one of the historical boring locations. The excavation was proposed to continue until all field observations indicated the extent of petroleum impacted soils had been delineated (Cannon AFB & AFCEC 2014). The initial excavation limits were 4ftx7ftx19ft; however, characterization samples at 11ft and 14ft bgs indicated potential contamination. Therefore, the excavation was expanded to 6ftx14ftx19.5ft. Confirmation end-point soil samples were then collected for laboratory analysis. Samples were analyzed for BTEX, naphthalene, Polycyclic Aromatic Hydrocarbons (PAHs), TPH-Diesel Range Organics (DRO), TPH-Gasoline Range Organics (GRO), and TPH-Motor Oils. Results indicated that PAHs, TPH-GRO, and naphthalene were non-detect. TPH-Motor Oils was detected at a maximum of 960 mg/kg along the north wall of the excavation. This value exceeded the 2006 residential screening level for unknown oil (800 mg/kg), but was below the industrial screening level (2000 mg/kg). Based on these values, the report recommended CAC with controls for SWMU 48A. In August 2010, NMED issued a Notice of Approval for the CMI Site Closure Report Addendum (URS 2010). However, this letter stated that the site was not appropriate for CAC status (Cannon AFB & AFCEC 2014). The 2010 North Wall end-point soil sample indicated a TPH detection of 960 mg/kg, the 1997 soil boring indicated a TPH result of 1,050 mg/kg at 5ft bgs, and the 2008 boring had a TPH result of 1,500 mg/kg. In 2010, the screening value for unknown oil for direct exposure via soil ingestion for both residential and industrial scenarios was 200 mg/kg. Because contamination above industrial screening levels was present, the site did not qualify for CAC status. The letter then went on to conclude that because the area is covered by an asphalt parking lot, NMED did not require additional corrective action unless the land use changed.

Current land use is industrial and Building 195 and its parking area have been constructed in its place. The SWMU48A site is located under the associated asphalt parking area.

Evaluation of Relevant Information – SWMU 48A

Based on the NMED Approval Letter issued for the CMI Site Closure Addendum Report, SWMUs 48A did not qualify for CAC status because historical sample results demonstrated TPH values above soil screening levels. In 2013 the Air Force began to review Installation Restoration Program (IRP) sites to determine ways to reach closure at sites remaining on Table 1 of the permit. A discussion with NMED in February 2014 provided information about how SWMU 48A could achieve CAC status (Cannon AFB & AFCEC 2014). All soil data was reviewed against 2012 soil screening values for unknown oil. While the 2012 values are higher than the values were in 2010, several samples still exceeded both residential and industrial values. Therefore, a 95% Upper Confidence Limit (UCL) was developed for this site. Three 95% UCLs were developed for this site based on various data sets. The first 95% UCL included data from 0-10ft and soil that was utilized for backfill. The second 95% UCL included data from 0-10ft, the soil that was backfilled, and the excavation walls. The third 95% UCL included all soil data. The ProUCL software recommended a 95% Adjusted Gamma UCL for all three scenarios. All 95% UCL outputs were below the residential and industrial screening value of 1000 mg/kg for unknown oil. This value is from Table 6-2 of the 2012 New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation. This table presents the applicable standard when groundwater may be used for drinking water purposes. Since this site sits above the Ogallala Aquifer, Standard GW-1 values were selected (Cannon AFB & AFCEC 2014). This standard presents the most conservative approach for

evaluating the site. Since the 95% UCL for all three data sets is below this screening level, the potential for migration to groundwater is low. In addition, the average depth to groundwater in this area is 330ft bgs. Therefore, impact to groundwater is not expected. The report recommended that based on the 95% UCL that SWMU 48A be recommended for Corrective Action Complete without Controls.

In a letter dated September 5, 2014, NMED issued the approval for the Development of A 95% Upper Confidence Level, Solid Waste Management Units 48A and 49 (ST-26) Report (Cannon AFB & AFCEC 2014). This letter also indicated that Cannon AFB may submit a Permit Modification Request to change the status of SWMU 48A from Corrective Action Required to Corrective Action Complete. The NMED Approval Letter is included in **Attachment II**. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B permit pursuant to 40 CFR 270.42(c) is warranted for closure of SWMU 48A.

Basis of Determination – SWMU 48A

SWMU 48A (ST-26) is proposed for CAC Without Controls status. The SWMU was characterized in accordance with applicable state and/or federal regulations, and the available data indicated that contaminants do not pose an unacceptable level of risk under current and projected land use.

2. SWMU 49 (ST-26) Inactive Petroleum Oil Lubricants (POL) Storage Tank No. 4028a

Location – SWMU 49

SWMU 49 was located at the former Facility 4028 location in the Cantonment Area, Cluster E (URS, 2008) (Figure I-1 in **Attachment I**). A site map is presented in Figure I-2 in **Attachment I**.

History / Current and Anticipated Future Land Use – SWMU 49

It was believed that SWMU 49 never existed as an individual site and was included in a 2000 No Further Action Petition. No previous investigations had been performed and the description matched the description of SWMU 48A. However, in 2004 NMED responded to the petition for No Further Action for SWMU 49 stating that because no investigation had been performed, a RFI was required for the site (Cannon AFB & AFCEC 2014).

An RFI was initiated for this SWMU in 2006. During the work plan preparation for this site, installation records indicated three tanks were originally present at Facility 4028, two underground tanks and one above ground tank. An investigation had previously been completed around these tanks in the 1993 Phase I RFI investigation and the 1994 Phase II RFI investigation. During the 2006 RFI, all collected site data to date was reviewed and compared to applicable screening values. The RFI evaluated data from the Phase I and Phase II RFIs and the Corrective Measures Study for SWMU 48A. Results of this review indicated that elevated soil contamination in this area was being addressed as part of the aforementioned SWMU 48A site. Therefore, CAC without Controls was proposed for SWMU 49. In 2008 NMED issued an “Approval with Direction” letter for the RFI (Cannon AFB & AFCEC 2014). In this letter, NMED stated that SWMU 49 is identified as one of the former storage tanks associated with Facility No. 4028. Therefore, the Permittee should delay submission of a CAC Proposal for SWMU 49 until investigatory activities associated with SWMU 48A were complete. This letter is included in **Attachment III**.

Current land use is industrial and Building 195 and its parking area have been constructed in its place. The SWMU49 site is located under the associated asphalt parking area.

Evaluation of Relevant Information – SWMU 49

When NMED issued the Notice of Approval for the CMI Site Closure Report at SWMU 48A, SWMU 49 was bonded to SWMU 48A. This letter stated *“Neither of the locations of the two former USTs has been identified as either 48a or 49. SWMU 49 has not been addressed directly or separately from SWMU 48A. Because of their proximity, similar uses, and similar history SWMUs 48a and 49 appear to be inseparable. Potential contamination resulting from the two SWMUs is comingled. Therefore, the status of SWMU 49 and SWMU 48A are the same.”* Since the 2010 letter was issued, this site has remained as two SWMUs on Table 1 of the RCRA permit. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B permit pursuant to 40 CFR 270.42(c) is warranted for closure of SWMU 49. This Notice of Approval Letter is presented in **Attachment IV**.

As included with SWMU 48a, the NMED issued the Notice of Approval Letter, dated September 5, 2014, for the Development of A 95% Upper Confidence Level, Solid Waste Management Units 48A and 49 (ST-26) Report (Cannon AFB & AFCEC 2014). This letter also indicated that Cannon AFB may submit a Permit Modification Request to change the status of SWMU 48A (including SWMU 49 as discussed) from Corrective Action Required to Corrective Action Complete. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B permit pursuant to 40 CFR 270.42(c) is warranted for closure of SWMU 48A. The NMED Approval Letter is included in **Attachment II**.

Basis of Determination – SWMU 49

SWMU 49 (ST-26) is proposed for CAC Without Controls status based on NMED CAC Criterion that this SWMU cannot be located, does not exist, or is a duplicate SWMU.

D. REFERENCES

- A.T. Kearny, Inc. 1987. Preliminary Review/VSI Report RCRA Facility Assessment. Cannon AFB, Clovis, New Mexico. July
- Cannon AFB & AFCEC. 2014. Development of an Upper Confidence Limit Solid Waste Management Units 48A and 49 (ST-26) Cannon AFB, Clovis New Mexico. April.
- NMED. 2010. Letter from NMED, Notice of Approval for the CMI Site Closure Report at SWMU 48A.
- NMED. 2014. Letter from NMED, Notice of Approval for the Development of a 95% Upper Confidence Level for SWMU 48A and 49.
- URS Group, Inc., 2000. Corrective Measures Study at SWMUs 31, 48A, 77, and 127. Cannon AFB, New Mexico. June.
- URS Group, Inc., 2006. RCRA Facility Investigation for 21 SWMUs. Cannon AFB, New Mexico. October.
- URS Group, Inc., 2008. Corrective Measure Implementation Site Closure Report for Site ST-26 (SWMU 48A) and AOC 36 Cannon AFB, New Mexico. October.
- URS Group, Inc., 2010. Corrective Measure Implementation Site Closure Report Addendum for Site ST-26 (SWMU 48A) Cannon AFB, New Mexico. May.
- Woodward-Clyde. 1997. RCRA Facility Investigation, Appendix II SWMUS – Phase II. Cannon AFB, New Mexico. November.

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ATTACHMENT I

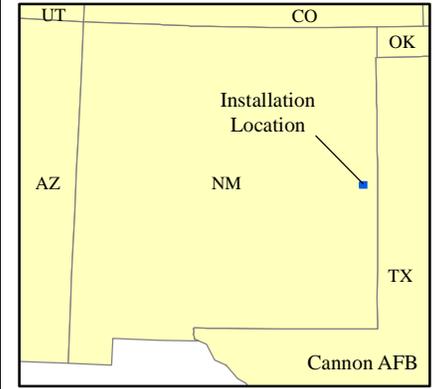
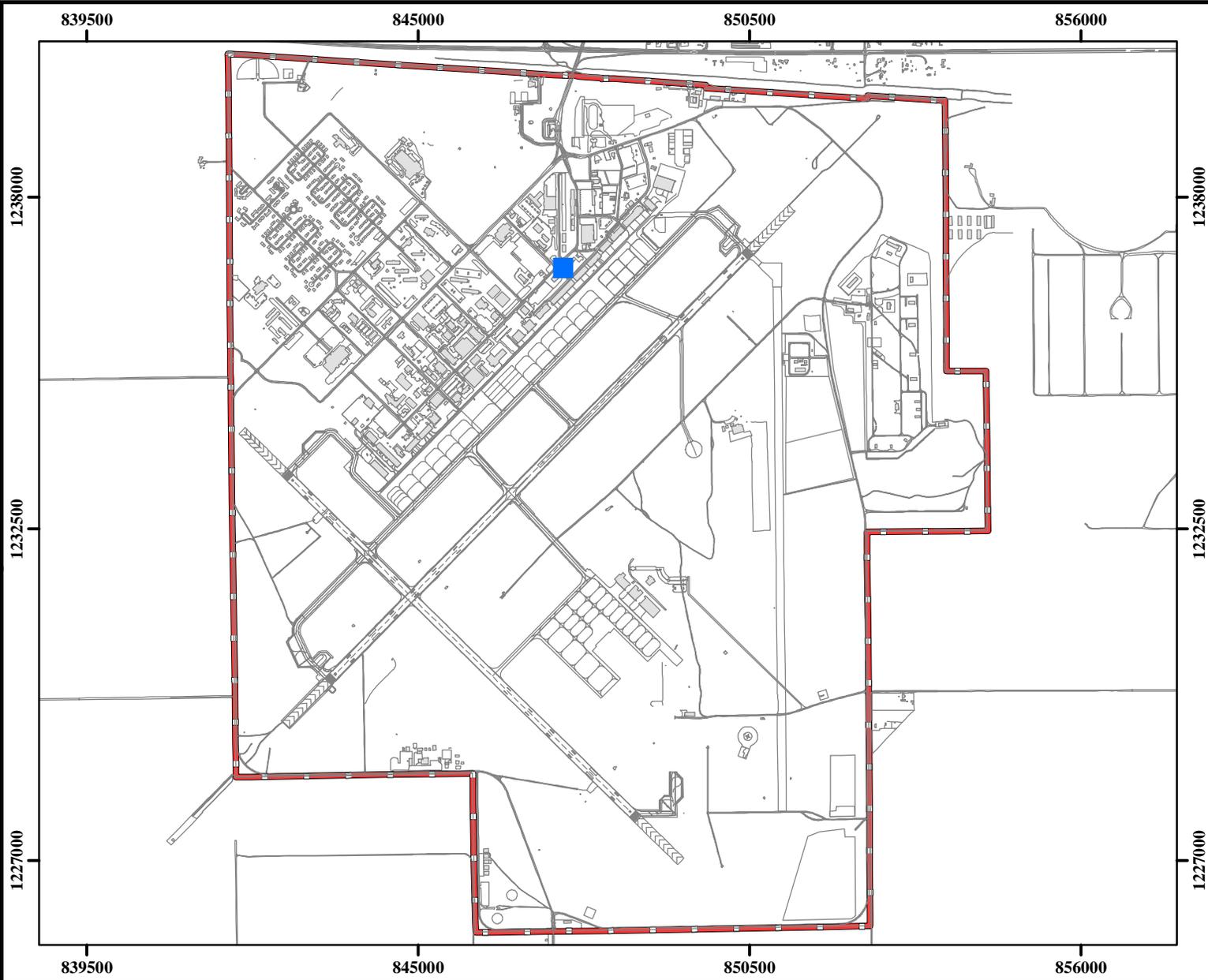
Maps and Figures

