DEPARTMENT OF THE AIR FORCE

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

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01/19/95

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MAY 2002

Mr. William Hurlbut
US EPA Region VI
1445 Ross Avenue Suite 1200
Dallas TX 75202-2733

Dear Mr. Hurlbut

SWMUs PHASE III

A copy of the "Final RCRA Facility Investigation (RFI) Activities, Phase II to Appendix I SWMUs--Supplemental Report" is attached for your use. This report supplements the previously approved Appendix I Phase II RFI Report.

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

CHRISTOPHER S. LONG, Colonel, USAF
Commander, 27th Support Group

Attachment:
RFI Supplemental Report

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

FINAL
(Revised)

LIBRARY COPY

RCRA FACILITY INVESTIGATION ACTIVITIES PHASE II TO APPENDIX I SOLID WASTE MANAGEMENT UNITS SUPPLEMENTAL RFI REPORT

NB: SHOULD BE PHASE III

SWMU Nos.			
34	82	95	106
74	85	96	107
75	86	98	109
76	87	101	110
78	88	102	111
81	89	104	112
	90	105	113

27 SWMUs

PROJECTS CZQZ 93 7017/CZQZ 93 7002
CANNON AIR FORCE BASE,
NEW MEXICO

Commander 27 FW
Cannon Air Force Base
100 South D.L. Ingram Blvd.
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January 1995

NM7572124454

FINAL
(Revised)

RCRA FACILITY INVESTIGATION ACTIVITIES
PHASE II TO APPENDIX I
(SOLID WASTE MANAGEMENT UNITS)

SHOULD BE PHASE III

SUPPLEMENTAL RFI REPORT

PROJECTS CZQZ 93 701/CZQZ 93 7002
CANNON AIR FORCE BASE, NEW MEXICO

JANUARY 1995

Prepared For

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C3M11L (1005)

CANNON AIR FORCE BASE, CLOVIS, NEW MEXICO
APPENDIX I SOLID WASTE MANAGEMENT UNITS

SWMU No. 34	AGE Drainage Ditch (IRP No. SD-11)
SWMU No. 74	Landfill No. 1 (IRP No. LF-1)
SWMU No. 75	Sanitary Sewage Lift Station Overflow Pit
SWMU No. 76	Sludge Weathering Pit (IRP No. WP-14)
SWMU No. 78	Fire Training Area No. 1 (IRP No. FT-6)
SWMU No. 81	Solvent Disposal Area (IRP No. DP-16)
SWMU No. 82	Landfill No. 2 (IRP No. LF-2)
SWMU No. 85	Stormwater Collection Point
SWMU No. 86	Engine Test Cell (IRP No. SD-11)
SWMU No. 87	Former Overflow Pit
SWMU No. 88	Former Leaching Field
SWMU No. 89	Evaporation Pond
SWMU No. 90	Oil/Water Separator No. 5114
SWMU No. 95	NE Stormwater Drainage Area (IRP No. SD-20)
SWMU No. 96	Old Entomology Rinse Area (IRP No. SD-17)
SWMU No. 98	Sanitary Sewer Line
SWMU No. 101	Wastewater Treatment System Lagoons
SWMU No. 102	Wastewater Treatment Effluent Discharge
SWMU No. 104	Landfill No. 4 (IRP No. LF-4)
SWMU No. 105	Landfill No. 3 (IRP No. LF-3)
SWMU No. 106	Fire Training Area No. 2 (IRP No. FT-7)
SWMU No. 107	Fire Training Area No. 3 (IRP No. FT-8)
SWMU No. 109	Fire Training Area No. 4
SWMU No. 110	Underground Waste Oil Tank No. 2336
SWMU No. 112	Oil/Water Separator No. 2336
SWMU No. 111	Unlined Pit
SWMU No. 113	Landfill No. 5 (IRP No. LF-5)

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19 SWMU BOUNDARY SURVEY PLAT

1.0
INTRODUCTION

1.1 PURPOSE AND SCOPE OF REPORT

The purpose of this Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Supplemental Report is to present the status of investigations of Solid Waste Management Units (SWMUs) located at Cannon Air Force Base (Cannon AFB), Clovis, New Mexico. This supplemental report updates activities for the Appendix I SWMUs listed in Cannon AFB's RCRA Part B Permit. Table 1-1 lists the SWMUs discussed in this report and their status. Additionally, this supplemental report presents the results of the additional field activities and subsequent laboratory analyses that further characterize the nature and extent of contamination (if any) at the Old Entomology Rinse Area (SWMU No. 96/Installation Restoration Program [IRP] No. SD-17).

In a meeting with Cannon AFB, U.S. Army Corps of Engineers (USACE), New Mexico Environmental Department (NMED), and U.S. Environmental Protection Agency (EPA), held on 17 September 1992 in Dallas, Texas to discuss results of the 18 SWMU Remedial Investigation (RI), EPA Region VI requested additional investigation prior to completion of the RI for the Appendix I SWMUs. The requested supplemental work was described in a letter dated 29 November 1992 from EPA Region VI to Cannon AFB. The USACE subsequently prepared and submitted a Phase II RCRA Facility Investigation Work Plan for Appendix I 18 Solid Waste Management Units at Cannon AFB (USACE 1993). The USACE Phase II RFI Work Plan outlined six investigative activities for the Appendix I SWMUs at Cannon AFB in response to the EPA Region VI 29 November 1992 request. EPA's request included the following:

- Provide Survey Plats and Notification Monuments for the Appendix I SWMUs, with the exception of SWMU No. 113 (Landfill No. 5 - IRP No. LF-5) and SWMU No. 109 (Fire Training Area No. 4 - IRP No. FT-9).

- Remove the oil/water separator and contaminated soil at SWMU Nos. 86-90 (Engine Test Cell - IRP No. SD-11).

- Determine if discharge monitoring is required at SWMU No. 95 (Northeast Stormwater Drainage-IRP No. SD-20) under a Base-wide National Pollution Discharge Elimination System (NPDES) Permit.

- Investigate (one soil boring and soil sampling for chemical analyses) the sink rinse pit location at SWMU No. 96 (Old Entomology Rinse Area-IRP No. SD-17). OERA

- Monitor groundwater annually at SWMU Nos. 101 and 102 (Wastewater Lagoons - IRP No. WP-21).

- Evaluate the lateral and vertical extent of contamination at SWMU No. 109 (Fire Training Area No. 4 - IRP No. FT-9).

PHASE II RFI WP TO APP I - 18 SWMUs

EPA Region VI approved the USACE Work Plan in a letter dated 17 August 1993. Woodward-Clyde (W-C) was contracted by USACE - Omaha District under the W-C/USACE A-E Indefinite Delivery Contract, Delivery Order No. 0013 to do the Phase II - RFI work for the Appendix I SWMUs Survey Plats and Notification Monuments (SWMU Boundary Survey) and the additional investigation at the Old Entomology Rinse Area (OERA). A copy of the USACE Scope of Services for Delivery Order No. 0013 is presented in Appendix A. In addition, Cannon AFB and the USACE requested that W-C prepare an update on the Phase II RFI activities for all Appendix I SWMUs in response to the EPA Region VI comment letter dated 23 August 1994. (NOD)

Woodward-Clyde addended existing RI work plans (W-C 1991a) prepared for the 18 SWMUs investigated at Cannon AFB in 1991 for the additional investigation at the OERA. Work Plan Addenda No. 2 for the OERA included the Quality Assurance Project Plan (QAPP), Field Sampling Plan (FSP), and Site Safety and Health Plan (SSHP) Addenda (W-C 1993).

Q: WHAT ABOUT 07/28/94 PHASE II REPORT ?

1.2 REPORT ORGANIZATION

The following topics are presented in Section 1.0:

- Purpose and Scope of Report
- Report Organization
- Installation Background Information
- Appendix I SWMUs Phase II RFI Status

Section 2.0 presents the results of the supplemental investigation at the OERA completed in November 1993. Included in this section are a description of the SWMU, information on the specific field investigation activities at this particular SWMU, a description of the physical characteristics of the SWMU, a discussion of the Quality Assurance/Quality Control (QA/QC) procedures for data collection and chemical analysis of the samples, and a discussion of the nature and extent of contamination, if any, based on the results of the supplemental investigation. Conclusions and recommendations based on the results of the supplemental field investigation for the OERA at Cannon AFB are also included in this section.

SWMU 96

Appendix B contains the lithologic log for the soil boring at the OERA. Appendix C presents the chemical analysis data validation report and Appendix D contains the analytical database results printout for samples collected and analyzed at the OERA. A copy of the Technical Memorandum describing the SWMU Boundary Survey activities is contained in Appendix E. A copy of the SWMU boundary survey plats is attached following the Appendixes.

Section 3.0 provides a discussion of planned future activities for remaining Phase II activities for the Appendix I SWMUs. References for additional documents used in preparing this RFI supplemental report are contained in Section 4.0.

1.3 INSTALLATION BACKGROUND INFORMATION

Cannon AFB is located in Curry County, New Mexico, approximately seven miles west of the City of Clovis. The base is situated on approximately 4,320 acres south of the intersection of U.S Highway 84/60 and New Mexico Highway 277. The vicinity map of Cannon AFB is shown in Figure 1-1, and a SWMU location map for Cannon AFB, including

SWMU No. 96 (OERA) is shown in Figure 1-2. Base facilities include the airfield area with operation, maintenance, and support facilities located primarily northwest of the airfield area. Base housing is located in the northwest quarter of the base and north of the base, west of New Mexico Highway 277. Additional ancillary base support facilities such as the wastewater lagoons, fire department training area, and munitions storage are located south and east of the airfield.

The Melrose Bombing Range is an off-base facility located approximately 25 miles west of Cannon AFB and occupies an area of about 77,190 acres (USAF 1990). For a more detailed description of Cannon AFB, see Section 1.5 of the RI Report for 18 SWMUs at Cannon AFB (W-C 1992).

1.4 APPENDIX I SWMUs PHASE II RFI STATUS

This section presents an update on the Phase II RFI activities for Cannon AFB's RCRA Part B Permit Appendix I SWMUs. Table 1-1 contains a summary of each SWMU's investigation history and current status. Detailed documentation on the Phase II activities and investigation results at each SWMU, if not contained within this report, will be provided in documents prepared specifically for that SWMU(s).

1.4.1 Administrative Controls (19 SWMU Boundary Survey)

Sites were surveyed and boundary monuments set for the 19 Appendix I SWMUs listed below. Permanent boundary corners and/or traverse points consist of Type G permanent monuments at each SWMU boundary. Each boundary monument was surveyed and the elevation, and northing and easting coordinates established and referenced to the Base Comprehensive Plan and state plane coordinates.

Boundary survey plats showing the boundary monument locations and SWMU boundary have been prepared and one copy will be filed with; the Curry County zoning authority or the authority with jurisdiction over local land use, USEPA Region VI, and Cannon AFB. This information will be used by Cannon AFB to complete a Class III permit modification for their RCRA Part B Permit. A copy of the Technical Memorandum describing the 19 SWMU

Boundary Survey activities is contained in Appendix E. The SWMUs which were surveyed include:

SWMU No.	SWMU Description
• No. 34	AGE Drainage Ditch (IRP No. SD-15)
• No. 76	Sludge Weathering Pit (IRP No. WP-14)
• No. 78	Fire Training Area No. 1 (IRP No. FT-6)
• No. 81	Solvent Disposal Area (IRP No. DP-16)
• No. 82	Landfill No. 2 (IRP No. LF-2)
• Nos 86-90	Engine Test Cell (IRP No. SD-11)
• No. 95	Northeast Stormwater Drainage (IRP No. SD-20)
• No. 96	Old Entomology Rinse Area (IRP No. SD-17)
• No. 98	Sanitary Sewer Line
• No. 101	Wastewater Treatment Lagoons (IRP No. WP-21)
• No. 102	Wastewater Treatment Effluent (IRP No. WP-21)
• No. 104	Landfill No. 4 (IRP No. LF-4)
• No. 105	Landfill No. 3 (IRP No. LF-3)
• No. 106	Fire Training Area No. 2 (IRP No. FT-7)
• No. 107	Fire Training Area No. 3 (IRP No. FT-8)

1.4.2 Appendix I SWMUs Activity Update

The following subsections present an activity update for each of the Appendix I SWMUs listed in Cannon AFB's RCRA Part B Permit.