Figure I-1 Cannon AFB Site Locations

Figure I-2 SWMU Features

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Legend

- ST-26/SWMU 48a (Duplicate SWMU 49)
- Base Boundary

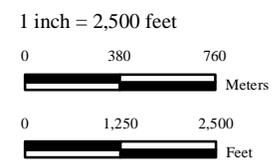
Performance Based Remediation
 New Mexico-Arizona
 Cannon Air Force Base
 Clovis, NM
 AFCEC

FIGURE I-1

Cannon AFB
Site Location

NOTES:
 Revision Date: 9/14/2015

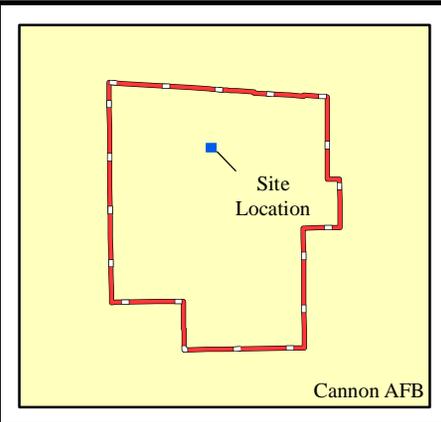
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 Central Meridian: -104.3333
 Latitude Of Origin: 31.0000
 Horizontal Datum: North American 1983
 False Northing: 0.0000
 Scale Factor: 0.99999
 Units: Foot US



FPM Remediations, Inc.

2015

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Legend

- ST-26/SWMU 48a (Duplicate SWMU 49)
- Base Boundary

Performance Based Remediation
 New Mexico-Arizona
 Cannon Air Force Base
 Clovis, NM
 AFCEC

FIGURE I-2

SWMU
Features

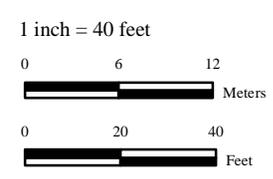


2015

NOTES:
 Revision Date: 9/14/2015

Coordinate System: NAD 1983 StatePlane New Mexico East FIPS 3001 Feet
 Projection: Transverse Mercator
 False Easting: 541,337.5000
 Central Meridian: -104.3333
 Latitude Of Origin: 31.0000

Horizontal Datum: North American 1983
 False Northing: 0.0000
 Scale Factor: 0.9999
 Units: Foot US



ATTACHMENT II

NMED Notice of Approval Letter
Development of an Upper Confidence Limit

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SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO ENVIRONMENT DEPARTMENT

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RYAN FLYNN
Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

September 5, 2014

Heather L. Buono, Colonel
Commander, 27th Special Operations Mission Support Group
27 SOMSG/CC
110 E. Alison Avenue, Suite 1098
Cannon Air Force Base, New Mexico 88103

**RE: APPROVAL
DEVELOPMENT OF A 95% UPPER CONFIDENCE LEVEL,
SOLID WASTE MANAGEMENT UNITS 48A AND 49 (ST-26)
CANNON AIR FORCE BASE, NEW MEXICO
NM7572124454
HWB-CAFB-14-006**

Dear Colonel Buono:

The New Mexico Environment Department (NMED) has received Cannon Air Force Base's (Permittee) 2014 *Development of a 95% Upper Confidence Level, Solid Waste Management Units 48A and 49 (ST-26)* (Report), dated July 2014 and received July 11, 2014. NMED has completed review of the Report and hereby approves the Report. The Permittee may submit a Permit Modification Request to change the status of Solid Waste Management Units 48A and 49 (ST-26) from Corrective Action Required to Corrective Action Complete.

Colonel Buono
September 5, 2014
Page 2

If you have any questions regarding this letter, please contact Daniel Comeau at (505) 476-6043.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

cc: N. Dhawan, NMED HWB
D. Cobrain, NMED HWB
D. Comeau, NMED HWB
L King, EPA 6PD-N
L. Peters, CAFB
S. Kottkamp, CAFB

File: CAFB 2014, Development of a 95% Upper Confidence Level, Solid Waste Management Units 48A and 49 (ST-26) Approval

ATTACHMENT III

NMED Notice of Approval Letter
RCRA Facility Investigation for 21 SWMUs

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ENTER



BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1

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RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 14, 2008

Colonel Timothy J. Leahy
27th Special Operations Wing
100 South D.L. Ingram Boulevard
Cannon Air Force Base, New Mexico 88103-5214

**RE: APPROVAL WITH DIRECTION
RCRA FACILITY INVESTIGATION FOR 21 SWMUs
CANNON AIR FORCE BASE, NEW MEXICO
EPA ID NM7572124454
HWB-CAFB-06-007**

Dear Mr. Leahy:

The New Mexico Environment Department (NMED) has reviewed the Department of the Air Force's (Permittee) *Final Revision 1 RCRA Facility Investigation for 21 SWMUs* (Report), dated October 2007. NMED hereby approves this Report with the following additional direction.

Corrective Action Complete without Controls status can only be achieved if all hazardous constituents are detected below their residential New Mexico Soil Screening Levels (NMSSLs). Solid Waste Management Units (SWMUs) included in this Report that are eligible for Corrective Action Complete without Controls status are SWMU 10, SWMU 50, SWMU 72, SWMU 75, SWMU 81, SWMU 98, SWMU 104 and SWMU 125. NMED recommends the Permittee petition for Corrective Action Complete without Controls status for the above listed SWMUs.

Corrective Action Complete with Controls status can be achieved if the hazardous constituents detected at a SWMU are between residential and industrial NMSSLs. The SWMUs included in

Mr. Leahy
May 14, 2008
Page 2

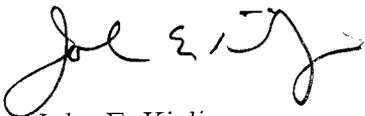
this Report that are eligible for Corrective Action Complete with Controls status are SWMU 2, SWMU 4, SWMU 6, SWMU 82, SWMU 96, and SWMU 102. The Permittee may petition for Corrective Action Complete with Controls status for the above listed SWMUs.

The SWMUs included in this Report that require additional investigation and/or clean-up activities are SWMU 34, SWMU 78, SWMU 85, SWMU 91, SWMU 95, and SWMU 107. A March 2008 work plan for these sites was submitted by the Permittee on April 4, 2008.

SWMU 49, along with SWMUs 48A and 48B, is identified as one of the former storage tanks associated with Facility No. 4028. Investigation activities for SWMU 48A are currently on-going, therefore NMED recommends that the Permittee delay submitting a petition for Corrective Action Complete status for SWMU 49 until after investigation and/or clean-up activities are complete at the site.

If you have any questions regarding this letter, please call Cheryl Frischkorn at (505) 476-6058.

Sincerely,



John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
C. Frischkorn, NMED HWB
Gerald Pelfrey, CAFB
File: CAFB 2008 and Reading
HWB-CAFB-06-007

ATTACHMENT IV

NMED Notice of Approval Letter
Site ST-26 (SWMU 48A) Corrective Measure Implementation (CMI) Site Closure Report
Addendum

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BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
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 **ENTERED**



RON CURRY
Secretary

SARAH COTTRELL
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 17, 2010

Ronald Lancaster
27 SOCES/CEA
506 N. DL Ingram Blvd.
Cannon AFB, New Mexico 88103-5003

**RE: NOTICE OF APPROVAL
SITE ST-26 (SWMU 48A) CORRECTIVE MEASURE
IMPLEMENTATION (CMI) SITE CLOSURE REPORT ADDENDUM,
MAY 2010, CANNON AIR FORCE BASE, NEW MEXICO
EPA ID #NM7572124454
HWB-CAFB-10-002**

Dear Mr. Lancaster:

The New Mexico Environment Department (NMED) has received Cannon Air Force Base's (Permittee) *Site ST-26 (SWMU 48A) Corrective Measure Implementation (CMI) Site Closure Report Addendum* dated May 2010 (Report). NMED has reviewed the Report and hereby issues this Notice of Approval. NMED provides comments presented below.

SWMUs associated with the old service station at the corner of Torch and Argentina Streets (Site ST-26) were numbered; SWMU 48a (20,000 gallon Underground Storage Tank [UST]), SWMU 48b (2,000 gallon Aboveground Storage Tank [AST]), SWMU 49 (20,000 gallon UST), and SWMU 50 (20,000 gallon UST).

SWMU 48b (the former 2,000 gallon AST) was moved to Table 2 (Corrective Action Complete) through a Class III Permit Modification in 2005.

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August 17, 2010
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SWMU 50 was described as a duplicate of SWMU 48a in the Permittee's October 2008 Corrective Action Complete Proposals. There were only two USTs, not three. NMED agreed that SWMU 50 is a duplicate of SWMU 48a and approved the proposal.

Results of analyses of soil samples collected from the vicinity of the two former side-by-side USTs are included in the Report as well as the results from previous RCRA Facility Investigations. Neither of the locations of the two former USTs has been identified as either 48a or 49. SWMU 49 has not been addressed directly or separately from SWMU 48a. Because of their proximity, similar uses, and similar history SWMUs 48a and 49 appear to be inseparable. Potential contamination resulting from the two SWMUs is comingled. Therefore, the status of SWMU 49 and SWMU 48a are the same.

Sampling and analyses of soil from investigations conducted in 1993, 1994 and 2008 determined that petroleum hydrocarbons were present in the soil at 8 feet to 15 feet below ground surface (bgs) at concentrations exceeding NMED TPH (Total Petroleum Hydrocarbon) Screening Guidelines (October 2006) at SWMU 48a.

In February and March of 2010 the Permittee excavated soil to depths of approximately 19 feet bgs in an area approximately 6 feet wide by 14 feet long. The 2010 excavation removed the most heavily petroleum-impacted soil surrounding a 1994 soil boring identified as 4806 that contained TPH at the concentration of 17,300 mg/kg.

According to the Report petroleum hydrocarbons remain in soil at SWMU 48a. The locations of the most highly petroleum-impacted soils remaining are: the north wall of the 2010 excavation at a depth of 11 feet to 18 feet bgs (960 mg/kg); the location of the 1994 soil core identified as 4804 at 5 ft bgs (1,050 mg/kg) and; the location of the 2008 soil core identified as SB02 (1,500 mg/kg). The screening values for unknown oil for direct exposure via vapor migration for the residential scenario is 800 mg/kg and for the industrial scenario is 2,000 mg/kg. The screening value for unknown oil for direct exposure via soil ingestion for both residential and industrial scenarios is 200 mg/kg.

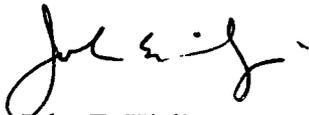
Because the residual contamination exceeds the screening value for unknown oil for direct exposure via soil ingestion for both residential and industrial scenarios, SWMU 48a does not qualify for corrective action complete status.

SWMUs 48a is currently covered with asphalt and used as a parking lot. Since the site does not pose any current unacceptable risk NMED does not require further corrective action at SWMU 48a at this time. However, at such time in the future that the Permittee decides on an alternative land use for SWMUs 48a, NMED may require the removal of contaminated soils to achieve the residual screening levels for unknown oil.

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Please contact Pat Stewart at (505) 476-6059, should you have any questions.

Sincerely,



John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
P. Stewart, NMED HWB
H. Hanson, CAFB
R. Lancaster, CAFB
File: CAFB 2010 and Reading

ATTACHMENT V

Historical Analytical Data Tables

- Development of a 95% Upper Confidence Level for SWMUs 48A and 49 (ST-26) Data Tables
- RCRA Facility Investigation for 21 SWMUs Data Tables
- 1997 RFI Data Tables

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Table 4.1 Evaluation of Soil Data at SWMU 48A/ 49

Date	Boring Number	Depth	Analyte	Result mg/kg	Location	Exceeds Unknown Oil 1000 mg/kg	Notes
12/12/1994	4804	0	TPH	185	West	N	
12/12/1994	4804	5	TPH	1050	West	Y	
12/12/1994	4804	10	TPH	81	West	N	
12/12/1994	4805	0	TPH	61.6	North	N	
12/12/1994	4904	15	TPH	594	East	N	
12/12/1994	4806	0	TPH	56.2	Center	NA	Top 7ft of soil used for backfill
12/12/1994	4806	5	TPH	729	Center	NA	Top 7ft of soil used for backfill
12/12/1994	4806	10	TPH	17300	Center	NA	Soil removed to 20'
12/12/1994	4806	15	TPH	3890	Center	NA	Soil removed to 20'
12/12/1994	4806	20	TPH	2080	Center	NA	Soil removed to 20'
12/12/1994	4806	25	TPH	1350	Center	Y	
12/12/1994	4806	30	TPH	199	Center	NA	
06/18/2008	SB02	8	TPH-DRO	580	West	N	
06/18/2008	SB02	8	TPH-Motor Oil	1500	West	Y	
06/18/2008	SB02	20	TPH-DRO	28	West	N	
06/18/2008	SB02	20	TPH-Motor Oil	55	West	N	
06/18/2008	SB01	7	TPH-DRO	140	North	N	
06/18/2008	SB01	7	TPH-Motor Oil	250	North	N	
06/18/2008	SB06	10	TPH-DRO	8.1	East	N	
06/18/2008	SB06	10	TPH-Motor Oil	14	East	N	
06/18/2008	SB04	8	TPH-DRO	22	Center	NA	Soil removed to 19.9'
06/18/2008	SB04	8	TPH-Motor Oil	50	Center	NA	Soil removed to 19.9'
06/18/2008	SB04	13	TPH-DRO	72	Center	NA	Soil removed to 19.9'
06/18/2008	SB04	13	TPH-Motor Oil	80	Center	NA	Soil removed to 19.9'
02/24/2010	N Wall	10-18	TPH-DRO	580	North Wall	N	
02/24/2010	N Wall	10-18	TPH-Motor Oil	960	North Wall	N	
02/24/2010	E Wall	10-18	TPH-DRO	15	East Wall	N	
02/24/2010	E Wall	10-18	TPH-Motor Oil	41	East Wall	N	
02/24/2010	S Wall	10-18	TPH-DRO	12	South Wall	N	
02/24/2010	S Wall	10-18	TPH-Motor Oil	27	South Wall	N	
02/24/2010	W Wall	10-18	TPH-DRO	460	West Wall	N	
02/24/2010	W Wall	10-18	TPH-Motor Oil	360	West Wall	N	
02/24/2010	Center	20	TPH-DRO	120	Ex Floor	N	
02/24/2010	Center	20	TPH-Motor Oil	210	Ex Floor	N	

Notes:

TPH- Total Petroleum Hydrocarbons

DRO- Diesel Range Organics

mg/kg- milligrams per kilogram

Red Text Indicates Detection is Above Screening Values

Green Text Indicates Detection is Below Screening Values

The Industrial and Residential Screening Value for Unknown Oil is 1000 mg/kg

Table 5.1 Soil Data from 0-10ft at SWMU 48A/ 49

Date	Boring Number	Depth	Analyte	Result mg/kg	Location	Exceeds Unknown Oil 1000 mg/kg	Notes
12/12/1994	4804	0	TPH	185	West	N	
12/12/1994	4804	5	TPH	1050	West	Y	
12/12/1994	4804	10	TPH	81	West	N	
12/12/1994	4805	0	TPH	61.6	North	N	
12/12/1994	4806	0	TPH	56.2	Center	NA	Top 7ft of soil used for backfill
12/12/1994	4806	5	TPH	729	Center	NA	Top 7ft of soil used for backfill
06/18/2008	SB02	8	TPH-DRO	580	West	N	
06/18/2008	SB02	8	TPH-Motor Oil	1500	West	Y	
06/18/2008	SB01	7	TPH-DRO	140	North	N	
06/18/2008	SB01	7	TPH-Motor Oil	250	North	N	
06/18/2008	SB06	10	TPH-DRO	8.1	East	N	

Notes:

TPH- Total Petroleum Hydrocarbons

DRO- Diesel Range Organics

mg/kg- milligrams per kilogram

The Industrial and Residential Screening Value for Unknown Oil is 1000 mg/kg

	A	B	C	D	E	F	G	H	I	J	K	L	
1	UCL Statistics for Uncensored Full Data Sets												
2	Table 5.2												
3	User Selected Options												
4	Date/Time of Computation			4/16/2014 4:07:37 PM									
5	From File			48A 10FT DATA.xls									
6	Full Precision			OFF									
7	Confidence Coefficient			95%									
8	Number of Bootstrap Operations			2000									
9													
10													
11	C4												
12													
13	General Statistics												
14	Total Number of Observations				12		Number of Distinct Observations				12		
15									Number of Missing Observations				1
16	Minimum				8.1		Mean				387.9		
17	Maximum				1500		Median				162.5		
18	SD				481		Std. Error of Mean				138.8		
19	Coefficient of Variation				1.24		Skewness				1.45		
20													
21	Normal GOF Test												
22	Shapiro Wilk Test Statistic				0.791		Shapiro Wilk GOF Test						
23	5% Shapiro Wilk Critical Value				0.859		Data Not Normal at 5% Significance Level						
24	Lilliefors Test Statistic				0.28		Lilliefors GOF Test						
25	5% Lilliefors Critical Value				0.256		Data Not Normal at 5% Significance Level						
26	Data Not Normal at 5% Significance Level												
27													
28	Assuming Normal Distribution												
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
30	95% Student's-t UCL				637.3		95% Adjusted-CLT UCL (Chen-1995)				678.4		
31							95% Modified-t UCL (Johnson-1978)				646.9		
32													
33	Gamma GOF Test												
34	A-D Test Statistic				0.256		Anderson-Darling Gamma GOF Test						
35	5% A-D Critical Value				0.774		Detected data appear Gamma Distributed at 5% Significance Level						
36	K-S Test Statistic				0.128		Kolmogrov-Smirnoff Gamma GOF Test						
37	5% K-S Critical Value				0.256		Detected data appear Gamma Distributed at 5% Significance Level						
38	Detected data appear Gamma Distributed at 5% Significance Level												
39													
40	Gamma Statistics												
41	k hat (MLE)				0.646		k star (bias corrected MLE)				0.54		
42	Theta hat (MLE)				600.1		Theta star (bias corrected MLE)				717.9		
43	nu hat (MLE)				15.51		nu star (bias corrected)				12.97		
44	MLE Mean (bias corrected)				387.9		MLE Sd (bias corrected)				527.7		
45							Approximate Chi Square Value (0.05)				5.872		
46	Adjusted Level of Significance				0.029		Adjusted Chi Square Value				5.161		
47													
48	Assuming Gamma Distribution												
49	95% Approximate Gamma UCL (use when n>=50)				856.8		95% Adjusted Gamma UCL (use when n<50)				974.8		
50													

	A	B	C	D	E	F	G	H	I	J	K	L		
51	Lognormal GOF Test													
52	Shapiro Wilk Test Statistic				0.959		Shapiro Wilk Lognormal GOF Test							
53	5% Shapiro Wilk Critical Value				0.859		Data appear Lognormal at 5% Significance Level							
54	Lilliefors Test Statistic				0.126		Lilliefors Lognormal GOF Test							
55	5% Lilliefors Critical Value				0.256		Data appear Lognormal at 5% Significance Level							
56	Data appear Lognormal at 5% Significance Level													
57														
58	Lognormal Statistics													
59	Minimum of Logged Data				2.092		Mean of logged Data				5.015			
60	Maximum of Logged Data				7.313		SD of logged Data				1.652			
61														
62	Assuming Lognormal Distribution													
63	95% H-UCL				4803		90% Chebyshev (MVUE) UCL				1223			
64	95% Chebyshev (MVUE) UCL				1561		97.5% Chebyshev (MVUE) UCL				2030			
65	99% Chebyshev (MVUE) UCL				2952									
66														
67	Nonparametric Distribution Free UCL Statistics													
68	Data appear to follow a Discernible Distribution at 5% Significance Level													
69														
70	Nonparametric Distribution Free UCLs													
71	95% CLT UCL				616.3		95% Jackknife UCL				637.3			
72	95% Standard Bootstrap UCL				597.5		95% Bootstrap-t UCL				808.1			
73	95% Hall's Bootstrap UCL				706.7		95% Percentile Bootstrap UCL				607.2			
74	95% BCA Bootstrap UCL				669.9									
75	90% Chebyshev(Mean, Sd) UCL				804.4		95% Chebyshev(Mean, Sd) UCL				993.1			
76	97.5% Chebyshev(Mean, Sd) UCL				1255		99% Chebyshev(Mean, Sd) UCL				1769			
77														
78	Suggested UCL to Use													
79	95% Adjusted Gamma UCL				974.8									
80														
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.													
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)													
83	and Singh and Singh (2003). However, simulation results will not cover all Real World data sets.													
84	For additional insight the user may want to consult a statistician.													
85														

Table 5.3 Soil Data from 0-10ft and Excavation Walls at SWMU 48A/ 49

Date	Boring Number	Depth	Analyte	Result mg/kg	Location	Exceeds Unknown Oil 1000 mg/kg	Notes
12/12/1994	4804	0	TPH	185	West	N	
12/12/1994	4804	5	TPH	1050	West	Y	
12/12/1994	4804	10	TPH	81	West	N	
12/12/1994	4805	0	TPH	61.6	North	N	
12/12/1994	4806	0	TPH	56.2	Center	NA	Top 7ft of soil used for backfill
12/12/1994	4806	5	TPH	729	Center	NA	Top 7ft of soil used for backfill
06/18/2008	SB02	8	TPH-DRO	580	West	N	
06/18/2008	SB02	8	TPH-Motor Oil	1500	West	Y	
06/18/2008	SB01	7	TPH-DRO	140	North	N	
06/18/2008	SB01	7	TPH-Motor Oil	250	North	N	
06/18/2008	SB06	10	TPH-DRO	8.1	East	N	
06/18/2008	SB06	10	TPH-Motor Oil	14	East	N	
02/24/2010	N Wall	10-18	TPH-DRO	580	North Wall	N	
02/24/2010	N Wall	10-18	TPH-Motor Oil	960	North Wall	N	
02/24/2010	E Wall	10-18	TPH-DRO	15	East Wall	N	
02/24/2010	E Wall	10-18	TPH-Motor Oil	41	East Wall	N	
02/24/2010	S Wall	10-18	TPH-DRO	12	South Wall	N	
02/24/2010	S Wall	10-18	TPH-Motor Oil	27	South Wall	N	
02/24/2010	W Wall	10-18	TPH-DRO	460	West Wall	N	
02/24/2010	W Wall	10-18	TPH-Motor Oil	360	West Wall	N	