1.4.2.1 SWMU No. 34 (AGE Drainage Ditch)

The AGE Drainage Ditch is a 1,200-foot-long, 12-foot-wide shallow ditch (approximately 1 foot deep at its deepest point). This SWMU originates on the flightline side of AGE Building 186 and runs parallel to Facilities Buildings Nos. 191, 192, and 193, terminating on base at a culvert inlet near Agentina Avenue. A 1991 RI (W-C 1992) included surface and subsurface soil sampling for chemical analyses, and performance of a Baseline Human Health and Environmental Risk Assessment. The 1991 RI report recommended no further action or

investigation was required at this time. To complete the RFI/CMS process for this SWMU, Cannon AFB will need to apply for a Class III RCRA Part B Permit modification under 40 CFR 270.42(c).

1.4.2.2 SWMU No. 74 (Landfill No. 1)

This SWMU is an inactive landfill located in the north-central portion of Cannon AFB, south of the northern perimeter road. Landfill No. 1 is currently located beneath part of the base golf course. A 1992 RFI (W-C 1993) at the previously reported location for Landfill No. 1, northeast of the base hospital, encountered no evidence of landfill material. As a result of the 1992 RFI and with EPA Region VI concurrence, no additional investigation was done at this location for Landfill No. 1.

In 1993, Cannon AFB encountered suspected landfill material during golf course expansion activities. An approximately 10-acre area, located within the western extent of the golf course and south of the northern perimeter road, has been identified for further investigation in Fiscal Year 1995 as Landfill No. 1.

1.4.2.3 SWMU No. 75 (Sanitary Sewage Lift Station Overflow Pit)

This SWMU is an unlined surface impoundment located on the golf course, north of the hospital and residential area. The overflow pit is located adjacent to the Sanitary Sewage Lift Station and provides containment for overflow when the lift station pumps do not operate. Reportedly, the overflow pit is located on a section of the base sanitary sewer system that handles only domestic sewage. Sewage from domestic areas is generally not considered hazardous. The overflow pit was characterized during the IRP Phase II investigation (Radian 1986), resulting in identification of this SWMU as one of the sites requiring no further action. This area was reportedly incorrectly defined as a SWMU under USEPA's definition of a SWMU for the purpose of corrective action, and therefore was not identified as requiring further study or action (Lee Wan & Associates 1990).

1.4.2.4 SWMU No. 76 (Sludge Weathering Pit)

The Sludge Weathering Pit is located near Building 396 on the north part of the base and was used for weathering sludge from leaded gas tanks in the 1960s and 1970s. In 1980, the pit was filled with soil and left to revegetate. A 1991 RI (W-C 1992) included surface and subsurface soil sampling for chemical analyses and performance of a Baseline Human Health and Environmental Risk Assessment. The 1991 RI report recommended no further action or investigation was required at this time. To complete the RFI/CMS process for this SWMU, Cannon AFB will need to apply for a Class III RCRA Part B Permit modification under 40 CFR 270.42(c).

1.4.2.5 SWMU No. 78 (Fire Department Training Area No. 1)

Fire Department Training Area No. 1 is located in an open field in the northeast corner of the base, south of the railroad tracks and northeast of Perimeter Road. This SWMU was used to conduct fire department training exercises from 1959 to 1968. A 1991 RI (W-C 1992) included surface and subsurface soil sampling for chemical analyses and performance of a Baseline Human Health and Environmental Risk Assessment. The 1991 RI report recommended no further action or investigation was required at this time. To complete the RFI/CMS process for this SWMU, Cannon AFB will need to apply for a Class III RCRA Part B Permit modification under 40 CFR 270.42(c).

1.4.2.6 SWMU No. 81 (Solvent Disposal Site)

The Solvent Disposal Site is located on the northeast part of the base between Landfill No. 2 and Fire Department Training Area No. 1. The site is located in an open field covered with prairie grass. A 1991 RI (W-C 1992) included surface and subsurface soil sampling for chemical analyses and performance of a Baseline Human Health and Environmental Risk Assessment. The 1991 RI report recommended no further action or investigation was required at this time. To complete the RFI/CMS process for this SWMU, Cannon AFB will need to apply for a Class III RCRA Part B Permit modification under 40 CFR 270.42(c).

1.4.2.7 SWMU No. 82 (Landfill No. 2)

Landfill No. 2 is an unlined, inactive, cut-and-fill landfill occupying approximately 15 acres in the northeast corner of the base. It is located in an open field just beyond the end of the primary southwest-northeast runway, northeast of Perimeter Road. The landfill received wastes from 1946 to 1947 and from 1952 to 1959. Reportedly, the mode of operation at this SWMU was for wastes to be deposited in trenches, burned, and buried. A 1992 RFI (W-C 1993) included an aerial photograph review, geophysical survey, trenching one pit, surface and subsurface soil sampling for chemical analyses, and performance of a Baseline Human Health and Environmental Risk Assessment. The 1992 RFI report recommended no further action or investigation was required at this time. To complete the RFI/CMS process for this SWMU, Cannon AFB will need to apply for a Class III RCRA Part B Permit modification under 40 CFR 270.42(c).

1.4.2.8 SWMU No. 85 (Stormwater Collection Point)

This SWMU is a naturally-occurring playa lake located in the southwestern portion of the base that has received stormwater runoff from the flightline area and POL materials from small spills which could accumulate in the lake. The Stormwater Collection Point was characterized during the IRP Phase II (Radian 1986) and remedial investigations (Walk, Haydel & Associates, Inc. 1990). The RI resulted in the finding that no adverse impact to public health or the environment was expected and that no further study or action was required. EPA by accepting the RI report (Walk, Haydel & Associates 1990) and the RFI Work Plan prepared by Lee Wan & Associates (1990) agreed with this recommendation.

1.4.2.9 SWMU Nos. 86-90 Oil/Water Separator Removal (Engine Test Cell)

The five SWMUs (Nos. 86, 87, 88, 89, and 90) at the Engine Test Cell location are commonly referred to as IRP No. SD-11. The oil/water separators and an underground storage tank (UST) were removed during July and August 1994. During the removal action, contaminated soil was encountered which was not expected based on the soil boring information collected during the 18 SWMU RI in 1991. Since contaminated soil was encountered, the removal action ceased, and plans are being made to complete additional RFI

investigation(s) to evaluate the nature and extent of contaminated subsurface soil at these SWMUs. The additional investigation(s) are planned for Fiscal Year 1995.

1.4.2.10 Discharge Monitoring at Northeast Stormwater Drainage (SWMU No. 95)

This SWMU consists of a 42-inch corrugated metal pipe (CMP) that discharges to an open ditch near northeast Runway 4/22, and extends under a road to an open field. The drainage receives water from several oil/water separators and runoff and stormwater drains in the east-central portion of the base. The Northeast Stormwater Drainage Area is included as part of the Base-wide Stormwater and National Pollution Discharge Elimination System (NPDES) Permit. This permit requires Cannon AFB to determine if sampling is required in accordance with the EPA guidance document entitled "Stormwater Management for Industrial Activities" (EPA 832/R-92/006).

1.4.2.11 Additional RFI at SWMU No. 96 (Old Entomology Rinse Area)

A Phase II RFI at the location of the sink rinse pit within the OERA was designed to further characterize the nature and extent of contamination (if any) at this SWMU. The Phase II RFI consisted of drilling and collection of soil samples for chemical analyses from one 100-foot-deep soil boring located at the approximate location of the former OERA rinse sink pit. A description of the investigation and analytical results are presented in Section 2.0 of this supplemental report.

1.4.2.12 SWMU No. 98 (Sanitary Sewer Line)

This SWMU consists of a northeast-flowing trunk line laid along Torch Boulevard in the aircraft maintenance area, with a small south-flowing branch along Torch Boulevard near the main base entrance. A secondary southeast-flowing sewer line enters the main trunk line along Torch Boulevard at Argentina Avenue, then enters a transmission line flowing east across the runways to the sewage treatment lagoons. Only the main and south branch trunk lines, and the east-flowing transmission lines, could have received hazardous wastes. Secondary branch lines flowing northeast to join the main trunk line receive only domestic sewage. The sewer lines are constructed of 8-inch-diameter polyvinyl chloride (PVC) pipe in the housing area and 15-inch-diameter clay tile in the main base area. A 1991 RI

(W-C 1992) included sewer line cleaning and video camera inspection/surveying, subsurface soil sampling for chemical analyses, and performance of a Baseline Human Health and Environmental Risk Assessment. The 1991 RI report recommended no further action or investigation was required at this time. To complete the RFI/CMS process for this SWMU, Cannon AFB will need to apply for a Class III RCRA Part B Permit modification under 40 CFR 270.42(c).

1.4.2.13 Annual Groundwater Monitoring at SWMU Nos. 101 and 102 (Wastewater Treatment Lagoons)

Groundwater samples are collected and submitted for laboratory analysis on an annual basis from four groundwater monitoring wells (101-E, 101-F, 101-G, and 101-H) at this SWMU. Cannon AFB submits analytical results to EPA Region VI within 90 calendar days following the sampling. The samples are analyzed for volatile organic compounds (VOCs), pesticides/polychlorinated biphenyls (PCB's), metals, nitrates, sulfates, and total dissolved solids (TDS). The analytical methods are specified in the USACE Work Plan.

1.4.2.14 SWMU No. 104 (Landfill No. 4)

This SWMU is an inactive landfill located in the east-central portion of the base, north of the Playa Lake (SWMU No. 103). After the Phase I RFI at Landfill No. 4 in 1992, EPA Region VI requested a Phase II RFI be designed to ascertain if a corrective measures program is required. The Phase II RFI for Landfill No. 4, consisting of the installation, sampling, and analysis at one downgradient groundwater monitoring well, is in progress. Results of the investigation will be submitted to EPA Region VI in mid-1995.

1.4.2.15 SWMU No. 105 (Landfill No. 3)

This SWMU is an inactive landfill located in the east-central portion of the base, south of the Playa Lake (SWMU No. 103). After the Phase I RFI in 1992, EPA Region VI requested a Phase II RFI be designed to ascertain if a corrective measures program is required. The Phase II RFI for Landfill No. 3, consisting of the installation, sampling and analysis at one downgradient groundwater monitoring well, is currently in progress. Results of the investigation will be submitted to EPA Region VI in mid-1995.

1.4.2.16 SWMU No. 106 (Fire Department Training No. 2)

Fire Department Training Area No. 2 is located in an open, grass-covered field in the southeast corner of the base, bounded on the north by an east-west paved road and west of an old abandoned north-south runway. This SWMU was used from 1968 to 1974 to provide fire extinguishing experience for base personnel. A 1991 RI (W-C 1992) included surface and subsurface soil sampling for chemical analyses and performance of a Baseline Human Health and Environmental Risk Assessment. The 1991 RI report recommended no further action or investigation was required at this time. To complete the RFI/CMS process for this SWMU, Cannon AFB will need to apply for a Class III RCRA Part B Permit modification under 40 CFR 270.42(c).

1.4.2.17 SWMU No. 107 (Fire Department Training Area No. 3)

Fire Department Training Area No. 3 was an unlined surface area, partially covered with gravel, located in the southern part of the base. It is immediately adjacent to an abandoned north-south runway. This SWMU was used for fire department training activities from 1968 to 1974. Recently, it has been used for activities associated with an adjacent explosive ordnance training site. A 1991 RI (W-C 1992) included surface and subsurface soil sampling for chemical analyses and performance of a Baseline Human Health and Environmental Risk Assessment. The 1991 RI report recommended no further action or investigation was required at this time. To complete the RFI/CMS process for this SWMU, Cannon AFB will need to apply for a Class III RCRA Part B Permit modification under 40 CFR 270.42(c).