Notes:
 TPH- Total Petroleum Hydrocarbons
 DRO- Diesel Range Organics
 mg/kg- milligrams per kilogram
 The Industrial and Residential Screening Value for Unknown Oil is 1000 mg/kg

	A	B	C	D	E	F	G	H	I	J	K	L				
1	UCL Statistics for Uncensored Full Data Sets															
2	Table 5.4															
3	User Selected Options															
4	Date/Time of Computation		4/18/2014 12:48:32 PM													
5	From File		48A 10FT DATA w EXCAVATE.xls													
6	Full Precision		OFF													
7	Confidence Coefficient		95%													
8	Number of Bootstrap Operations		2000													
9																
10																
11	C4															
12																
13	General Statistics															
14	Total Number of Observations				20		Number of Distinct Observations				19					
15									Number of Missing Observations				1			
16	Minimum				8.1		Mean				355.5					
17	Maximum				1500		Median				162.5					
18	SD				424.6		Std. Error of Mean				94.94					
19	Coefficient of Variation				1.194		Skewness				1.386					
20																
21	Normal GOF Test															
22	Shapiro Wilk Test Statistic				0.811		Shapiro Wilk GOF Test									
23	5% Shapiro Wilk Critical Value				0.905		Data Not Normal at 5% Significance Level									
24	Lilliefors Test Statistic				0.207		Lilliefors GOF Test									
25	5% Lilliefors Critical Value				0.198		Data Not Normal at 5% Significance Level									
26	Data Not Normal at 5% Significance Level															
27																
28	Assuming Normal Distribution															
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)									
30	95% Student's-t UCL				519.7		95% Adjusted-CLT UCL (Chen-1995)				543.1					
31									95% Modified-t UCL (Johnson-1978)				524.6			
32																
33	Gamma GOF Test															
34	A-D Test Statistic				0.411		Anderson-Darling Gamma GOF Test									
35	5% A-D Critical Value				0.791		Detected data appear Gamma Distributed at 5% Significance Level									
36	K-S Test Statistic				0.135		Kolmogrov-Smirnoff Gamma GOF Test									
37	5% K-S Critical Value				0.203		Detected data appear Gamma Distributed at 5% Significance Level									
38	Detected data appear Gamma Distributed at 5% Significance Level															
39																
40	Gamma Statistics															
41	k hat (MLE)				0.62		k star (bias corrected MLE)				0.56					
42	Theta hat (MLE)				573.4		Theta star (bias corrected MLE)				634.5					
43	nu hat (MLE)				24.8		nu star (bias corrected)				22.41					
44	MLE Mean (bias corrected)				355.5		MLE Sd (bias corrected)				474.9					
45									Approximate Chi Square Value (0.05)				12.65			
46	Adjusted Level of Significance				0.038						Adjusted Chi Square Value				12.07	
47																
48	Assuming Gamma Distribution															
49	95% Approximate Gamma UCL (use when n>=50)				630		95% Adjusted Gamma UCL (use when n<50)				660.2					
50																

	A	B	C	D	E	F	G	H	I	J	K	L		
51	Lognormal GOF Test													
52	Shapiro Wilk Test Statistic				0.936		Shapiro Wilk Lognormal GOF Test							
53	5% Shapiro Wilk Critical Value				0.905		Data appear Lognormal at 5% Significance Level							
54	Lilliefors Test Statistic				0.126		Lilliefors Lognormal GOF Test							
55	5% Lilliefors Critical Value				0.198		Data appear Lognormal at 5% Significance Level							
56	Data appear Lognormal at 5% Significance Level													
57														
58	Lognormal Statistics													
59	Minimum of Logged Data				2.092		Mean of logged Data				4.882			
60	Maximum of Logged Data				7.313		SD of logged Data				1.674			
61														
62	Assuming Lognormal Distribution													
63	95% H-UCL				2241		90% Chebyshev (MVUE) UCL				1097			
64	95% Chebyshev (MVUE) UCL				1383		97.5% Chebyshev (MVUE) UCL				1781			
65	99% Chebyshev (MVUE) UCL				2563									
66														
67	Nonparametric Distribution Free UCL Statistics													
68	Data appear to follow a Discernible Distribution at 5% Significance Level													
69														
70	Nonparametric Distribution Free UCLs													
71	95% CLT UCL				511.7		95% Jackknife UCL				519.7			
72	95% Standard Bootstrap UCL				503.1		95% Bootstrap-t UCL				576.9			
73	95% Hall's Bootstrap UCL				557.2		95% Percentile Bootstrap UCL				504.2			
74	95% BCA Bootstrap UCL				536.7									
75	90% Chebyshev(Mean, Sd) UCL				640.3		95% Chebyshev(Mean, Sd) UCL				769.3			
76	97.5% Chebyshev(Mean, Sd) UCL				948.4		99% Chebyshev(Mean, Sd) UCL				1300			
77														
78	Suggested UCL to Use													
79	95% Adjusted Gamma UCL				660.2									
80														
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.													
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)													
83	and Singh and Singh (2003). However, simulation results will not cover all Real World data sets.													
84	For additional insight the user may want to consult a statistician.													
85														

Table 5.5 All Soil Data at SWMU 48A/ 49

Date	Boring Number	Depth	Analyte	Result mg/kg	Location	Exceeds Unknown Oil 1000 mg/kg	Notes
12/12/1994	4804	0	TPH	185	West	N	
12/12/1994	4804	5	TPH	1050	West	Y	
12/12/1994	4804	10	TPH	81	West	N	
12/12/1994	4805	0	TPH	61.6	North	N	
12/12/1994	4904	15	TPH	594	East	N	
12/12/1994	4806	0	TPH	56.2	Center	NA	Top 7ft of soil used for backfill
12/12/1994	4806	5	TPH	729	Center	NA	Top 7ft of soil used for backfill
12/12/1994	4806	25	TPH	1350	Center	Y	
12/12/1994	4806	30	TPH	199	Center	NA	
06/18/2008	SB02	8	TPH-DRO	580	West	N	
06/18/2008	SB02	8	TPH-Motor Oil	1500	West	Y	
06/18/2008	SB02	20	TPH-DRO	28	West	N	
06/18/2008	SB02	20	TPH-Motor Oil	55	West	N	
06/18/2008	SB01	7	TPH-DRO	140	North	N	
06/18/2008	SB01	7	TPH-Motor Oil	250	North	N	
06/18/2008	SB06	10	TPH-DRO	8.1	East	N	
06/18/2008	SB06	10	TPH-Motor Oil	14	East	N	
02/24/2010	N Wall	10-18	TPH-DRO	580	North Wall	N	
02/24/2010	N Wall	10-18	TPH-Motor Oil	960	North Wall	N	
02/24/2010	E Wall	10-18	TPH-DRO	15	East Wall	N	
02/24/2010	E Wall	10-18	TPH-Motor Oil	41	East Wall	N	
02/24/2010	S Wall	10-18	TPH-DRO	12	South Wall	N	
02/24/2010	S Wall	10-18	TPH-Motor Oil	27	South Wall	N	
02/24/2010	W Wall	10-18	TPH-DRO	460	West Wall	N	
02/24/2010	W Wall	10-18	TPH-Motor Oil	360	West Wall	N	
02/24/2010	Center	20	TPH-DRO	120	Ex Floor	N	
02/24/2010	Center	20	TPH-Motor Oil	210	Ex Floor	N	

Notes:

TPH- Total Petroleum Hydrocarbons

DRO- Diesel Range Organics

mg/kg- milligrams per kilogram

The Industrial and Residential Screening Value for Unknown Oil is 1000 mg/kg

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2	Table 5.6											
3	User Selected Options											
4	Date/Time of Computation			4/16/2014 3:32:18 PM								
5	From File			48A ALL DATA.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	C4											
12												
13	General Statistics											
14	Total Number of Observations				27		Number of Distinct Observations				26	
15							Number of Missing Observations				0	
16	Minimum				8.1		Mean				358	
17	Maximum				1500		Median				185	
18	SD				428.3		Std. Error of Mean				82.43	
19	Coefficient of Variation				1.196		Skewness				1.424	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.792		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.923		Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.229		Lilliefors GOF Test					
25	5% Lilliefors Critical Value				0.171		Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL				498.6		95% Adjusted-CLT UCL (Chen-1995)				517.7	
31							95% Modified-t UCL (Johnson-1978)				502.3	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				0.419		Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value				0.792		Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.119		Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value				0.176		Detected data appear Gamma Distributed at 5% Significance Level					
38	Detected data appear Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)				0.663		k star (bias corrected MLE)				0.614	
42	Theta hat (MLE)				539.6		Theta star (bias corrected MLE)				582.6	
43	nu hat (MLE)				35.83		nu star (bias corrected)				33.18	
44	MLE Mean (bias corrected)				358		MLE Sd (bias corrected)				456.7	
45							Approximate Chi Square Value (0.05)				21.01	
46	Adjusted Level of Significance				0.0401		Adjusted Chi Square Value				20.39	
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50)				565.4		95% Adjusted Gamma UCL (use when n<50)				582.5	
50												

	A	B	C	D	E	F	G	H	I	J	K	L		
51	Lognormal GOF Test													
52	Shapiro Wilk Test Statistic				0.949		Shapiro Wilk Lognormal GOF Test							
53	5% Shapiro Wilk Critical Value				0.923		Data appear Lognormal at 5% Significance Level							
54	Lilliefors Test Statistic				0.11		Lilliefors Lognormal GOF Test							
55	5% Lilliefors Critical Value				0.171		Data appear Lognormal at 5% Significance Level							
56	Data appear Lognormal at 5% Significance Level													
57														
58	Lognormal Statistics													
59	Minimum of Logged Data				2.092		Mean of logged Data				4.963			
60	Maximum of Logged Data				7.313		SD of logged Data				1.573			
61														
62	Assuming Lognormal Distribution													
63	95% H-UCL				1385		90% Chebyshev (MVUE) UCL				963.4			
64	95% Chebyshev (MVUE) UCL				1196		97.5% Chebyshev (MVUE) UCL				1519			
65	99% Chebyshev (MVUE) UCL				2154									
66														
67	Nonparametric Distribution Free UCL Statistics													
68	Data appear to follow a Discernible Distribution at 5% Significance Level													
69														
70	Nonparametric Distribution Free UCLs													
71	95% CLT UCL				493.6		95% Jackknife UCL				498.6			
72	95% Standard Bootstrap UCL				493.8		95% Bootstrap-t UCL				537.5			
73	95% Hall's Bootstrap UCL				509		95% Percentile Bootstrap UCL				491.3			
74	95% BCA Bootstrap UCL				526.9									
75	90% Chebyshev(Mean, Sd) UCL				605.3		95% Chebyshev(Mean, Sd) UCL				717.3			
76	97.5% Chebyshev(Mean, Sd) UCL				872.7		99% Chebyshev(Mean, Sd) UCL				1178			
77														
78	Suggested UCL to Use													
79	95% Adjusted Gamma UCL				582.5									
80														
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.													
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)													
83	and Singh and Singh (2003). However, simulation results will not cover all Real World data sets.													
84	For additional insight the user may want to consult a statistician.													
85														

**TABLE 11-1
COMPARISON OF SWMU 49/50 MAXIMUM SURFACE SOIL CONCENTRATIONS TO NMED SSLs
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) ¹	Qual	Background Concentration ² (mg/kg)	Daily Intake from the Site ³ (Essential Nutrients)	Recommended Daily Allowance ⁴ (Essential Nutrients)	Residential Soil SSL Concentration ⁵ (mg/kg)	Industrial Soil SSL Concentration ⁶ (mg/kg)	Construction Worker Soil SSL Concentration ⁷ (mg/kg)	Soil to Groundwater SSL Using DAF ⁸ = 20	Exceeds Background ?	COPC ⁹ (Yes or No)/ Basis ¹⁰
VOLATILE ORGANIC COMPOUNDS (VOCs)												
Methylene Chloride	3/8	0.15					65	161	2,630	sat	0.171	NO / A
Acetone	4/10	0.11					12,600	53,000	42,600		19.1	NO / A
Toluene	3/5	0.0057					252	252	252	sat	6.93	NO / A
Xylene (total)	1/8	0.075					132	132	132		10.1	NO / A
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)												
Bis(2-Ethyl hexyl)phthalate	1/3	0.057	J				347	1,370	4,660		21,500	NO / A
METALS												
Aluminum	3/3	15,300		8950			77,800	100,000	14,400		1,100,000	YES NO / A
Antimony	1/3	5.5	J	3.15			31.3	454	124		13.2	YES NO / A
Arsenic	3/3	3		3.6			3.9	17.7	85.2		0.292	NO NO / A,F
Barium	8/8	242	J	670			5,450	78,300	1,440		2,110	NO NO / A,F
Beryllium	3/3	0.71	J	0.78			156	2,250	56.2		1,150	NO NO / A,F
Calcium	8/8	230,000		237,498	23	1200	NA	NA	NA		NA	NO NO / C,F
Chromium	3/3	13.8		10.5			100,000	100,000	100,000	max	1,970,000,000	YES NO / A
Cobalt	3/3	5.9		6.6			1,520	20,500	61		661	NO NO / A,F
Copper	3/3	10		18.3			3,130	45,400	12,400		1030	YES NO / A
Iron	3/3	13,300		10,100			23,500	100,000	92,900	max	5,540	YES NO / A
Lead	3/3	18.8	J	12			400	800	800		NA	YES NO / A
Magnesium	3/3	3,100		1,930	0.31	400	NA	NA	NA		NA	YES NO / C
Manganese	3/3	245		307			10,200	100,000	151	max	6670	NO NO / F
Nickel	8/8	13.5		11			1,560	22,500	561		953	YES NO / A
Potassium	3/3	2,330		2691	0.233	390-780	NA	NA	NA		NA	NO NO / C,F
Vanadium	8/8	22.2		23.3			78	1,140	310		730	NO NO / A,F
Zinc	3/3	33.1		32.2			23,500	100,000	92,900		13,600	NO NO / A,F

Notes:

⁵ Naphthalene was used as a surrogate for noncarcinogenic PAHs.

mg/kg = milligrams per kilogram

NA = not available

ND = nondetect

sat = chemical specific soil saturation limit.

max = a non risk-based maximum concentration was used when the risk-based SSL exceeded 100,000 mg/kg for low toxicity chemicals.

(1) Maximum detected concentration from all investigations at SWMU 49/50.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) * ingestion rate of 100 mg/day for construction workers * conversion factor of 1x¹⁰ kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2005) - NOT APPLICABLE TO THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2005).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2005).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2005) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

(9) For this site, a chemical is only considered a contaminant of potential concern(COPC) if the maximum concentration exceeds background and the industrial or construction worker SSL.

(10) See A-F footnotes below.

A = Does not exceed the applicable screening level.

B = Exceeds the applicable screening value.

C = The chemical is an essential nutrient; the calculated daily intake did not exceed the recommended daily allowance.

D = Daily Intake exceeds the RDA.

E = No toxicity value available to quantify risk. Chemical will be evaluated qualitatively in the risk assessment.

F = Concentration is below background concentration.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 11-2
COMPARISON OF SWMU 49/50 MAXIMUM COMBINED SURFACE AND SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLs
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) ¹	Qual	Background Concentration ² (mg/kg)	Daily Intake from the Site ³ (Essential Nutrients)	Recommended Daily Allowance ⁴ (Essential Nutrients)	Residential Soil SSL Concentration ⁵ (mg/kg)	Industrial Soil SSL Concentration ⁶ (mg/kg)	Construction Worker Soil SSL Concentration ⁷ (mg/kg)	Soil to Groundwater SSL Using DAF ⁸ = 20	Exceeds Background ?	COPC ⁹ (Yes or No)/ Basis ¹⁰			
TOTAL PETROLEUM HYDROCARBONS	11/27	17.3					760	1,810	1,810	NA		NO / A			
COMPOUNDS (VOCs)															
Methylene Chloride	23 / 54	0.15					65	161	2,630	sat	0.171	NO / A			
Acetone	30 / 53	0.41					12,600	53,000	42,600		19.1	NO / A			
Carbon Disulfide	1 / 18	0.0012	J				3,760	21,400	13,400		7.52	NO / A			
2-Butanone	2 / 27	1.2	J				573	2,100	1,880		6.63	NO / A			
Toluene	15 / 60	1.2					252	252	252	sat	6.93	NO / A			
Chlorobenzene	1 / 27	0.003	J				176	242	242		1.03	NO / A			
Ethylbenzene	7 / 36	16					10600	25400	571000		10.5	NO / A			
Xylene (total)	11 / 51	100					132	132	132		10.1	NO / A			
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)															
Acenaphthene	1 / 29	0.088	J				31.90	31.90	31.90	sat	55	NO / A			
Bis(2-Ethyl hexyl)phthalate	4 / 29	9.100					347	1,370	4,660		21,500	NO / A			
4-Chloroaniline	1 / 29	7.900	J				240	2500	NA		0.70	NO / A			
Di-n-butylphthalate	1 / 29	0.410	J				0.621	2.34	21.2		2.78	NO / A			
1,2-Dichlorobenzene	5 / 29	7.500					43	43	43	sat	2.04	NO / A			
1,3-Dichlorobenzene	2 / 29	0.700	J				174	174	174	sat	4.06	NO / A			
1,4-Dichlorobenzene	2 / 29	1.800					13.3	32.8	81.9		0.11	NO / A			
Dibenzofuran	2 / 29	0.220	J				36.6	36.6	36.6	sat	2.87	NO / A			
Fluoranthene	6 / 29	1.200	J				2,290	24,400	8,730		4,690	NO / A			
Fluorene	4 / 29	0.190	J				39.7	39.7	39.7	sat	102	NO / A			
2-Methylnaphthalene	5 / 29	12.000					25.2	92.5	82.5		0.394	NO / A			
Napthalene	6 / 29	5.200					25.2	92.5	82.5		0.394	NO / A			
N-nitrosodiphenylamine	1 / 29	0.400	J				74	74	74	sat	5.71	NO / A			
Phenanthrene ^S	4 / 29	0.400	J				25.2	92.5	82.5		0.394	NO / A			
Phenol	1 / 29	0.038	J				18,300	100,000	69,000		47.4	NO / A			
METALS															
Aluminum	27 / 27	15,300		12,214			77,800	100,000			14,400	1,100,000	YES	YES / B	
Antimony	2 / 27	14	J	16			31.3	454	124		13.2		NO	NO / A,F	
Arsenic	27 / 27	3.4		4.3			3.9	17.7	85.2		0.292		NO	NO / A,F	
Barium	54 / 54	2390		890			5,450	78,300			1,440	2,110	YES	YES / B	
Beryllium	15 / 27	0.71	J	0.73			156	2,250	56.2		1,150		NO	NO / A,F	
Calcium	54 / 54	282,000		237,498	28.2	1200	NA	NA	NA		NA		YES	NO / C	
Chromium	25 / 27	12.8		13.3			100,000	100,000	100,000	max	1,970,000,000		NO	NO / A,F	
Cobalt	25 / 27	5.9		4.7			1,520	20,500	61		661		YES	NO / A	
Copper	25 / 27	14.5		8.3			3,130	45,400	12,400		1030		YES	NO / A	
Iron	27 / 27	13,300		13,148			23,500	100,000	92,900	max	5,540		YES	NO / A	
Lead	27 / 27	25.7		8.7			400	800	800		NA		YES	NO / A,F	
Magnesium	54 / 54	17,700		19,300	1.77	400	NA	NA	NA		NA		NO	NO / C,F	
Manganese	27 / 27	245	J	333			10,200	100,000			151	max	6670	NO	NO / F
Nickel	54 / 54	13.5		15			1,560	22,500	561		953		NO	NO / A,F	
Potassium	27 / 27	3,110		2,512	0.311	390-780	NA	NA	NA		NA		NO	NO / C,F	
Thallium	1 / 10	5.6	J	2.7			5.16	74.9	20.4		3.43		YES	NO / A	
Vanadium	53 / 54	28.9		32.8			78	1,140	310		730		NO	NO / A,F	
Zinc	27 / 27	33.1		30.6			23,500	100,000	92,900		13,600		YES	NO / A	

TABLE 11-2
COMPARISON OF SWMU 49/50 MAXIMUM COMBINED SURFACE AND SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLs
CANNON AFB, NEW MEXICO

Notes:

^S Naphthalene was used as a surrogate for noncarcinogenic PAHs.

max = a non risk-based maximum concentration was used when the risk-based SSL exceeded 100,000 mg/kg for low toxicity chemicals.

mg/kg = milligrams per kilogram

NA = not available

ND = nondetect

sat = chemical specific soil saturation limit.

(1) Maximum detected concentration from all investigations at SWMU 49/50.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) * ingestion rate of 100 mg/day for construction workers * conversion factor of 1×10^{-6} mg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2005) - NOT APPLICABLE TO THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2005).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2005).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2005) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

(9) For this site, a chemical is only considered a contaminant of potential concern(COPC) if the maximum concentration exceeds background and the industrial or construction worker SSL.

(10) See A-F footnotes below.

A = Does not exceed the applicable screening level.

B = Exceeds the applicable screening value.

C = The chemical is an essential nutrient; the calculated daily intake did not exceed the recommended daily allowance.

D = Daily Intake exceeds the RDA.

E = No toxicity value available to quantify risk. Chemical will be evaluated qualitatively in the risk assessment.

F = Concentration is below background concentration.

Shading indicates the maximum concentration exceeds the designated SSL.

TABLE 9-1

SUMMARY OF ANALYTICAL AND QA/QC SAMPLING
 UNDERGROUND STORAGE TANK (SWMU NO. 48A)
 CANNON AFB, NEW MEXICO

Sample Location	Target Interval (ft-bgs)	Sample Identification Number	QA/QC Type	Sample Matrix	Analytical Parameters			
					VOCs	SVOCs	Metals	TRPH
Boring 04804	0 - 0.5	CAN048-4804-0000		Soil	X	X	X	X
	3 - 5	CAN048-4804-0005		Soil	X	X	X	X
	8 - 10	CAN048-4804-0010		Soil	X	X	X	X
	13 - 15	CAN048-4804-0015		Soil	X	X	X	X
	18 - 20	CAN048-4804-0020		Soil	X	X	X	X
	23 - 25	CAN048-4804-0025		Soil	X	X	X	X
	28 - 30	CAN048-4804-0030		Soil	X	X	X	X
	33 - 35	CAN048-4804-0035		Soil	X	X	X	X
	38 - 40	CAN048-4804-0040		Soil	X	X	X	X
Boring 04805	0.5 - 2.5	CAN048-4805-0000		Soil	X	X	X	X
	3 - 5	CAN048-4805-0005		Soil	X	X	X	X
	8 - 10	CAN048-4805-0010		Soil	X	X	X	X
	8 - 10	CAN048-4805-4861	FD	Soil	X	X	X	X
	13 - 15	CAN048-4805-0015		Soil	X	X	X	X
	13 - 15	CAN048-4805-4801	MRD	Soil	X	X	X	X
	18 - 20	CAN048-4805-0020		Soil	X	X	X	X
	23 - 25	CAN048-4805-0025		Soil	X	X	X	X
	28 - 30	CAN048-4805-0030		Soil	X	X	X	X
	33 - 35	CAN048-4805-0035		Soil	X	X	X	X
	38 - 40	CAN048-4805-0040		Soil	X	X	X	X
Boring 04806	0 - 2.0	CAN048-4806-0000		Soil	X	X	X	X
	0 - 2.0	CAN048-4806-4862	FD	Soil	X	X	X	X
	3 - 5	CAN048-4806-0005		Soil	X	X	X	X
	3 - 5	CAN048-4806-4802	MRD	Soil	X	X	X	X

TABLE 9-1

**SUMMARY OF ANALYTICAL AND QA/QC SAMPLING
UNDERGROUND STORAGE TANK (SWMU NO. 48A)
CANNON AFB, NEW MEXICO**

Sample Location	Target Interval (ft-bgs)	Sample Identification Number	QA/QC Type	Sample Matrix	Analytical Parameters			
					VOCs	SVOCs	Metals	TRPH
Boring 04806, cont.	8 - 10	CAN048-4806-0010		Soil	X	X	X	X
	13 - 15	CAN048-4806-0015		Soil	X	X	X	X
	18 - 20	CAN048-4806-0020		Soil	X	X	X	X
	23 - 25	CAN048-4806-0025		Soil	X	X	X	X
	28 - 30	CAN048-4806-0030		Soil	X	X	X	X
	28 - 30	CAN048-4806-4863	FD	Soil	X	X	X	X
	33 - 35	CAN048-4806-0035		Soil	X	X	X	X
	38 - 40	CAN048-4806-0040		Soil	X	X	X	X

FD = Field Duplicate
MRD = Missouri River Division Split
MS/MSD = Matrix spike/matrix spike duplicate

See Figure 11-1 for locations of the borings.