1.4.2.18 Additional RFI at SWMU Nos. 109, 110, 111, and 112 (Fire Training Area No. 4)

The full nature and extent of contamination at Fire Training Area No. 4 (SWMU No. 109) was not evaluated by the 1991 RI since this SWMU is an active facility. Additional investigation has been planned, but will not be scheduled until a new Fire Training Area has been constructed and is operational. At that time, Fire Training Area No. 4 will be deactivated. The Phase II RFI planned for Fire Training Area No. 4 includes investigation of SWMU Nos. 110 (underground waste oil tank no. 2336), 111 (unlined pit), and 112 (oil/water separator no. 2336), that are co-located with SWMU No. 109. The unlined pit

(SWMU No. 111) was replaced by oil/water separator no. 2336 in 1985. Previous investigations of the unlined pit area have resulted in no further action recommendations (Radian 1986; A.T. Kearney 1987; Walk, Haydel & Associates 1990). However, since SWMU No. 111 is co-located within the boundaries of Fire Training Area No. 4, it will be included in the Phase II RFI for Fire Training Area No. 4. The Phase II RFI is planned to include the following intrusive activities to evaluate the potential lateral and vertical extent of petroleum hydrocarbon contamination in underlying soils:

• Mock airplane area	Four soil borings to 100-feet below ground surface
• "Tree" area	Two soil borings to 75-feet below ground surface
• Vehicle burn area	Two soil borings to 75-feet below ground surface
• Outer perimeter area	Three soil borings to 100-feet below ground surface

The outer perimeter area soil borings are intended to evaluate the spread of petroleum hydrocarbon contamination from past activities at Fire Training Area No. 4.

1.4.2.19 SWMU No. 113 (Landfill No. 5)

This SWMU is an inactive landfill located in the southeastern area of the base and occupies about 70 acres. Cell No. 3, which is closed, is RCRA-regulated because this cell received hazardous waste until mid-1981. No additional hazardous wastes were placed in this cell from 1981 until its closure in 1983. Landfill closure consisted of placing an impermeable cap over Cell No. 3, in accordance with NMED and EPA requirements. During the 18 SWMU RI (W-C 1992) groundwater samples were collected and analyzed for Appendix IX constituents (40 CFR 264) from five previously-installed groundwater monitoring wells at Landfill No. 5. Evaluation of the chemical data collected during this investigation indicated that the quality of groundwater has not been affected by past activities at Landfill No. 5. Additional groundwater monitoring wells were also installed in 1992 by USACE to meet RCRA release detection monitoring requirements.

Landfill No. 5 is currently being investigated using a phased RFI approach, under NMED lead. The Phase I RFI Work Plans are currently being finalized, and the Phase I investigation

and report are scheduled to be complete in early 1997. A Draft Post-Closure Plan (ES 1994) for Cell 3 requires installation of a new upgradient well and water quality sampling for one year to determine baseline water quality beneath Landfill No. 5. However, groundwater monitoring plans for the landfill will be finalized after completion of the RFI and the first year of post-closure groundwater sampling and analysis.

TABLE 1-1

CANNON AIR FORCE BASE, CLOVIS, NEW MEXICO
APPENDIX I SOLID WASTE MANAGEMENT UNITS

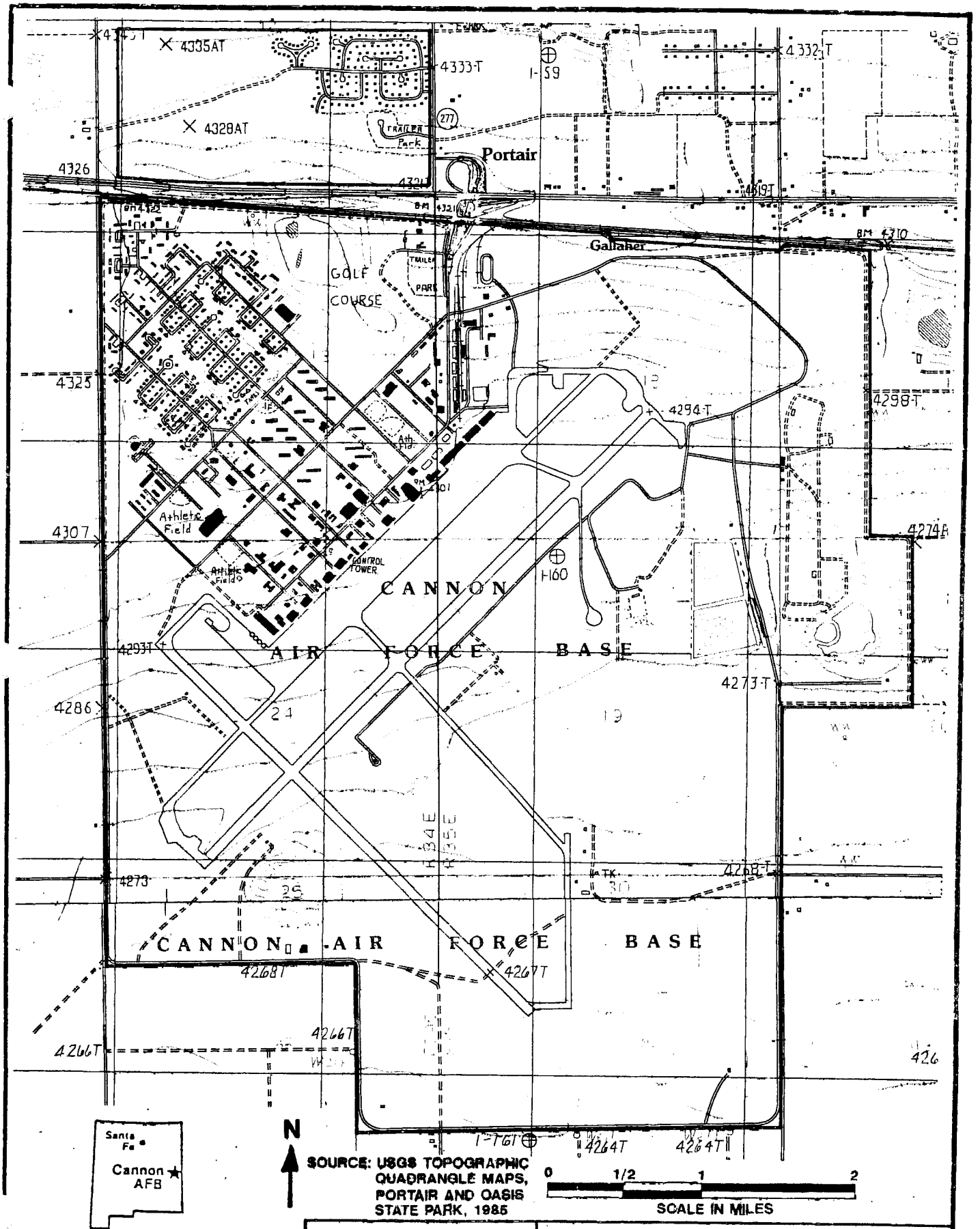
SWMU NO.	SWMU DESCRIPTION	STATUS		
		PHASE I	PHASE II	PHASE III
34	AGE Drainage Ditch (IRP No. SD-11)	YES	YES	NFA
74	Landfill No. 1 (IRP No. LF-1)[1]	YES	F.Y. 95	TBD
75	Sanitary Sewage Lift Station Overflow Pit (IRP No. SD-13)	NFA	NFA	NFA
76	Sludge Weathering Pit (IRP No. WP-14)	YES	YES	NFA
78	Fire Training Area No. 1 (IRP No. FT-6)	YES	YES	NFA
81	Solvent Disposal Area (IRP No. DP-16)	YES	YES	NFA
82	Landfill No. 2 (IRP No. LF-2)	YES	YES	NFA
85	Stormwater Collection Point (IRP No. SD-12)	NFA	NFA	NFA
86	Engine Test Cell (IRP No. SD-11)	YES	YES	F.Y. 95
	(Investigated with SD-11)			
87	Former Overflow Pit	YES	YES	F.Y. 95
88	Former Leaching Field	YES	YES	F.Y. 95
89	Evaporation Pond	YES	YES	F.Y. 95
90	Oil/Water Separator No. 5114[2]	YES	YES	F.Y. 95
95	NE Stormwater Drainage Area (IRP No. SD-20)	YES	YES	TBD
96	Old Entomology Rinse Area (IRP No. SD-17)	YES	YES	TBD
98	Sanitary Sewer Line	YES	YES	NFA
101	Wastewater Treatment System Lagoons (IRP No. WP-21)	YES	YES	Groundwater Monitoring
102	Wastewater Treatment Effluent Discharge (IRP No. WP-21)	YES	YES	Groundwater Monitoring
104	Landfill No. 4 (IRP No. LF-4)	YES	YES	TBD
105	Landfill No. 3 (IRP No. LF-3)	YES	YES	TBD
106	Fire Training Area No. 2 (IRP No. FT-7)	YES	YES	NFA
107	Fire Training Area No. 3 (IRP No. FT-8)	YES	YES	NFA
109	Fire Training Are No. 4 (IRP No. FT-9)	YES	C.Y. 95	TBD
	(To be investigated in C.Y. 95 after new one is built)			
	(Investigated with SWMU No. 109)			
110	Underground Waste Oil Tank No. 2336[3]	YES	C.Y. 95	TBD
111	Unlined Pit	YES	NFA	NFA
112	Oil/Water Separator No. 2336[2]	YES	C.Y. 95	TBD
113	Landfill No. 5 (IRP No. LF-5)[4]	YES	State Lead	TBD

NOTES:

C.Y.95 = Calendar Year 1995
F.Y.95 = Fiscal Year 1995
NFA = No Further Action
TBD = To Be Determined

[1] Initially No Further Action, recent discovery requires investigation.
[2] Included in Appendix III, being investigated with SD-11.
[3] Included in Appendix II, being investigated with FT-9.
[4] NMED has primacy, with EPA Region VI review and concurrence.

150271

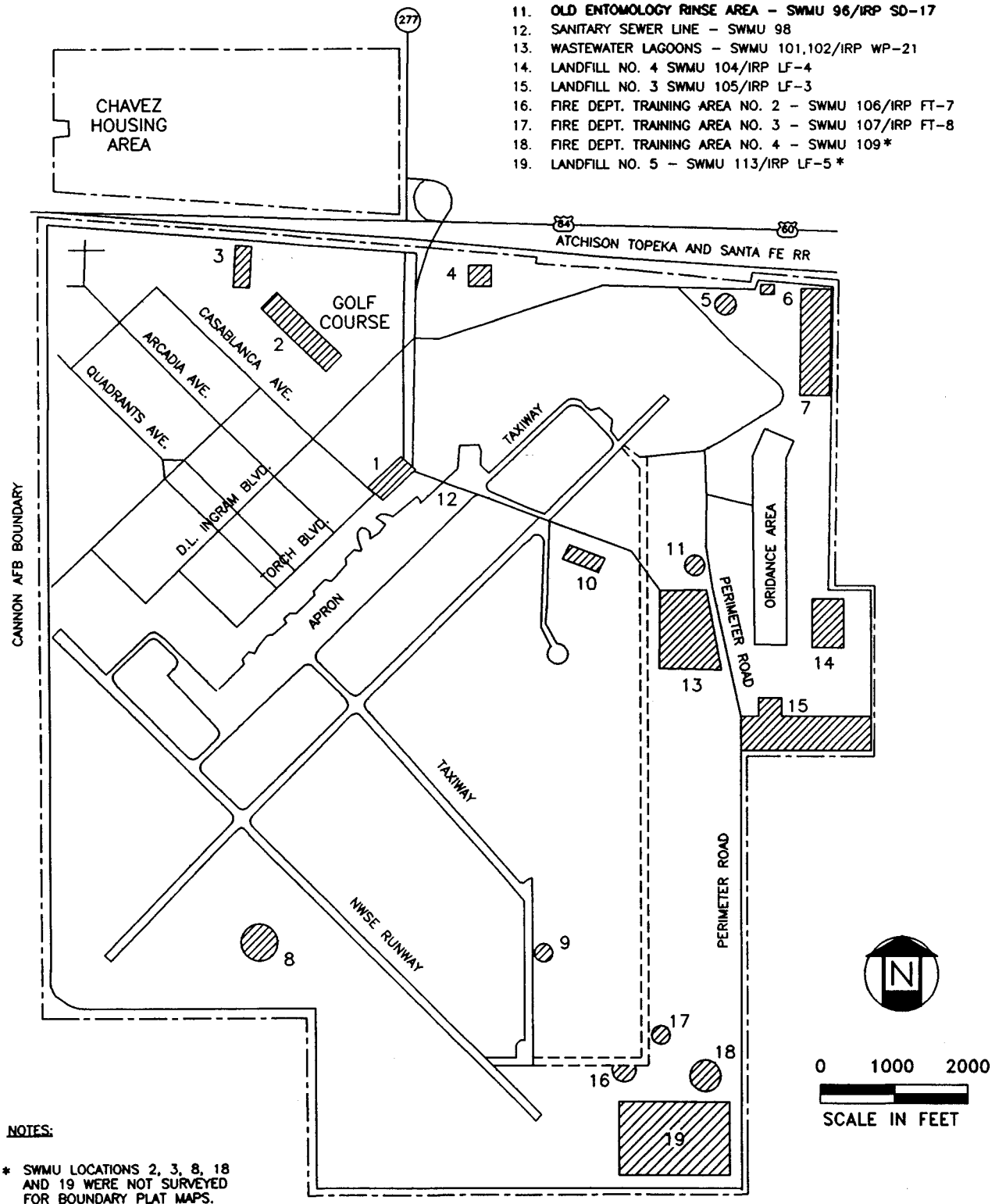


Job No. : 89C114LL	GENERAL VICINITY MAP
Prepared by : D.A.K.	CANNON AFB, NEW MEXICO
Date : 7/9/92	