TABLE 9-2

**FIELD SCREENING DATA
PHASE II RFI
UNDERGROUND STORAGE TANK (SWMU NO. 48A)**

Boring/Sample Number	Date	Time Collected (hrs)	Time of Field Screening	Sample Depth	Field Screening Concentrations (ppm)
CAN048-4804	12/11/94	1625	*	0.5	ND
		1633	*	5.0	ND
		1638	*	10.0	ND
		1645	*	15.0	ND
		1655	*	20.0	ND
		1712	*	25.0	ND
	12/12/94	0800	*	30.0	ND
		0815	*	35.0	ND
		0830	*	40.0	ND
CAN048-4805	12/12/94	0855	*	0.5	ND
		0905	*	5.0	ND
		0915	*	10.0	ND
		0925	*	15.0	ND
		0940	*	20.0	ND
		0951	*	25.0	ND
		1008	*	30.0	ND
		1020	*	35.0	ND
		1030	*	40.0	ND
CAN048-4806	12/12/94	1058	*	0.5	5.2
		1115	*	5.0	50.5
		1133	*	10.0	58
		1148	*	15.0	125.7
		1200	*	20.0	106.1
		1215	*	25.0	86.8
		1225	*	30.0	ND
		1235	*	35.0	ND
		1245	*	40.0	ND

* Exact time unknown; indicates 1/2 hour after sample collection

ND = Nondetect

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4804-0000			CAN048-4804-0005			CAN048-4804-0010			CAN048-4804-0015			CAN048-4804-0020			CAN048-4804-0025		
LAB SAMPLE NUMBER	0397740007SA			0397740008SA			0397740009SA			0397740010SA			0397740011SA			0397740012SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual															
Volatile Organics (µg/kg)																		
Acetone	3.4	11	J	<	11	U	3	12	J	<	11	U	<	11	U	<	11	U
2-Butanone (MEK)	<	11	U	<	11	U	<	12	U	<	11	U	<	11	U	<	11	U
Chlorobenzene	<	5.6	U	<	5.7	U	<	5.8	U	<	5.6	U	<	5.6	U	<	5.5	U
Ethylbenzene	<	5.6	U	<	5.7	U	<	5.8	U	<	5.6	U	<	5.6	U	<	5.5	U
Methylene chloride	<	5.6	U	<	5.7	U	<	5.8	U	<	5.6	U	<	5.6	U	<	5.5	U
Toluene	5.7	5.6		1.3	5.7	J	<	5.8	U	<	5.6	U	<	5.6	U	<	5.5	U
Xylenes (total)	<	5.6	U	<	5.7	U	<	5.8	U	<	5.6	U	<	5.6	U	<	5.5	U
Semivolatile Organics (µg/kg)																		
Acenaphthene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
bis(2-Ethylhexyl)phthalate	57	370	J	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
4-Chloroaniline	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
Di-n-butyl phthalate	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
Dibenzofuran	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
1,2-Dichlorobenzene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
1,3-Dichlorobenzene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
1,4-Dichlorobenzene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
Fluoranthene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
Fluorene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
2-Methylnaphthalene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
Naphthalene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
N-Nitrosodiphenylamine	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
Phenanthrene	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U
Phenol	<	370	U	<	370	U	<	380	U	<	370	U	<	370	U	<	360	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

⁽¹⁾ Duplicate for the preceding sample number.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4804-0000			CAN048-4804-0005			CAN048-4804-0010			CAN048-4804-0015			CAN048-4804-0020			CAN048-4804-0025		
LAB SAMPLE NUMBER	0397740007SA			0397740008SA			0397740009SA			0397740010SA			0397740011SA			0397740012SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual															
Metals (mg/kg)																		
Aluminum	12900	11.3		11900	11.3		8580	11.5		4400	55.6		8150	11.1		6370	22.1	
Antimony	5.5	6.8	J	<	6.8	UJ	<	6.9	U	<	33.3	UJ	<	6.7	UJ	<	13.2	UJ
Arsenic	3	0.56		2.6	0.57		2.9	0.58		2	0.56		1.2	0.56		1.8	0.55	
Barium	149	1.1		456	1.1		304	1.2		436	5.6		69.3	1.1		109	2.2	
Beryllium	0.53	0.23		0.5	0.23		0.46	0.23		<	1.1	U	0.26	0.22		<	0.44	U
Calcium	63800	22.5		102000	22.7		112000	23		250000	111		78900	22.3		173000	44.1	
Chromium	11.3	1.1		8.9	1.1		6.8	1.2		<	5.6	U	5.9	1.1		2.6	2.2	
Cobalt	4.1	1.1		3.5	1.1		3.3	1.2		<	5.6	U	1.6	1.1		1.2	2.2	J
Copper	7.3	2.3		7	2.3		5.9	2.3		<	11.1	U	1.8	2.2	J	1.9	4.4	J
Iron	9480	11.3		8550	11.3		6840	11.5		2410	55.6		4810	11.1		3680	22.1	
Lead	18.8	5.6	J	15.5	5.7	J	11.3	2.9	J	2.3	0.56	J	2.7	0.56	J	1.9	0.55	J
Magnesium	2830	22.5	J	3760	22.7	J	4160	23		13400	111		8310	22.3	J	10500	44.1	J
Manganese	133	1.1		168	1.1		118	1.2		21.4	5.6	J	40.5	1.1		34	2.2	
Nickel	8.2	4.5		7.8	4.5		8.3	4.6		9	22.2	J	5.7	4.5		4.2	8.8	J
Potassium	2140	563		1980	567		1540	576		448	2780	J	1400	556		1070	1100	J
Vanadium	18.6	1.1		18.3	1.1		17.2	1.2		17.7	5.6		18	1.1		15	2.2	
Zinc	29.2	2.3		28.2	2.3		18.2	2.3		6.1	11.1	J	10.3	2.2		7.5	4.4	
TRPH (mg/kg)																		
Total Recoverable	185	45.1	J	1050	90.8	J	81	46.1	J	<	44.5	UJ	<	44.5	UJ	<	44.1	UJ
Petroleum Hydrocarbons																		

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

⁽¹⁾ Duplicate for the preceeding sample number.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4804-0030			CAN048-4804-0035			CAN048-4804-0040			CAN048-4805-0000			CAN048-4805-0005			CAN048-4805-0010			CAN048-4805-4861 ⁽¹⁾		
LAB SAMPLE NUMBER	0397940007SA			0397940008SA			0397940009SA			0397940010SA			0397940011SA			0397940012SA			0398000001SA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual															
Volatile Organics (µg/kg)																					
Acetone	4.8	11	J	4.9	11	J	6.7	11	J	<	11	U	9.5	12	J	<	11	U	17	11	
2-Butanone (MEK)	<	11	U	<	12	U	<	11	U	<	11	U									
Chlorobenzene	<	5.5	U	<	5.3	U	<	5.3	U	<	5.7	U	<	5.8	U	<	5.5	U	<	5.5	U
Ethylbenzene	<	5.5	U	<	5.3	U	<	5.3	U	<	5.7	U	<	5.8	U	<	5.5	U	<	5.5	U
Methylene chloride	<	5.5	U	<	5.3	U	<	5.3	U	<	5.7	U	<	5.8	U	<	5.5	U	5.6	5.5	
Toluene	<	5.5	U	<	5.3	U	<	5.3	U	<	5.7	U	<	5.8	U	<	5.5	U	<	5.5	U
Xylenes (total)	<	5.5	U	<	5.3	U	<	5.3	U	<	5.7	U	<	5.8	U	<	5.5	U	<	5.5	U
Semivolatile Organics (µg/kg)																					
Acenaphthene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
bis(2-Ethylhexyl)phthalate	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
4-Chloroaniline	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
Di-n-butyl phthalate	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
Dibenzofuran	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
1,2-Dichlorobenzene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
1,3-Dichlorobenzene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
1,4-Dichlorobenzene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
Fluoranthene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
Fluorene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
2-Methylnaphthalene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
Naphthalene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
N-Nitrosodiphenylamine	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
Phenanthrene	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U
Phenol	<	360	U	<	350	U	<	350	U	<	370	U	<	380	U	<	360	U	<	360	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

⁽¹⁾ Duplicate sample for the preceding sample number.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4804-0030			CAN048-4804-0035			CAN048-4804-0040			CAN048-4805-0000			CAN048-4805-0005			CAN048-4805-0010			CAN048-4805-4861 ⁽¹⁾		
LAB SAMPLE NUMBER	0397940007SA			0397940008SA			0397940009SA			0397940010SA			0397940011SA			0397940012SA			0398000001SA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual															
Metals (mg/kg)																					
Aluminum	4010	21.9		3210	10.7		3940	10.7		15300	11.3		6410	23.3		9080	10.9		4190	11	J
Antimony	<	13.1	UJ	<	6.4	UJ	<	6.4	UJ	<	6.8	UJ	<	14	UJ	<	6.6	UJ	<	6.6	UJ
Arsenic	1.6	0.55		0.85	0.53		0.67	0.53		2.5	0.57		2.1	0.58		2.1	0.55		2	0.55	
Barium	87.5	2.2		37.5	1.1		39.6	1.1		132	1.1		170	2.3		49.5	1.1		43.9	1.1	J
Beryllium	<	0.44	U	<	0.21	U	<	0.21	U	0.71	0.23	J	0.29	0.47	J	0.43	0.22	J	0.38	0.22	
Calcium	193000	43.8		67900	21.3		64000	21.3		21000	22.6		207000	46.6		49600	21.9		52600	22.1	J
Chromium	4.1	2.2		3	1.1		3.5	1.1		13.8	1.1		4.1	2.3		7.8	1.1		4.5	1.1	J
Cobalt	<	2.2	U	0.88	1.1	J	1.6	1.1		5.9	1.1		3	2.3		3.5	1.1		3.1	1.1	
Copper	2.2	4.4	J	1.8	2.1	J	2	2.1	J	10	2.3		3.2	4.7	J	5.4	2.2		4.5	2.2	
Iron	2830	21.9		3120	10.7		3800	10.7		13300	11.3		5230	23.3		8180	10.9		4480	11	J
Lead	1.4	0.55		1.8	0.53		1.7	1.1		11.8	1.1		3.7	0.58		5.9	0.55		5.2	1.1	J
Magnesium	7060	43.8		3260	21.3		5470	21.3		2840	22.6		2990	46.6		3410	21.9		2580	22.1	
Manganese	27.6	2.2		32.3	1.1		58.9	1.1		245	1.1		49.9	2.3		126	1.1		99.8	1.1	
Nickel	8.2	8.8	J	4.1	4.3	J	5	4.3		13.5	4.5		5.6	9.3	J	8.9	4.4		5.2	4.4	
Potassium	836	1100	J	725	533		838	533		2330	565		1040	1160	J	1810	547		1050	552	
Vanadium	9.5	2.2		7.4	1.1		11.6	1.1		22.2	1.1		13.9	2.3		23.4	1.1		20.7	1.1	J
Zinc	7	4.4		6.5	2.1		7.6	2.1		33.1	2.3		12.7	4.7		19.3	2.2		11.3	2.2	J
TRPH (mg/kg)																					
Total Recoverable	<	43.8	U	<	42.7	U	<	42.6	U	61.6	45.2		<	46.6	U	<	43.8	U	<	44.2	U
Petroleum Hydrocarbons																					

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

⁽¹⁾ Duplicate sample for the preceding sample number.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4805-0015			CAN048-4805-0020			CAN048-4805-0025			CAN048-4805-0030			CAN048-4805-0035			CAN048-4805-0040		
LAB SAMPLE NUMBER	0397940013SA			0397940001SA			0397940002SA			0397940003SA			0397940004SA			0397940005SA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual															
Volatile Organics (µg/kg)																		
Acetone	5	11	J	<	11	U	8.9	11	J	4.8	11	J	<	11	U	3.8	11	J
2-Butanone (MEK)	<	11	U															
Chlorobenzene	<	5.6	U	<	5.7	U	<	5.4	U	<	5.4	U	<	5.3	U	<	5.4	U
Ethylbenzene	<	5.6	U	<	5.7	U	<	5.4	U	<	5.4	U	<	5.3	U	<	5.4	U
Methylene chloride	<	5.6	U	<	5.7	U	<	5.4	U	3.9	5.4	J	4.3	5.3	J	<	5.4	U
Toluene	<	5.6	U	<	5.7	U	<	5.4	U	<	5.4	U	<	5.3	U	<	5.4	U
Xylenes (total)	<	5.6	U	<	5.7	U	<	5.4	U	<	5.4	U	<	5.3	U	<	5.4	U
Semivolatile Organics (µg/kg)																		
Acenaphthene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	U	<	350	U
bis(2-Ethylhexyl)phthalate	<	370	U	<	370	U	120	360	J	<	360	U	<	350	U	<	350	U
4-Chloroaniline	<	370	U	<	370	U	<	360	U	<	360	U	<	350	UJ	<	350	U
Di-n-butyl phthalate	<	370	U	<	370	U	<	360	U	<	360	U	<	350	U	<	350	U
Dibenzofuran	<	370	U	<	370	U	<	360	U	<	360	U	<	350	U	<	350	U
1,2-Dichlorobenzene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	UJ	<	350	U
1,3-Dichlorobenzene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	UJ	<	350	U
1,4-Dichlorobenzene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	UJ	<	350	U
Fluoranthene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	U	<	350	U
Fluorene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	U	<	350	U
2-Methylnaphthalene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	UJ	<	350	U
Naphthalene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	UJ	<	350	U
N-Nitrosodiphenylamine	<	370	U	<	370	U	<	360	U	<	360	U	<	350	U	<	350	U
Phenanthrene	<	370	U	<	370	U	<	360	U	<	360	U	<	350	U	<	350	U
Phenol	<	370	U	<	370	U	<	360	U	<	360	U	<	350	UJ	<	350	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4805-0015			CAN048-4805-0020			CAN048-4805-0025			CAN048-4805-0030			CAN048-4805-0035			CAN048-4805-0040		
LAB SAMPLE NUMBER	0397940013SA			0397940001SA			0397940002SA			0397940003SA			0397940004SA			0397940005SA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual															
Metals (mg/kg)																		
Aluminum	8100	11.1		12100	11.4		7480	21.8		6460	10.8		3790	10.6		3120	10.7	
Antimony	<	6.7	UJ	<	6.8	UJ	<	13.1	UJ	<	6.5	UJ	<	6.4	UJ	<	6.4	UJ
Arsenic	1.7	0.56		1.7	1.1		0.79	0.54		0.65	0.54		0.58	0.53		0.64	0.54	
Barium	96.1	1.1		331	1.1		2390	2.2		40.1	1.1		35.3	1.1		41.7	1.1	
Beryllium	0.46	0.22	J	0.53	0.23	J	<	0.44	U	0.18	0.22	J	0.13	0.21	J	<	0.21	U
Calcium	37400	22.3		75100	22.7		128000	43.5		53900	21.6		41900	21.2		49200	21.5	
Chromium	7	1.1		9	1.1		4.6	2.2		5.6	1.1		2.8	1.1		3	1.1	
Cobalt	3	1.1		2.7	1.1		2.2	2.2		1.5	1.1		1.8	1.1		1.4	1.1	
Copper	5	2.2		4.1	2.3		14.5	4.4		1.8	2.2	J	1.6	2.1	J	2.4	2.1	
Iron	7620	11.1		8180	11.4		6130	21.8		4670	10.8		3630	10.6		3160	10.7	
Lead	6.5	1.1		5.8	0.57		2.5	0.54		1.9	0.54		2	0.53		2.1	0.54	
Magnesium	3340	22.3		7730	22.7		13700	43.5		5080	21.6		2820	21.2		3600	21.5	
Manganese	124	1.1		81.1	1.1		79.8	2.2		36.7	1.1		58.5	1.1		44.3	1.1	
Nickel	7.7	4.5		9.6	4.5		7.9	8.7	J	5.1	4.3		4.3	4.2		3.5	4.3	J
Potassium	1880	556		3110	568		1350	1090		1380	539		817	530		593	537	
Vanadium	17.9	1.1		21.2	1.1		15.3	2.2		11.3	1.1		8.2	1.1		8.6	1.1	
Zinc	18.3	2.2		19.5	2.3		21.1	4.4		9.2	2.2		7	2.1		7.2	2.1	
TRPH (mg/kg)																		
Total Recoverable	<	44.5	U	<	45.4	U	<	43.5	U	<	43.1	U	<	42.4	U	<	42.9	U
Petroleum Hydrocarbons																		

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4806-0000			CAN048-4806-4862 ⁽¹⁾			CAN048-4806-0005			CAN048-4806-0010			CAN048-4806-0010			CAN048-4806-0015		
LAB SAMPLE NUMBER	0398000002SA			0398000007SA			0398000003SA			0398000004RA			0398000004SA			0398000005RA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone	<	11	U	<	11	U	29	11					<	5500	U			
2-Butanone (MEK)	<	11	U	<	11	U	<	11	U				<	5500	U			
Chlorobenzene	<	5.3	U	<	5.6	U	3	5.6	J				<	2800	U			
Ethylbenzene	<	5.3	U	<	5.6	U	1.8	5.6	J				890	2800	J			
Methylene chloride	5.2	5.3	J	5.5	5.6	J	6.5	5.6					<	2800	U			
Toluene	1.3	5.3	J	<	5.6	U	2.3	5.6	J				<	2800	U			
Xylenes (total)	<	5.3	U	<	5.6	U	26	5.6					12000	2800				
Semivolatile Organics (µg/kg)																		
Acenaphthene	<	350	U	<	370	U	<	3700	U	<	1500	UJ	<	3600	UJ	<	750	UJ
bis(2-Ethylhexyl)phthalate	<	350	U	<	370	U	<	3700	U	9100	1500		<	7400	UJ	3300	750	
4-Chloroaniline	<	350	U	<	370	U	<	3700	U	<	1500	UJ	7900	3600	J	<	750	UJ
Di-n-butyl phthalate	<	350	U	<	370	U	<	3700	U	<	1500	UJ	410	3600	J	<	750	UJ
Dibenzofuran	<	350	U	<	370	U	<	3700	U	<	1500	UJ	<	3600	UJ	<	750	UJ
1,2-Dichlorobenzene	<	350	U	<	370	U	<	3700	U	7500	1500		4100	3600	J	1100	750	
1,3-Dichlorobenzene	<	350	U	<	370	U	<	3700	U	700	1500	J	450	3600	J	<	750	UJ
1,4-Dichlorobenzene	<	350	U	<	370	U	<	3700	U	1800	1500		950	3600	J	<	750	UJ
Fluoranthene	<	350	U	<	370	U	<	3700	U	1200	1500	J	700	3600	J	500	750	J
Fluorene	<	350	U	<	370	U	<	3700	U	190	1500	J	<	3600	UJ	110	750	J
2-Methylnaphthalene	<	350	U	<	370	U	<	3700	U	12000	1500		<	3600	UJ	5000	750	
Naphthalene	<	350	U	<	370	U	<	3700	U	5200	1500		2900	3600	J	2200	750	
N-Nitrosodiphenylamine	<	350	U	<	370	U	<	3700	U	<	1500	UJ	<	3600	UJ	400	750	J
Phenanthrene	<	350	U	<	370	U	<	3700	U	400	1500	J	<	3600	UJ	110	750	J
Phenol	<	350	U	<	370	U	<	3700	U	<	1500	UJ	<	3600	UJ	<	750	UJ

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value.

U = Nondetected value.

D = Sample was diluted for analysis.

RL = Reporting Limit.

⁽¹⁾ Duplicate sample for the preceeding sample number.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4806-0000			CAN048-4806-4862 ⁽¹⁾			CAN048-4806-0005			CAN048-4806-0010			CAN048-4806-0010			CAN048-4806-0015		
LAB SAMPLE NUMBER	0398000002SA			0398000007SA			0398000003SA			0398000004RA			0398000004SA			0398000005RA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg)																		
Aluminum	5240	10.7	J	5640	11.1	J	9790	11.3	J				4050	55.1	J			
Antimony	<	6.4	UJ	<	6.7	UJ	<	6.8	UJ				<	33	U			
Arsenic	2.8	0.53		2.6	0.56		2.7	0.56					3.4	0.55				
Barium	242	1.1	J	169	1.1	J	206	1.1	J				1640	5.5	J			
Beryllium	0.37	0.21		0.41	0.22		0.44	0.23					<	1.1	U			
Calcium	54100	21.3	J	32000	22.3	J	47600	22.5	J				246000	110	J			
Chromium	5.2	1.1	J	6.2	1.1	J	8.2	1.1	J				<	5.5	UJ			
Cobalt	3	1.1		3.6	1.1		3.4	1.1					4.4	5.5	J			
Copper	6.5	2.1		7.1	2.2		6.9	2.3					<	11	U			
Iron	4900	10.7	J	5810	11.1	J	7930	11.3	J				2800	55.1	J			
Lead	11.2	1.1	J	16.1	1.1		25.7	2.8	J				8.9	1.1	J			
Magnesium	3100	21.3		2320	22.3		2140	22.5					7050	110				
Manganese	132	1.1		152	1.1		138	1.1					40.2	5.5				
Nickel	7	4.3		7.1	4.5		7.1	4.5					6	22	J			
Potassium	1150	533		1270	557		1830	563					926	2750	J			
Vanadium	13.4	1.1	J	14.7	1.1	J	15.9	1.1	J				12.3	5.5	J			
Zinc	17.5	2.1	J	17.7	2.2	J	23.1	2.3	J				9.4	11	J			
TRPH (mg/kg)																		
Total Recoverable	56.2	42.7		81.8	44.5		729	45					17300	1320				
Petroleum Hydrocarbons																		

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value.

U = Nondetected value.

⁽¹⁾ Duplicate sample for the preceding sample number.

D = Sample was diluted for analysis.