FIG. 1-1

EXPLANATION

1. AGE DRAINAGE DITCH – SWMU 34/IRP SD-15
2. LANDFILL NO. 1 – SWMU 74/IRP LF-1*
3. SANITARY SEWAGE LIFT STATION OVERFLOW PIT SWMU 75/IRP SD-13*
4. SLUDGE WEATHERING PIT – SWMU 76/IRP WP-14
5. FIRE DEPT. TRAINING AREA NO. 1 SWMU 78/IRP FT-6
6. SOLVENT DISPOSAL SITE – SWMU 81/IRP DP-16
7. LANDFILL NO. 2 – SWMU 82/IRP LF-2
8. STORMWATER COLLECTION POINT SWMU 85/IRP SD-12*
9. ENGINE TEST CELL AREA – SWMU 86-90/IRP SD-11
10. NE STORMWATER DRAINAGE AREA – SWMU 95/IRP SD-20
11. **OLD ENTOMOLOGY RINSE AREA – SWMU 96/IRP SD-17**
12. SANITARY SEWER LINE – SWMU 98
13. WASTEWATER LAGOONS – SWMU 101,102/IRP WP-21
14. LANDFILL NO. 4 SWMU 104/IRP LF-4
15. LANDFILL NO. 3 SWMU 105/IRP LF-3
16. FIRE DEPT. TRAINING AREA NO. 2 – SWMU 106/IRP FT-7
17. FIRE DEPT. TRAINING AREA NO. 3 – SWMU 107/IRP FT-8
18. FIRE DEPT. TRAINING AREA NO. 4 – SWMU 109*
19. LANDFILL NO. 5 – SWMU 113/IRP LF-5*



NOTES:

* SWMU LOCATIONS 2, 3, 8, 18 AND 19 WERE NOT SURVEYED FOR BOUNDARY PLAT MAPS.

SWMU LOCATIONS 3 AND 8 ARE APPROXIMATELY LOCATED FROM CANNON AFB, BASE COMPREHENSIVE PLAN, TAB C-1E, SHEET 1, 18 MARCH 1991.

SOURCE: WCC, 1992

Job No. : C3M11L	APPENDIX I SOLID WASTE MANAGEMENT UNIT (SWMU) LOCATION MAP CANNON AFB, NEW MEXICO
Prepared by : J.T.A.	
Date : 1/3/95	

C3M1L01

FIG. 1-2

2.0
OLD ENTOMOLOGY RINSE AREA (SWMU NO. 96/IRP NO. SD-17)

2.1 SWMU DESCRIPTION

2.1.1 Setting

The Old Entomology Rinse Area (OERA) is located behind the former pesticide storage Building 2160 which was abandoned during October 1983, and demolished in September 1984 (Figure 2-1). The site is in the east-central part of the base, north of the wastewater lagoons and west of the perimeter road. During the OERA's use, pesticide and herbicide application equipment and containers were rinsed in a sink in Building 2160. The sink drained to a 3-foot-square and 2-foot-deep open pit in the rear of the building. The bottom of the pit was open to the soil (USAF 1990).

2.1.2 History of Use

Start-up on this unit is suspected to have been in 1968, although it could have been earlier (USAF 1990).

2.1.3 Land Use and Demography

Current use of the land around this SWMU by Cannon AFB personnel is minimal. The wastewater lagoons are the closest facility to this unit and are about 150 feet to the south. The area is fenced and has a locked gate. Two workers pass through the area daily to check the pump station serving the wastewater lagoons.

2.1.4 Past Investigations

Three soil borings (17A, 17B, and 17C) were drilled by Radian Corporation in 1985 to depths of 62.5, 63.0 and 58.0 feet below ground surface (BGS), respectively (Figure 2-1). Ten soil samples were collected and analyzed for arsenic, mercury, herbicides, pesticides, and purgeable halocarbons and aromatics (Table 2-1). No organophosphate pesticides, purgeable

halocarbons or aromatics were detected in the samples. Low total organic carbon (TOC) concentrations and metal concentrations within normal soil ranges were detected. Analytical results from boring 17A indicated the presence of the herbicide 2, 4-D at depths of 5-10 feet BGS and at 63 feet BGS, and the presence of minor concentrations of pesticides at depths of 2-4 feet BGS. The 62-foot BGS depth sample from boring 17C contained 406 μg/kg 2,4-D (Radian 1986).

A Phase IV-A investigation in November and December 1986 by Walk, Haydel & Associates involved soil borings, surface sediment sampling, sewage lagoon sediment and water sampling, and groundwater sampling and analyses. Eight soil borings were drilled and sampled for chemical analyses at the OERA. Also, one 356-foot-deep monitoring well was installed downgradient of the OERA (Figure 2-1). The borings were sampled at designated intervals from 0 to 10 feet BGS, and at 10-foot intervals from 10 to 50 feet BGS. Four of the deeper borings (total depth = 100 feet BGS) were also sampled every 10 feet from 50 to 100 feet BGS. The pesticides 4,4-DDE, 4,4-DDD, 4,4-DDT, and chlordane were present at seven of eight boring locations at the 0.5-foot sample depth. Concentrations decreased with increasing depth (Table 2-1). The highest concentration detected was 2,600 μg/kg in boring B1 at a depth of 0.5 feet BGS. The soil boring samples showed contamination to a depth of 1.0 foot, except for boring B8, located near the open pit adjacent to building 2160. This boring showed pesticides to a depth of 6.0 feet BGS. No herbicides were detected in any of the samples collected during this investigation. Based on these data, Walk, Haydel & Associates concluded the conditions at this site were not conducive to downward contaminant migration (Walk, Haydel & Associates 1988).

A Remedial Investigation at the OERA in October and November 1991 conducted by W-C involved surface soil and groundwater sampling and analyses. The activities at this SWMU consisted of collecting one surface soil sample for chemical analysis, one surface soil sample for gradation analysis, measuring the static water level in one monitoring well, purging and sampling one monitoring well, and collecting one groundwater sample for chemical analysis. A complete record of all surface soil, groundwater, and associated QA/QC samples collected by W-C at the Old Entomology Rinse Area is presented in Table 2-2. The locations of the surface soil sample and monitoring well are shown on Figure 2-1.

One surface soil sample, 0961, was collected by W-C in 1991 from 0 to 0.5 feet BGS at the approximate location of the sink rinse pit behind building 2160. This sample was collected using a stainless steel hand trowel and analyzed for pesticides/PCBs, and the gradation of the sample was determined. The pesticides, 4,4-DDE and 4,4-DDT, were reported at estimated values (flagged with J) of 66J and 110J μg/kg, respectively (Table 2-3). The α- and γ-chlordane compounds were reported at estimated values of 16J and 47J μg/kg, respectively. Heptachlor epoxide was reported as an estimated value of 19J μg/kg. The concentrations of PCBs were reported as non-detects below the Contract Required Quantitation Limit (CRQL). The "J" qualifier for the chemical analytes discussed above indicates that the analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample. Further discussion on data qualifiers is provided in Appendix C - Chemical Analysis Data Validation Report.

A comparison of the above analytical results with those of borings B4 and B8 of past investigations (Final Report, IRP Phase IV-A) shows that the concentrations of the pesticides described above are far below the detected range of 1,200-1,500 μg/kg for 4,4-DDE, 1,600-2,000 μg/kg for 4,4-DDT, and 300-500 μg/kg for chlordane, for shallow soil at B4 and B8. Heptachlor epoxide had not been previously reported as detected. The conclusion from this analysis is that the levels of pesticides in surficial soil at boring location 0961 are much lower than that detected in past investigations for soils southeast of former building 2160 (W-C 1992).

The groundwater sample collected during the W-C 1991 investigation from the existing monitoring well, 096K, located downgradient from the OERA (Figure 2-1) was analyzed for Target Analyte List (TAL) metals and Target Compound List (TCL) pesticides and polychlorinated biphenyls (PCBs). Six metals were detected above the detection limits for TAL metals: barium, chromium, copper, lead, vanadium, and zinc. Table 2-4 summarizes the reported concentrations for the detected metals and compares them with established maximum contaminant levels (MCL) for drinking water quality standards. All the metal concentrations were below the MCL. No pesticides or PCBs were found in the groundwater sample 096K. These analytical results show that the groundwater at well K has not been impacted by metals or pesticides/PCBs resulting from activities at the old entomology rinse site (W-C 1992).

2.2 FIELD INVESTIGATION

This section discusses the W-C supplemental field activities at the OERA on November 9 through November 10, 1993. The activities at this SWMU, as outlined in the Field Sampling Plan Addendum (FSPA) No. 2 (W-C 1993), consisted of collecting 10 subsurface soil samples from a single deep boring for chemical analysis and 3 subsurface soil samples for gradation analysis. Table 2-5 summarizes the subsurface soil sampling effort and provides a record of all subsurface soil and associated QA/QC samples collected. The location of soil boring 0962 is shown on Figure 2-1.

2.2.1 Sampling Objectives

The main objective for further investigation at the OERA was to sample the deeper soil beneath the suspected rinse sink pit location which had not yet been sampled and to provide information on current conditions at the SWMU. Secondary objectives of the sampling program were:

- Supplement previous investigations
- Collect enough acceptable data (i.e., chemically analyze a sufficient number of samples collected at appropriate locations and/or intervals) to:
    - Evaluate the nature and extent of the contamination beneath the rinse sink pit area, if present.
    - Support the selection of corrective measures/remedial alternatives and remedial design, if necessary.
    - Evaluate subsurface conditions that could affect contaminant migration.
    - Evaluate baseline risk to determine if the SWMU poses a risk to human health or the environment according to EPA policy, if necessary.

The project goals for the field investigation at the OERA included evaluation of the presence or absence of contamination in one soil boring at the former sink rinse pit location of the old Entomology Building, characterization of contamination if present, and preparation of recommendations for further action required at this site.

2.2.2 Field Investigation Methods

This section provides a discussion of the investigation methods (i.e., sampling equipment and procedures, sample designation, and sample handling, documentation, and analysis) used during field activities for the RFI at Cannon AFB from November 9 through 10, 1993. The activities at Cannon AFB, as outlined in the FSPA No. 2 (W-C 1993), consisted of drilling one soil boring, 0962, to a depth of 102 feet BGS, at the approximate location of the sink rinse pit behind building 2160 (i.e., at the same location where the surface soil sample, 0961, was collected during the 1991 W-C investigation). The soil boring was sampled at 5-foot intervals from the ground surface to the total depth and was described lithologically from the split spoon samples obtained during drilling. Subsurface samples for chemical analysis were collected at 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 feet BGS for a total of 10 subsurface soil samples. The subsurface soil samples were analyzed for the following parameters using SW-846 methods:

- TCL volatile organic compounds (VOCs) Method 8240;
- Semivolatile organic compounds (semi-VOCs) Method 8270;
- TAL Metals Methods 6010, 7060, 7471, 7740;
- Pesticides and polychlorinated biphenyls (pesticide/PCB) Method 8080;
- Chlorinated herbicides Method 8150;
- Total recoverable petroleum hydrocarbons (TRPH) Method 418.1.
- Gasoline range organics (GRO) Modified Method 8015; and
- Total chromatographable organics (TCO) Modified Method 8015.