RL = Reporting Limit.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4806-0015			CAN048-4806-0020			CAN048-4806-0025			CAN048-4806-0030			CAN048-4806-4863 ⁽¹⁾			CAN048-4806-0035		
LAB SAMPLE NUMBER	0398000005SA			0398000006SA			0398000008SA			0398000009SA			0398000012SA			0398000010SA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone	<	5700	U	<	2900	U	410	110		13	12		<	11	U	9.2	10	J
2-Butanone (MEK)	<	5700	U	1200	2900	J	140	110		<	12	U	<	11	U	<	10	U
Chlorobenzene	<	2800	U	<	1400	U	<	56	U	<	5.8	U	<	5.3	U	<	5.2	U
Ethylbenzene	570	2800	J	420	1400	J	<	56	U	<	5.8	U	<	5.3	U	<	5.2	U
Methylene chloride	<	2800	U	<	1400	U	41	56	J	4.8	5.8	J	1.9	5.3	J	3.3	5.2	J
Toluene	<	2800	U	<	1400	U	<	56	U	<	5.8	U	<	5.3	U	<	5.2	U
Xylenes (total)	5500	2800		3300	1400		69	56		<	5.8	U	<	5.3	U	<	5.2	U
Semivolatile Organics (µg/kg)																		
Acenaphthene	88	750	J	<	1900	U	<	370	U	<	380	U	<	350	U	<	340	U
bis(2-Ethylhexyl)phthalate	<	750	UJ	<	1900	U	<	370	U	<	380	U	<	350	U	<	340	U
4-Chloroaniline	<	750	R	<	1900	U	<	370	U	<	380	U	<	350	U	<	340	U
Di-n-butyl phthalate	<	750	R	<	1900	U	<	370	U	<	380	U	<	350	U	<	340	U
Dibenzofuran	220	750	J	<	1900	U	88	370	J	<	380	U	<	350	U	<	340	U
1,2-Dichlorobenzene	1100	750	J	220	1900	J	<	370	U	<	380	U	<	350	U	<	340	U
1,3-Dichlorobenzene	<	750	R	<	1900	U	<	370	U	<	380	U	<	350	U	<	340	U
1,4-Dichlorobenzene	<	750	R	<	1900	U	<	370	U	<	380	U	<	350	U	<	340	U
Fluoranthene	510	750	J	230	1900	J	150	370	J	<	380	U	<	350	U	<	340	U
Fluorene	130	750	J	<	1900	U	47	370	J	<	380	U	<	350	U	<	340	U
2-Methylnaphthalene	5700	750	J	3600	1900		2300	370		<	380	U	87	350	J	<	340	U
Naphthalene	2100	750	J	1200	1900	J	800	370		<	380	U	<	350	U	<	340	U
N-Nitrosodiphenylamine	<	750	R	<	1900	U	<	370	U	<	380	U	<	350	U	<	340	U
Phenanthrene	98	750	J	<	1900	U	41	370	J	<	380	U	<	350	U	<	340	U
Phenol	<	750		<	1900	U	38	370	J	<	380	U	<	350	U	<	340	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value.

U = Nondetected value.

D = Sample was diluted for analysis.

RL = Reporting Limit.

⁽¹⁾ Duplicate sample for the preceding sample number.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4806-0015			CAN048-4806-0020			CAN048-4806-0025			CAN048-4806-0030			CAN048-4806-4863 ⁽¹⁾			CAN048-4806-0035		
LAB SAMPLE NUMBER	0398000005SA			0398000006SA			0398000008SA			0398000009SA			0398000012SA			0398000010SA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual									
Metals (mg/kg)																		
Aluminum	3630	22.7	J	3860	22.9	J	4590	22.4	J	5850	11.5	J	2030	10.7	J	2860	10.4	J
Antimony	<	13.6	UJ	14	13.7	J	<	13.4	UJ	<	6.9	UJ	<	6.4	UJ	<	6.3	UJ
Arsenic	1.7	0.57		1.4	0.57		1.6	0.56		0.82	0.58		0.94	2.1	J	0.61	2.1	J
Barium	402	2.3	J	205	2.3	J	518	2.2	J	244	1.2	J	63.6	1.1	J	24.3	1	J
Beryllium	<	0.45	U	<	0.46	U	0.23	0.45	J	0.2	0.23	J	0.12	0.21	J	<	0.21	U
Calcium	210000	45.3	J	170000	45.8	J	173000	44.7	J	33600	23.1	J	23000	21.4	J	27700	20.9	J
Chromium	5.8	2.3	J	2.4	2.3	J	6.5	2.2	J	4	1.2	J	1.3	1.1	J	2.5	1	J
Cobalt	1.6	2.3	J	1.2	2.3	J	1.8	2.2	J	1.2	1.2		0.79	1.1	J	0.82	1	J
Copper	1.4	4.5	J	1.4	4.6	J	2.9	4.5	J	1.6	2.3	J	0.9	2.1	J	1.3	2.1	J
Iron	1980	22.7		2320	22.9	J	2890	22.4	J	4360	11.5	J	1560	10.7	J	2890	10.4	J
Lead	1.8	0.57	J	1.9	0.57	J	2.1	0.56	J	2.1	0.58	J	2.1	0.53	J	1.6	0.52	J
Magnesium	16200	45.3		15500	45.8		17700	44.7		3330	23.1		2100	21.4		1930	20.9	
Manganese	20.8	2.3		26.8	2.3		28.9	2.2		34.6	1.2		24.5	1.1		32.1	1	
Nickel	8.5	9.1	J	4.4	9.2	J	6.2	8.9	J	3.6	4.6	J	1.7	4.3	J	1.9	4.2	J
Potassium	478	1130	J	483	1140	J	735	1120	J	1310	577		613	534		662	522	
Vanadium	18.9	2.3	J	20	2.3	J	19.8	2.2	J	9.8	1.2	J	5.5	1.1	J	6.8	1	J
Zinc	6.1	4.5	J	5.5	4.6	J	7.1	4.5	J	9	2.3	J	3.7	2.1	J	5.8	2.1	J
TRPH (mg/kg)																		
Total Recoverable	3890	907		2080	137		1350	492		199	46.2		172	42.7		<	41.8	U
Petroleum Hydrocarbons																		

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value.

U = Nondetected value.

⁽¹⁾ Duplicate sample for the preceding sample number.

D = Sample was diluted for analysis.

RL = Reporting Limit.

TABLE 9-3

SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB

LOCATOR	CAN048-4806-0040		
LAB SAMPLE NUMBER	0398000011SA		
COLLECT DATE	12/12/94		
	Result	RL	Qual
Volatile Organics (µg/kg)			
Acetone	3.5	11	J
2-Butanone (MEK)	<	11	U
Chlorobenzene	<	5.3	U
Ethylbenzene	<	5.3	U
Methylene chloride	2.1	5.3	J
Toluene	<	5.3	U
Xylenes (total)	<	5.3	U
Semivolatile Organics (µg/kg)			
Acenaphthene	<	350	U
bis(2-Ethylhexyl)phthalate	<	350	U
4-Chloroaniline	<	350	U
Di-n-butyl phthalate	<	350	U
Dibenzofuran	<	350	U
1,2-Dichlorobenzene	<	350	U
1,3-Dichlorobenzene	<	350	U
1,4-Dichlorobenzene	<	350	U
Fluoranthene	<	350	U
Fluorene	<	350	U
2-Methylnaphthalene	<	350	U
Naphthalene	<	350	U
N-Nitrosodiphenylamine	<	350	U
Phenanthrene	<	350	U
Phenol	<	350	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value.

U = Nondetected value.

D = Sample was diluted for analysis.

RL = Reporting Limit.

⁽¹⁾ Duplicate sample for the preceding sample number.

TABLE 9-3

**SUMMARY OF COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED AT SWMU 48A
CANNON AFB**

LOCATOR	CAN048-4806-0040		
LAB SAMPLE NUMBER	0398000011SA		
COLLECT DATE	12/12/94		
	Result	RL	Qual
Metals (mg/kg)			
Aluminum	2970	10.5	J
Antimony	<	6.3	UJ
Arsenic	0.57	0.53	
Barium	23.1	1.1	J
Beryllium	<	0.21	U
Calcium	33300	21.1	J
Chromium	2.3	1.1	J
Cobalt	0.86	1.1	J
Copper	0.94	2.1	J
Iron	2810	10.5	J
Lead	1.5	0.53	J
Magnesium	2640	21.1	
Manganese	29.9	1.1	
Nickel	2.2	4.2	J
Potassium	625	527	
Vanadium	7	1.1	J
Zinc	5.6	2.1	J
TRPH (mg/kg)			
Total Recoverable	<	42.2	U
Petroleum Hydrocarbons			

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value.

U = Nondetected value.

⁽¹⁾ Duplicate sample for the preceding sample number.

D = Sample was diluted for analysis.

RL = Reporting Limit.

TABLE 9-4

COMPARISON OF MAXIMUM DETECTED METAL CONCENTRATIONS IN SOIL TO BACKGROUND⁽¹⁾
SWMU 48A CANNON AFB

Underground Storage Tank

Sample ID	Metal	Maximum Detected Concentration	Range of Background Concentrations (2)	Upper Tolerance Limit (UTL) Background Concentration(3)	Reported Level in Clovis, NM Region (4)	Does Maximum Detected Exceed Background
CAN048-4805-0000	Aluminum	15,300	1,410 - 11,000	10,540	50,000	NO**
CAN048-4806-0020	Antimony	14	<4.9 - <13	*	<1	YES
CAN048-4806-0010	Arsenic	3.4	0.67 - 28	15.5	6.5	NO
CAN048-4805-0025	Barium	2390	14.5 - 1200	642	500	YES
CAN048-4805-0000	Beryllium	0.71	0.17 - 0.77	0.73	1-2	NO
CAN048-4805-0000	Chromium	13.8	4 - 15.4	12.5	30	NO**
CAN048-4805-0000	Cobalt	5.9	0.85 - 5.3	4.5	3-7	YES
CAN048-4805-0025	Copper	14.5	<2 - 18.4	*	20	NO**
CAN048-4806-0005	Lead	25.7	1.1 - 46	25.8	15	NO
CAN048-4805-0000	Manganese	245	22.4 - 216	164	500	YES
CAN048-4805-0000	Nickel	13.5	1.3 - 9.8	9	15	YES
CAN048-4805-0010	Vanadium	23.4	5.2 - 28.3	25.3	30-70	NO
CAN048-4805-0000	Zinc	33.1	<4.3 - 27.5	21.9	45	YES

⁽¹⁾ All units in mg/kg.

⁽²⁾ Compiled from data collected by Woodward-Clyde for the RFI and RI (W-C 1992 and WC-1994) and Walk, Haydel and Associates for the IRP (Walk, Haydel and Associates 1990). Summarized in "Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater at Cannon AFB, NM (W-C 1993).

⁽³⁾ Upper Tolerance Limit (UTL) = mean + 2 * k standard deviation. See Appendix D. This is for all practical purposes the same as the 90% upper confidence limit of the 95th percentile where UTL = mean + standard deviation*, where k=2.02 for n=37.

⁽⁴⁾ USGS 1984.

* Data insufficient to calculate UTL of background concentration.

** Maximum concentration within or only slightly above Base-wide background range and within naturally occurring levels (USGS 1984); therefore, concentration is not considered to exceed background.

TABLE 9-5

**COMPARISON OF MAXIMUM SOIL CONCENTRATIONS
AT SWMU 48A TO RBCs FOR RESIDENTIAL SOIL
UNDERGROUND STORAGE TANK**

Chemical	Maximum Detected Concentration (mg/kg)	Residential Soil Risk-Based Concentration ⁽¹⁾ (mg/kg)	Exceeds RBC?
2-Butanone (MEK)	1.2	47,000	NO
Acetone	0.41	7,800	NO
Chlorobenzene	0.003	1,600	NO
Ethylbenzene	0.89	7,800	NO
Methylene Chloride	0.041	85	NO
Toluene	0.0057	16,000	NO
Xylenes (total)	12	160,000	NO
1,2-Dichlorobenzene	7.5	7,000	NO
1,3-Dichlorobenzene	0.7	7,000	NO
1,4-Dichlorobenzene	1.8	27	NO
2-Methylnaphthalene	12	NA(a)	--
4-Chloroaniline	7.9	310	NO
Acenaphthene	0.088	4,700	NO
Bis(2-ethylhexyl)phthalate	9.1	46	NO
Di-n-butylphthalate	0.41	7,800	NO
Dibenzofuran	0.22	310	NO
Fluoranthene	1.2	3,100	NO
Fluorene	0.19	3,100	NO
N-Nitrosodiphenylamine	0.4	130	NO
Naphthalene	5.2	3,100	NO
Phenanthrene	0.4	NA(a)	--
Phenol	0.038	47,000	NO
TRPH	17,300	NA(a)	--
Antimony	14	31	NO
Barium	2,390	5,500	NO
Cobalt	5.9	4,700	NO
Manganese	245	390	NO
Nickel	13.5	1,600	NO
Zinc	33.1	23,000	NO

(1) EPA Region III Risk-Based Concentrations for Residential Soil (EPA 1994).

(a) Not Applicable: EPA has not established a toxicity factor for these chemicals, so RBCs could not be calculated.