In addition to these analyses, three samples representative of different soil horizons encountered during drilling were collected at 25, 55, and 85 feet BGS for geotechnical gradation analysis. Gradation (ASTM D-421) including hydrometer (ASTM D-422) analyses were determined on the subsurface soil samples by Western Laboratories of Torrance, California to determine the particle size distribution of the soil samples. The distribution of particles larger than 0.074 millimeters (i.e., retained on the No. 200 sieve) was determined by sieving, while the distribution of particles smaller than 0.074 millimeters was determined by hydrometer analysis. These analyses were specified on the Chain-of-Custody.

In accordance with the Quality Assurance Project Plan Addendum (QAPPA) No. 2 (W-C 1993), a total of four QA/QC samples (i.e., one field duplicate, one matrix spike/matrix spike duplicate [MS/MSD], one decontamination water blank, and one USACE [Missouri River Division Laboratory, MRD] duplicate) were also collected and submitted to the analytical laboratory to provide a means of assessing the quality of the data obtained during the field sampling program.

The types and frequency of QA/QC samples are presented in the QAPPA No. 2 (W-C 1993) for the Cannon AFB RFI. The field duplicate sample (collected at a minimum frequency of 1 per 10 environmental samples) was analyzed to check for sampling and laboratory reproducibility. The matrix spike/matrix spike duplicate (collected at a frequency of 1 per 20 environmental samples) was analyzed to evaluate the precision and bias of a method in a given sample matrix. The decontamination water blank sample (collected at a frequency of one per SWMU) was analyzed for the full suit of analytical parameters to evaluate the quality of the potable water obtained during the field work at the supply location near the contractor's area at the base and used for equipment decontamination. All QA/QC samples, except for MS/MSDs, were submitted blind to the laboratory.

In addition to the QA/QC samples described above, one duplicate field sample was collected and submitted to the USACE - Missouri River Division QA laboratory (MRDL) in Omaha, Nebraska for analysis to aid in evaluating interlaboratory precision as well as consistency of field techniques.

2.2.2.1 Soil Sampling Equipment and Procedures

The specific procedures for soil sample collection are described in the Standard Operating Procedures (SOPs), which are contained in the QAPP (W-C 1991b).

A W-C geologist supervised the drilling operations, logged the boring, and collected the subsurface soil samples. The soil boring was drilled, sampled, lithologically logged, and grouted in accordance with QAPP SOPs No. 7 - Subsurface Drilling and Sampling, No. 8 - Lithologic Descriptions of Subsurface Samples, and No. 9 - Borehole Abandonment (W-C 1991b). Layne Environmental Services, Inc. of Denver, Colorado drilled the soil boring with a truck-mounted CME-75 high-torque auger rig using hollow-stem augers. A

field boring log was completed for the soil boring drilled as part of the investigation (Appendix B).

Subsurface soil samples were obtained by driving a 2-foot long, 3-inch OD steel modified split-spoon sampler with six 4-inch long stainless-steel liners, 18 to 24 inches below the top of a targeted interval with a pneumatic 140-pound hammer falling 30 inches. Upon retrieval of the split-spoon sampler, the liner sample for VOC analysis was capped at the ends with 4-inch square piece of Teflon tape and plastic end caps. The remainder of the sample was extracted, placed in a clean stainless-steel bowl, and mixed thoroughly with a stainless-steel spoon. The homogenized sample was then divided among the appropriate sample containers depending on the proposed analyses (i.e., 16-ounce glass jars for semi-VOCs, TCL pesticide/PCBs, chlorinated herbicides, and TAL metals, and an 8-ounce glass jar for TRPH, GRO, and TCO) and placed in a cooler with ice for shipment to the laboratory. QA/QC and/or gradation analysis sample containers were also filled from the same mixture.

All standard penetration tests (SPTs) complied with American Society for Testing and Materials (ASTM) method D-1586, while all gradations were determined by Western Laboratories, Torrance, California in accordance with ASTM D-421 and D-422.

2.2.2.2 Decontamination Procedures

The W-C field manager was responsible for ensuring that samples were collected with properly decontaminated equipment. All sampling equipment was decontaminated between sampling events, the rig, augers, and any other downhole equipment were decontaminated before and after the boring was drilled. All decontamination complied with QAPP SOP No. 1 - Equipment Decontamination (W-C 1991b). The decontamination procedures outlined in the SOP are consistent with the most recent EPA guidelines. The procedure for decontaminating equipment consisted of a high-pressure steam cleaning, followed by an Alconox wash, a potable water rinse, an acid rinse, and a double-deionized water rinse.

2.2.2.3 Sample Designation

The sample designation system for all field (analytical and geotechnical) and QA/QC samples was a three letter and eleven digit/letter unique identification for each sample (CANXXX-

YYYY-ZZZZ). CANXXX is the facility identifier with CAN identifying Cannon AFB and XXX identifying the specific SWMU. The next four digits/letters (YYYY) identify the specific SWMU and boring sampled. The last four digits (ZZZZ) were the sample identifier. The first number corresponds to the specific type of sample collected (i.e., 0 for subsurface soil analytical samples, 4 for subsurface soil geotechnical samples, and 6 for subsurface soil lithologic samples). The last 3 numbers correspond to the beginning depth of the sample in feet BGS for all soil samples.

All QA/QC samples were identified at the location where they were collected and assigned a unique identification number following the same procedure above except for the last four digit (ZZZZ) identifier. The first two numbers of the QA/QC sample identifier corresponded to the OERA (06). The third number corresponded to the type of QA/QC sample collected (i.e., 6 for field duplicate, 8 for decontamination water blank, and 0 for Missouri River Division Laboratory duplicate). The last number corresponded to the sequential number of the particular QA/QC sample type. The only QA/QC sample type which was not identified as above is the MS/MSD sample type. These samples were not discrete samples but rather a previously collected analytical sample which was first analyzed and then spiked by the laboratory and reanalyzed. The samples that were chosen for MS/MSD analyses were labeled in the field as MS/MSD samples and were noted as such on the Chain-of-Custody forms.

2.2.2.4 Sample Handling and Documentation

All labeling, preservation, handling, shipping, documentation (including Chains-of-Custody), and tracking for the samples collected at Cannon AFB complied with QAPP SOP No. 12 - Sample Handling, Documentation, and Analysis (W-C 1991b).

Documentation of observations and data acquired in the field provided information on the acquisition of samples and also provided a permanent record of field activities. The observations and data were recorded with waterproof ink in a permanently bound weatherproof field book with consecutively numbered pages. In addition, all pertinent sampling information for every sample collected was recorded on field sampling data sheets. The data sheets for all subsurface soil samples are on file in the W-C Denver, Colorado office.

A-E daily quality control reports (DQCRs) were completed in accordance with the USACE SOS to supplement the information recorded in the field book and field sampling data sheets. The DQCRs were transmitted to the USACE Project Manager and are on file in the W-C Denver, Colorado office.

2.3 PHYSICAL CHARACTERISTICS

This section provides a discussion of the soil and geology at the Old Entomology Rinse Area based on the detailed lithologic descriptions of split spoon samples and gradation analysis results from the 1993 W-C supplemental investigation, the lithologic description of the surface soil sample and gradation analysis results from the 1991 W-C investigation, and the review of lithologic boring logs from the previous 1988 Walk, Haydel and Associates field investigation (Walk, Haydel & Associates 1988).

2.3.1 Soil

The shallow soils underlying the Old Entomology Rinse Area consist of sandy loam and loamy sand of the Amarillo Soil Group (United States Department of Agriculture - Soil Conservation Service 1958). The soils consist primarily of fine-grained, well sorted, silty, clayey, brown sands. The sands are dry to slightly moist at depth. One gradation was determined for a sample collected from this soil unit at 0.5 feet BGS in boring 0961 during the W-C 1991 investigation. The results indicate that this soil sample was comprised of approximately 53 percent sand, 23 percent silt, and 34 percent clay. The total thickness of the surficial soil zone is approximately 4 to 5 feet.

2.3.2 Geology

The near surface (upper 102 feet) stratigraphy at the Old Entomology Rinse Area consists of Tertiary Miocene to Pliocene fluvial deposits of the Ogallala Formation. Based on information contained in the field boring log for 0962, the SWMU is underlain by Ogallala fluvial deposits consisting primarily of well sorted sand, with scattered (1 to 11 feet thick) layers of caliche or clay lenses. The total thickness of these Ogallala deposits beneath the SWMU is not presently known, but based on regional information, may be as thick as 390 feet.

It would appear from the lithologic descriptions (Appendix B) that three fairly distinct sand, sand/caliche units are present beneath the SWMU to a depth of approximately 102 feet. The lowermost fluvial deposits shown on the boring log from 70 to 102 feet BGS consist of medium-grained, well sorted, unconsolidated light to medium orange sand deposits. These sand deposits are comprised predominantly of subrounded to subangular quartz grains. This unit is classified under the Unified Soil Classification System (USCS) as poorly graded clean sands (SP). Overall, these sands are non-calcareous, however, there are occasional thin layers and pockets of calcareous sands. The gradation was determined for one sample collected within this unit at 85 feet BGS. The results indicate that this sample was comprised of approximately 80 percent sand, 12 percent silt, and 8 percent clay. This unit was encountered in boring 0962 between approximately 70 and 102 feet BGS. The thickness of this unit is unknown at present since the unit was not fully penetrated, but is at least 32 feet thick at this SWMU.

The middle fluvial deposits shown on the boring log from 52 to 70 feet BGS consist of fine- to medium-grained, well sorted, silty to slightly silty, pale orange to orange sands. These sands are comprised predominantly of subangular to subrounded quartz grains, and are classified under the USCS as silty sand (SM). These sands are generally non-calcareous and become siltier toward the top of the unit. The gradation was determined for one sample collected within this unit at 55 feet BGS. The results indicate that this sample was comprised of approximately 88 percent sand, 8 percent silt, and 4 percent clay. This unit was encountered between approximately 52 and 70 feet BGS in boring 0962. Based on the log for boring 0962, the thickness of this unit is approximately 18 feet.

The upper fluvial deposits shown on the boring log from 5 to 52 feet BGS consist of fine-grained, well sorted, silty, calcareous, medium to pale orange to tan-orange sands, and orange to red-orange, silty clays. The sands are comprised predominantly of subangular to subrounded quartz grains with varying amounts of silt and calcium carbonate. This unit is classified under the USCS as silty sand (SM). Occasionally, these sands are moderately to well cemented with calcium carbonate. Thin layers (ranging from a few inches to several feet in thickness) and small pockets or nodules of tan-orange, silty, sandy, clayey caliche are scattered throughout this unit. The gradation was determined for one sample collected within this unit at 25 feet BGS. The results indicate that this sample was comprised of approximately 63 percent sand, 26 percent silt, and 11 percent clay-sized material. Based on

the boring log, the thickness of this unit is approximately 47 feet. Approximately 4 to 5 feet of native material exists above this unit. No groundwater was encountered during the drilling of this boring.

2.4 DATA VALIDATION

A total of eleven subsurface soil samples (ten analytical and one field duplicate) and one aqueous decontamination water sample were submitted to Enseco-Rocky Mountain Analytical (RMAL) for analysis. The analysis and reporting of the samples followed the requirements described in the QAPP for the 18 SWMU investigation (W-C 1991b) and the QAPPA No. 2 (W-C 1993). In accordance with the USACE SOS and Section 1.0 of the QAPPA No. 2, these data underwent a full validation.

The validated analytical results are summarized and described with respect to an evaluation of the data quality of each matrix and parameter and an evaluation of the usability of the data. The complete validation reports and validated analytical data are presented in Appendices C and D, respectively, of this report. The analytical data reports and validated data sheets are on file at Cannon AFB.

Few qualifications of the data were necessary during the validation of the analytical data from the soil and water samples collected during the drilling of boring 0962 at the OERA. The necessary qualifications are discussed in detail in the validation report contained in Appendix C. No analytical results were rejected, and the completeness for the program was acceptable at 100 percent, which exceeded the 90 percent completeness requirement.

2.5 NATURE AND EXTENT OF CONTAMINATION

A summary of the organics detected in subsurface soil samples collected from boring 0962 at the OERA by W-C in 1993 is given in Table 2-6. Analytical results from boring 0962 soil samples indicate that three of the TCL VOCs, acetone, methylene chloride, and toluene, were detected above the reporting limit (RL). Acetone was detected in seven samples at depths of 10, 20, 30, 40, 50, 60, and 70 feet, at estimated concentrations (flagged with a J) of 150J, 240J, 28J, 39J, 26J, 120J, and 15J µg/kg, respectively. Acetone was also detected in the field duplicate at the 10 foot depth sample at an estimated concentration of 690 µg/kg. Methylene

chloride was detected in two samples at depths of 10 and 20 feet, at estimated concentrations (i.e., below the RL) of 4.5J (RL 9) and 3.1J µg/kg (RL 11), respectively. Toluene was detected in eight samples at depths of 20, 30, 40, 60, 70, 80, 90, and 100 feet, at concentrations of 9.4J (RL 11), 5.1J (RL 5.4), 2.5J (RL 5.2), 10, 5.2J (RL 5.2), 4.2J (RL 5.2), 1.9J (RL 5.2), and 3.4J (RL 5.3) µg/kg, respectively. Seven of the eight results for toluene were estimated concentrations at or below the reporting limit, with only the result from the 60 foot sample interval indicating a non-estimated concentration of 10 µg/kg (RL 5.2).

It is noted that these three organic compounds, acetone, methylene chloride, and toluene, are also known laboratory contaminants. Because these compounds were detected at such low concentrations with at least one compound detected in each sample interval, and the fact that there is no historic information indicating their use at this particular SWMU, their presence throughout the entire borehole is considered highly suspect, and is probably due to laboratory contamination. — BLANKS ?

None of the TCL semi-VOCs, TCL pesticides/PCBs, or chlorinated herbicides were detected above the RL in subsurface soil samples from SWMU No. 96. However, two pesticides, 4,4-DDE and 4,4-DDT, were detected at estimated concentrations of 2.6 and 17 µg/kg, respectively, in the field duplicate sample (CAN096-0962-0661) collected at 10 feet BGS. The 4,4-DDE field duplicate result (2.6 µg/kg) and 4,4-DDT result (17 µg/kg) are lower than the concentrations reported for 4,4-DDE and 4,4-DDT (66J and 110J µg/kg, respectively) in the surface soil sample, 0961, collected at the former rinse sink pit location during the W-C 1991 investigation at the OERA. The presence of the pesticides 4,4-DDE and 4,5-DDT at the rinse sink pit could be related to general pesticide application at the base. The pesticide concentrations are similar to or lower than those found at two other SWMUs, for which no further action was required for certification of closure under Cannon AFB's RCRA Part B Permit (i.e., at Fire Department Training Area No. 1 and Landfill No. 2).

Three analysis methods were used for evaluation of petroleum hydrocarbons. Total recoverable petroleum hydrocarbons (TRPH) analysis was used for quantitation of the amount of petroleum hydrocarbons present. Gasoline range organics and total chromatographable organics chromatograms were obtained for the qualitative determination of presence or absence and qualitative characterization of hydrocarbons present. TRPH were detected in one sample from boring 0962 at a depth of 40 feet BGS at a concentration of 64.9 mg/kg.

However, since no gasoline range organics or total chromatographable organics were reported as present in this sample, and no petroleum hydrocarbons were detected either above or below this sample interval, the presence of petroleum hydrocarbons at this sample interval is an anomaly and does not indicate TRPH contamination as a result of past activities at the OERA rinse sink pit.

Gasoline range organics (GRO) were reported as present in three of the ten soil samples at depths of 10, 90, and 100 feet BGS. In addition, the field duplicate sample (CAN096-0962-0661) collected at 10 feet BGS indicated the presence of GRO. Total chromatographable organics (TCO) were reported as present in three samples at depths of 20, 70, and 100 feet BGS. Although these four samples had gas chromatograph/flame ionization detector (GC/FID) characteristics for which reliable identification of a product could not be achieved, they did resemble hydrocarbon products occurring within the n-alkane ranges of C15-C32 (duplicate sample at 10 feet BGS), C18-C32 (70 feet BGS), and C21-C32 (20 and 100 feet BGS). The GRO and TCO methods can detect hydrocarbons at concentrations well below the Reporting Limit for quantitation by TRPH. TRPH were non-detectable for all these samples in which TCO or GRO were reported as present. Therefore, concentrations of hydrocarbon must be below the TRPH quantitative reporting limit. Since the analytical methods for GRO and TCO are considered to be qualitative, and the concentrations detected for TRPH are low, the presence of these organics are considered to be insignificant.

Seventeen metals were detected at varying concentrations (Table 2-7) in the ten subsurface soil samples collected at boring 0962 (i.e., aluminum [1210 to 7090 mg/kg], arsenic [0.4 to 2.3 mg/kg], barium [11.2J to 89.1J mg/kg], beryllium [0.24 to 0.76 mg/kg], calcium [5400J to 70,000J mg/kg], chromium [2.3 to 10.2 mg/kg], cobalt [0.78 to 3.3 mg/kg], copper [1.3 to 7.2 mg/kg], iron [1990 to 8530 mg/kg], lead [0.79 to 6.3 mg/kg], magnesium [1000 to 5490 mg/kg], manganese [24J to 194J mg/kg], nickel [1.2 to 8.2 mg/kg], potassium [288 to 2150 mg/kg], silver [0.31 to 0.38 mg/kg], sodium [68.4 to 292 mg/kg], and vanadium [6 to 20.4 mg/kg]).

All of the metals concentrations are within the range of naturally occurring metals at Cannon AFB (Table 2-7, Remedial Investigation Report for 18 SWMUs, W-C 1992b; and Table 2-6, Concentrations of Naturally Occurring Chemical Constituents in Soil and Groundwater at Cannon AFB, W-C 1994).

2.6 CONCLUSIONS AND RECOMMENDATIONS

The following section summarizes the nature and extent of contamination found at the OERA based on the data collected during the RFI. Recommendations for the OERA are presented in Section 2.6.2.

2.6.1 Conclusions

During the W-C 1991 RI, both soil and groundwater samples were collected at this SWMU. The pesticides 4,4-DDE and 4,4-DDT were detected at estimated concentrations of 66J µg/kg and 110J µg/kg, respectively in the surface soil sample. The α- and γ- chlordane compounds were also detected and reported at estimated concentrations of 16J µg/kg and 47J µg/kg, respectively. The pesticide heptachlor epoxide was detected at an estimated concentration of 19J µg/kg.

Because pesticides were detected in this surface soil sample, the EPA requested that a deeper boring be drilled and sampled to evaluate potential downward migration of pesticides at the former rinse sink pit location. One soil boring (0962) was subsequently drilled and sampled to a depth of approximately 102 feet BGS at this location (i.e., previous surface soil sample 0961 location).

Volatile Organic Compounds

Analytical results from boring 0962 soil samples indicate that three of the TCL VOCs, acetone, methylene chloride, and toluene, were detected above the CRQL in subsurface soil samples from SWMU No. 96 (Table 2-6). All three of these compounds are known laboratory contaminants. The concentrations of acetone (ranging from 26J to 240J µg/kg), methylene chloride (4.5J and 3.1J µg/kg), and toluene (ranging from 1.9J to 10 µg/kg) are extremely low. Based on this information, the presence of these organics is probably due to laboratory contamination, not actual soil contamination. Additionally, the concentrations of these organic compounds are several orders of magnitude lower than both the RCRA Subpart S Corrective Action Levels for soils (i.e., 6,000,000 µg/kg for acetone; 90,000 µg/kg for methylene chloride; and 20,000,000 µg/kg for toluene) and the draft CERCLA Soil

Screening Levels (i.e., 44,000 µg/kg for methylene chloride; and 150,000 µg/kg for toluene), and, therefore, are not of significance at the OERA.

Pesticides

None of the TCL semi-VOCs, TCL pesticides/PCBs, or chlorinated herbicides were detected above the CRQL in the ten subsurface soil samples. However, two pesticides, 4,4-DDE and 4,4-DDT, were detected at estimated concentrations of 2.6 and 17 µg/kg, respectively, in the field duplicate sample (CAN096-0962-0661) collected at 10 feet BGS. The 4,4-DDE field duplicate result (2.6 µg/kg) and 4,4-DDT result (17 µg/kg) are lower than the concentrations reported for 4,4-DDE and 4,4-DDT (66J and 110J µg/kg, respectively) in the surface soil sample, 0961, collected at the former rinse sink pit location during the W-C 1991 investigation at the OERA.

The source of contamination at the rinse sink pit could be related to general pesticide application at the base. Although the presence of pesticides found in soil at the rinse sink pit could be related to past pesticide container rinsing, the pesticide concentrations are similar to or lower than those found at two other SWMUs, for which no further action was required for certification of closure under Cannon AFB's RCRA Part B Permit (i.e., at Fire Department Training Area No. 1 and at Landfill No. 2). Additionally, the concentrations of these pesticide compounds are several orders of magnitude lower than both the RCRA Subpart S Corrective Action Levels for soils (i.e., 2,000 µg/kg for DDE and 2,000 µg/kg for DDT) and the draft CERCLA Soil Screening Levels (i.e., 1,900 µg/kg for DDT), and, therefore, are not a concern at the OERA. NMED 2000 SSLs
DDE = 1700 PPM
DDT = 1700 PPM

Petroleum Hydrocarbons

Total recoverable petroleum hydrocarbons (TRPH) were detected in one sample at a depth of 40 feet BGS at a concentration of 64.9 mg/kg. However, since no gasoline range organics or total chromatographable organics were detected in this sample, and no petroleum hydrocarbons were detected either above or below this sample interval, the presence of petroleum hydrocarbons at this sample interval is suspect. Additionally, the concentration of TRPH in this one sample is below the New Mexico Environmental Department regulatory

limit for total petroleum hydrocarbons (i.e., an underground storage tank [UST] cleanup level of 100 mg/kg for soil).

Gasoline range organics (GRO) were present in three of the ten samples at depths of 10, 90, and 100 feet, and in the field duplicate sample at 10 feet at concentrations below the reporting limit or at estimated concentrations (i.e., 0.54J, 0.52, 0.53, and 0.53 mg/kg, respectively). Total chromatographable organics (TCO) were present in three samples at depths of 20, 70, and 100 feet BGS at estimated concentrations (i.e., 4.0J mg/kg for all three samples). Since the analytical methods for GRO and TCO are considered to be qualitative, and the concentrations detected for GROs and TCOs (i.e., 0.5 and 4.0 mg/kg, respectively) are significantly lower than any NMED regulatory limits for petroleum hydrocarbon constituents (i.e., a UST cleanup level of 10 mg/kg for benzene and 50 mg/kg for aromatics for soil), the presence of these petroleum range organics is not significant at the OERA.

Metals

Analytical results from boring 0962 soil samples indicate that seventeen metals (i.e., aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, and vanadium) were detected at varying concentrations in the ten subsurface soil samples collected at boring 0962. All of these metals concentrations are within the range of naturally occurring metals at Cannon AFB as determined by background studies (W-C 1994).

Additionally, the concentrations of those metals, for which action levels exist (i.e., metals with high toxicity), are significantly lower than both the RCRA proposed Subpart S Corrective Action Levels, 40 CFR part 264 as specified in Appendix A, "Examples of Concentrations Meeting Criteria for Action Levels", FR, V.55, July 27, 1990, pp. 30865-30869) for soils (i.e., 80 mg/kg for arsenic, 4,000 mg/kg for barium, 0.2 mg/kg for beryllium, 400 mg/kg for chromium (as CrVI), and 2,000 mg/kg for nickel) and the draft CERCLA Soil Screening Levels (i.e., 390 mg/kg for chromium and 1,600 mg/kg for nickel), and, therefore, are not a concern at the OERA.

2.6.2 Recommendations

Based on the above results from the W-C 1993 supplemental investigation, as well as results from the W-C 1992 RI, which included a baseline risk assessment, a **"No Action"** remedial alternative is recommended for the Old Entomology Rinse Area.

TABLE 2-1

PESTICIDE CONCENTRATIONS[1] IN SOIL SAMPLES COLLECTED BY RADIAN IN 1985 AND BY WALK, HAYDEL & ASSOCIATES IN 1986 AT OLD ENTOMOLOGY RINSE AREA

SWMU NO. 96/IRP NO. SD-17, CANNON AFB, NEW MEXICO

Sample Depth (Ft-BGS)	Compound	Boring Number								
		17A	17C	B1	B3	B4	B5	B6	B7	B8
0.5	4,4 - DDD			300		500		200		400
	4,4 - DDE			2600	500	1500	100	1300	500	200
	4,4 - DDT			900	200	2000	100	800	700	600
	Chlordane			700	100	500	300	1000	500	300
1.0	4,4 - DDE			100					300	
	4,4 - DDT					100			200	
	Chlordane						200		200	
2.0 - 4.0	4,4 - DDD		7[2]							
	4,4 - DDE		25[2]							
	4,4 - DDT		29[2]							
	Dieldrin	.002								
	Toxaphene	.221								
5.0 - 6.0	2,4 - D	283								
	4,4 - DDD									300
	4,4 - DDE									900
	4,4 - DDT									1300
	Chlordane									200
7.5 - 9.5	2,4 - D	59								
61.5 - 62.0	2,4 - D		406							
	4,4 - DDT		8[2]							
62.5 - 63.0	2,4 - D	3410								

TABLE 2-1
(Concluded)

Ft-BGS = Feet below ground surface

[1] All concentrations are in milligrams per kilogram (mg/kg)
[2] Below detection limit

Source: Final Report, IRP Phase IV-A (Walk, Haydel & Associates Inc. 1988)

TABLE 2-2

SUMMARY OF SURFACE SOIL, GROUNDWATER, AND ASSOCIATED QA/QC SAMPLES COLLECTED BY W-C IN 1991 AT OLD ENTOMOLOGY RINSE AREA

SWMU NO. 96 / IRP NO. SD-17, CANNON AFB, NEW MEXICO

Boring/ Well Number	Depth Interval (Ft-BGS)	Sample Identification Number	Sample Type	QA/QC Sample Type	Sample Matrix	Date Sampled	Time Sampled	OVA on Sample (ppmv)	Analytical/Geotechnical Parameters
0961	0 to 0.5	CAN096 - 0961 - 0000	A	MS	Soil	24-Oct-91	1645	0	Pest/PCB
		CAN096 - 0961 - 4000	GA		Soil	24-Oct-91	1645	0	
096K		CAN096 - 096K - 2001	A	MS	Water	13-Nov-91	1700		Pest/PCB, Metals
		CAN096 - 096K - 0661	A	FD	Water	13-Nov-91	1600		Pest/PCB, Metals
		CAN096 - 096K - 0671	A	RB	Water	13-Nov-91	1800		Pest/PCB, Metals
		CAN096 - 096K - 0601	A	MRD	Water	13-Nov-91	1700		Pest/PCB, Metals

Ft-BGS Feet Below Ground Surface
ppmv Parts Per Million Vapor
A Soil Analytical
G Soil Geotechnical
L Lithological
SPT Standard Penetration Test
GA Gradation Analysis
FD Field Duplicate
RB Rinsate Blank
MRD Missouri River Division

MS Matrix Spike/Matrix Spike Duplicate
VOC TCL Volatile Organic Compounds
Semi TCL Semi-volatile Organic Compounds
PCB Polychlorinated Biphenyls
Pest TCL Pesticides
TPH Total Petroleum Hydrocarbons
Metals TAL Metals

TABLE 2-3

PESTICIDE/PCB CONCENTRATIONS IN THE SURFACE SOIL SAMPLE COLLECTED BY W-C IN 1991 AT OLD ENTOMOLOGY RINSE AREA

SWMU NO. 96/IRP NO. SD-17, CANNON AFB, NEW MEXICO

Boring Number	Sample Depth (Ft-BGS)	Compound	Concentration (µg/kg)
0961	0 - 0.5	4,4-DDD	14 UJ
		4,4-DDE	66 J
		4,4-DDT	110 J
		Aldrin	7.4 UJ
		Dieldrin	14 UJ
		Endosulfan I	7.4 UJ
		Endosulfan II	14 UJ
		Endosulfan Sulfate	14 UJ
		Endrin	14 UJ
		Endrin Aldehyde	14 UJ
		Endrin Ketone	14 UJ
		Heptachlor	7.4 UJ
		Heptachlor Epoxide	19 J
		Methoxychlor	74 UJ
		PCB 1016	140 UJ
		PCB 1221	290 UJ
		PCB 1232	140 UJ
		PCB 1242	140 UJ
		PCB 1248	140 UJ
		PCB 1254	140 UJ
		PCB 1260	140 UJ
		Toxaphene	740 UJ
		alpha-BHC	7.4 UJ
		alpha-Chlordane	16 J
		beta-BHC	7.4 UJ
		delta-BHC	7.4 UJ
		gamma-BHC	7.4 UJ
		gamma-Chlordane	47 J

Ft-BGS = Feet below ground surface
J = Estimated value
UJ = Estimated as non-detect at the CRQL

Source: Final Report, RI at 18 SWMUs (W-C 1992)

TABLE 2-4

METAL CONCENTRATIONS[1] IN THE GROUNDWATER SAMPLE COLLECTED BY W-C IN 1991 AT OLD ENTOMOLOGY RINSE AREA

SWMU NO. 96/IRP NO. SD-17, CANNON AFB, NEW MEXICO

Element WQCC (PPM)	Well 96K	MCL[2]	WQCC
Antimony MCL * .010 *	0.06 U mg/l	0.01/0.005	
Arsenic	0.0047 J	0.05	
Barium	0.66	1.0	
Beryllium	0.002 U	0.01[3]	
Cadmium	0.005 U	0.005[3]	
Chromium	0.034 U	0.1	
Cobalt	0.01 U	*	
Copper	0.15	1.0[4]	
Lead	0.034 J ok.	~~0.05~~[5] / 0.015 AL	0.05
Mercury	0.0002 U	0.002	
Nickel	0.029 J	1.0[3]	
Selenium	0.02 U	0.05[5]	
Silver	0.003 U	1.0[4]	
Thallium	0.01 U	0.022/0.001[3]	
Tin	0.1 U	*	
Vanadium	0.035	*	
Zinc	0.049	5.0[4]	

MCL = Maximum contaminant level
J = Estimated value
U = Not detected

1 All concentrations are in milligrams per liter (mg/L)
2 Primary MCL in effect as of November 13, 1991 (i.e., date monitoring well was sampled).
3 Proposed primary MCL
4 Secondary MCL in effect as of November 13, 1991 (i.e., date monitoring well was sampled).
5 Effective until 12/7/92, at which time action level of 0.015 mg/L became effective.
* No primary or secondary MCL or proposed MCL as of March 1992

Source: Final Report, RI at 18 SWMUs, (W-C 1992)

TABLE 2-5

SUMMARY OF SUBSURFACE SOIL AND ASSOCIATED QA/QC SAMPLES COLLECTED BY W-C IN 1993 AT OLD ENTOMOLOGY RINSE AREA

SWMU NO. 96 / IRP NO. SD-17, CANNON AFB, NEW MEXICO SUPPLEMENTAL INVESTIGATION

Boring Number	Depth Interval (Ft-BGS)	Sample Identification Number	Sample Type	QA/QC Sample Type	Sample Matrix	Date Sampled	Time Sampled	OVA on Sample (ppmv)	Analytical/Geotechnical Parameters
0962	5 to 7	CAN096 0962 - 6005	L/SPT		Soil	9-Nov-93	1018	0	
		CAN096 0962 - 0681	A	DW	Water	9-Nov-93	900		VOC, Semi, Pest/PCB, Metals, Herb, TPH
	10 to 13	CAN096 0962 - 0010	A/SPT		Soil	9-Nov-93	1025	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
		CAN096 0962 - 0661	A	FD	Soil	9-Nov-93	1035	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	15 to 17	CAN096 0962 - 6015	L/SPT		Soil	9-Nov-93	1045	0	
	20 to 22	CAN096 0962 - 0020	A/SPT		Soil	9-Nov-93	1055	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	25 to 27	CAN096 0962 - 4025	G/SPT		Soil	9-Nov-93	1115	0	GA
	30 to 33	CAN096 0962 - 0030	A/SPT	MS	Soil	9-Nov-93	1125	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	35 to 37	CAN096 0962 - 6035	L/SPT		Soil	9-Nov-93	1155	0	
	40 to 42	CAN096 0962 - 0040	A/SPT		Soil	9-Nov-93	1205	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
		CAN096 0962 - 0601	A	MRD	Soil	9-Nov-93	1205	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	45 to 47	CAN096 0962 - 6045	L/SPT		Soil	9-Nov-93	1235	0	
	50 to 52	CAN096 0962 - 0050	A/SPT		Soil	9-Nov-93	1255	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	55 to 57	CAN096 0962 - 4055	G/SPT		Soil	9-Nov-93	1325	0	GA
	60 to 62	CAN096 0962 - 0060	A/SPT		Soil	9-Nov-93	1350	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	65 to 67	CAN096 0962 - 6065	L/SPT		Soil	9-Nov-93	1410	0	
	70 to 72	CAN096 0962 - 0070	A/SPT		Soil	9-Nov-93	1435	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	75 to 77	CAN096 0962 - 6075	L/SPT		Soil	9-Nov-93	1445	0	
	80 to 82	CAN096 0962 - 0080	A/SPT		Soil	9-Nov-93	1615	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	85 to 87	CAN096 0962 - 4085	G/SPT		Soil	9-Nov-93	1640	0	GA
	90 to 92	CAN096 0962 - 0090	A/SPT		Soil	9-Nov-93	1650	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH
	95 to 97	CAN096 0962 - 6095	L/SPT		Soil	9-Nov-93	1715	0	
	100 to 102	CAN096 0962 - 0100	A/SPT		Soil	9-Nov-93	1740	0	VOC, Semi, Pest/PCB, Metals, Herb, TPH

Ft-BGS	Feet Below Ground Surface
ppmv	Parts Per Million Vapor
A	Soil Analytical
G	Soil Geotechnical
L	Lithological
SPT	Standard Penetration Test
GA	Gradation Analysis
FD	Field Duplicate
DW	Decon Water
MRD	Missouri River Division
MS	Matrix Spike/Matrix Spike Duplicate
VOC	TCL Volatile Organic Compounds
Semi	TCL Semi-volatile Organic Compounds
PCB	Polychlorinated Biphenyls
Pest	TCL Pesticides
TPH	Total Petroleum Hydrocarbons
Herb	Herbicides
Metals	TAL Metals

TABLE 2-6

CONCENTRATIONS(1) OF ORGANICS DETECTED IN SOIL SAMPLES COLLECTED FROM BORING 0962 BY W-C IN 1993 AT THE OLD ENTOMOLOGY RINSE AREA

SWMU NO. 96 / IRP NO. SD-17, CANNON AFB, NEW MEXICO
SUPPLEMENTAL INVESTIGATION

Boring No.	0962																			
Sample Depth in FT-BGS	10		20		30		40		50		60		70		80		90		100	
Analyte	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Acetone	150	J	240	J	28	J	39	J	26	J	120	J	15	J	10	UJ	10	UJ	11	UJ
Methylene chloride	4.5	J	3.1	J	5.4	U	5.2	U	5.3	U	5.2	U	5.2	U	5.2	U	5.2	U	5.3	U
Toluene	13	U	9.4	J	5.1	J	2.5	J	5.3	U	10		5.2	J	4.2	J	1.9	J	3.4	J
4,4-DDE	3.5*	U	3.6	U	3.5	U	3.5	U	3.5	U	3.4	U	3.5	U	3.4	U	3.4	U	3.5	U
4,4-DDT	3.5**	UJ	3.6	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.4	UJ	3.5	UJ	3.4	UJ	3.4	UJ	3.5	UJ
TRPH	42.9	U	43.9	U	43	U	64.9		42.5	U	41.5	U	41.8	U	41.8	U	41.2	U	42.1	U
GRO	0.54	J	0.55	U	0.54	U	0.52	U	0.53	U	0.52	U	0.52	U	0.52	U	0.52		0.53	
TCO	4***	UJ	4	J	4	UJ	4	UJ	4	UJ	4	UJ	4	J	4	UJ	4	UJ	4	J

U = Not detected
J = Estimated value
UJ = Estimated as a non-detect at the Contract Required Quantitation Limit
TRPH = Total recoverable petroleum hydrocarbons
GRO = Gasoline range organics
TCO = Total chromatographable organics

(1) Concentrations for acetone, methylene chloride, toluene, 4,4-DDE, and 4,4-DDT are in micrograms per kilogram (ug/kg), while concentrations for TRPH, GRO, and TCO are in milligrams per kilogram (mg/kg).

* 4,4-DDE was reported at 2.6 ug/kg in the field duplicate sample (CAN096-0962-0661) collected at this interval.
** 4,4-DDT was reported at 17 ug/kg in the field duplicate sample (CAN096-0962-0661) collected at this interval.
*** Total chromatographable organics were reported PRESENT in the field duplicate sample (CAN096-0962-0661) collected at this interval.

TABLE 2-7

CONCENTRATIONS(1) OF METALS DETECTED IN SOIL SAMPLES COLLECTED FROM BORING 0962 BY W-C IN 1993 AT THE OLD ENTOMOLOGY RINSE AREA

SWMU NO. 96 / IRP NO. SD-17, CANNON AFB, NEW MEXICO
SUPPLEMENTAL INVESTIGATION

Boring No.		0962																			
Sample Depth in FT-BGS	Background Range	10		20		30		40		50		60		70		80		90		100	
Analyte		Result	Qual	Result	u	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Aluminum	0-10,800	7090		6460		4430		2470		2600		1320		1570		1460		1210		1510	
Antimony	0-30	6.4	U	6.6	U	6.5	U	6.3	U	6.4	U	6.2	U	6.3	U	6.3	U	6.2	U	6.3	U
Arsenic	0-10	2.1		2.3		1.1		0.71		0.54		0.4		0.49		0.67		0.86		0.85	
Barium	0-550	68	J	89.1	J	15	J	29	J	45.8	J	11.2	J	61.8	J	17.8	J	18.5	J	32.6	J
Beryllium	0-0.6	0.59		0.76		0.29		0.21	U	0.24		0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
Cadmium	0-2.1	0.54	U	0.55	U	0.54	U	0.52	U	0.53	U	0.52	U	0.52	U	0.52	U	0.52	U	0.53	U
Calcium	0-167,000	5400	J	70000	J	19900	J	62700	J	52700	J	15600	J	28300	J	12600	J	12100	J	17400	J
Chromium	0.8-12	8.5		10.2		4.5		2.5		7.1		2.3		4.4		2.6		2.4		5.8	
Cobalt	0-4	3.3		2.8		1.6		0.94		1.3		0.78		1.1		1.4		1.1		1.4	
Copper	0-10	7.2		4.5		3		1.3		2		1.3		1.4		1.9		1.8		1.8	
Iron	0-8600	8530		5270		3880		2010		2300		1990		2290		2730		2440		2930	
Lead	0-18	6.3		3.6		2.8		1		1.1		0.79		0.9		1.7		1.9		1.7	
Magnesium	0-9900	1370		5030		5490		4550		4580		1140		1500		1200		1000		1180	
Manganese	0-152	59.9	J	194	J	45.9	J	27.1	J	39	J	24	J	30.2	J	43	J	39	J	57.3	J
Mercury	0-0.2	0.11	U	0.11	U	0.11	U	0.1	U	0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.11	U
Nickel	0-9.7	6.1		8.2		3.4		2		2.6		1.2		1.6		1.7		1.7		2.3	
Potassium	0-2500	1310		2150		1860		617		577		288		351		365		333		413	
Selenium	0-37	0.54	UJ	1.1	U	1.1	UJ	1	UJ	1.1	UJ	1	UJ	0.52	UJ	0.52	UJ	0.52	UJ	0.53	UJ
Silver	0-1.8	1.1	U	0.37		1.1	U	1	U	1.1	U	1	U	0.31		1	U	1	U	0.38	
Sodium	0-830	205		292		219		90.2		135		68.4		140		136		135		148	
Thallium	0-6	0.54	UJ	1.1	U	0.54	UJ	1	UJ	1.1	UJ	1	UJ	1	UJ	0.52	UJ	0.52	UJ	0.53	UJ
Vanadium	2-25	16.8		20.4		13.1		7		9.6		6		6.6		7.8		7.1		8.2	
Zinc	0-21	16.5	U	11.7	U	8.1	U	4.4	U	4.6	U	3.5	U	4.2	U	5.3	U	6.4	U	0.54	U

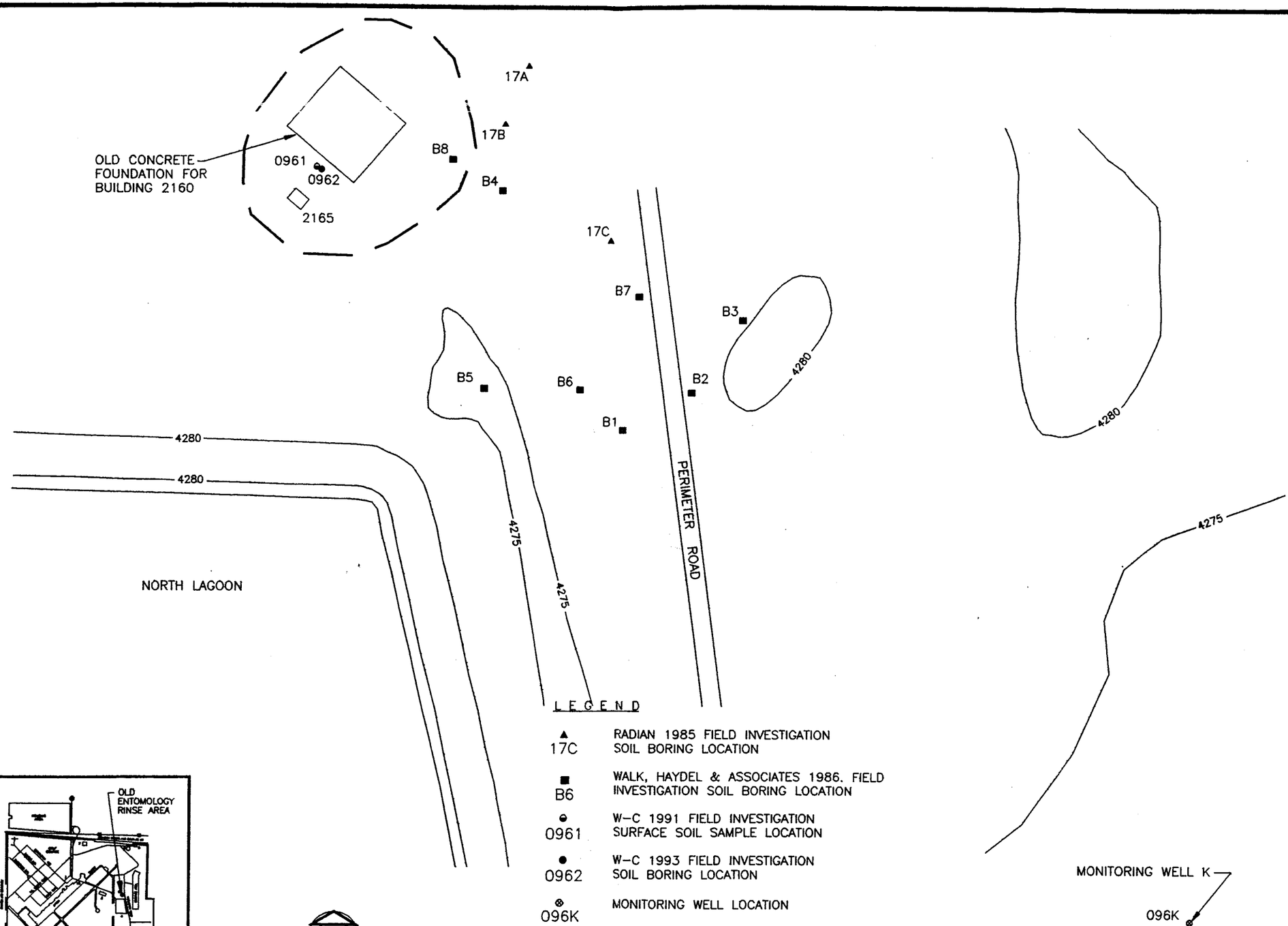
U = Not detected

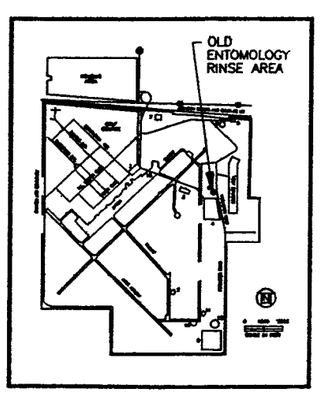
J = Estimated value

UJ = Estimated as a non-detect at the Contract Required Quantitation Limit

(1) All concentrations are in milligrams per kilogram (mg/kg).

(2) Background range from Concentrations of Selected Naturally Occurring Constituents in Soil and Groundwater at Cannon AFB (Table 2-6), W-C 1994.





N

0 30 60

SCALE IN FEET

LEGEND

▲ 17C	RADIAN 1985 FIELD INVESTIGATION SOIL BORING LOCATION
■ B6	WALK, HAYDEL & ASSOCIATES 1986. FIELD INVESTIGATION SOIL BORING LOCATION
⊖ 0961	W-C 1991 FIELD INVESTIGATION SURFACE SOIL SAMPLE LOCATION
● 0962	W-C 1993 FIELD INVESTIGATION SOIL BORING LOCATION
⊗ 096K	MONITORING WELL LOCATION
— —	SWMU BOUNDARY
4280	GROUND SURFACE CONTOUR LINE IN FEET MSL CONTOUR INTERVAL = 5 FEET
2165	BUILDING NUMBER

Job No. : C3M11L	LOCATION OF SURFACE SOIL SAMPLES, SOIL BORINGS AND MONITORING WELL AT OLD ENTOMOLOGY RINSE AREA SWMU NO. 96/IRP NO. SD-17 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

C114001

FIG. 2-1

3.0
FUTURE APPENDIX I ACTIVITIES

This section presents a brief description of future activities currently planned for those Appendix I SWMUs requiring additional investigation.

3.1 LANDFILL NO. 1 (SWMU NO. 74)

This SWMU requires further investigation of recently discovered burn pits in the golf course expansion area, and at Area of Concern D. A limited Phase I RFI is scheduled at this SWMU in Fiscal Year 1995. The results of this investigation and recommendations for further investigation will be submitted to EPA in an separate report.

3.2 SWMU NOS. 86-90 (ENGINE TEST CELL)

Subsurface soil contamination was encountered during the oil/water separator removal during July and August 1994. Additional investigation is planned for Fiscal Year 1995 to further evaluate the nature and extent of subsurface soil contamination at these SWMUs. The investigation plan details will be provided to EPA prior to investigation. Results of the additional investigation(s) will be submitted to EPA under separate cover at the conclusion of the investigation(s).

3.3 DISCHARGE MONITORING AT NORTHEAST STORMWATER DRAINAGE (SWMU NO. 95)

Cannon AFB must determine if the Northeast Stormwater Drainage requires discharge monitoring under NPDES. Cannon AFB plans to make this determination and submit plans for monitoring in Calendar Year 1995.

3.4 ANNUAL GROUNDWATER MONITORING AT SWMU NOS. 101 AND 102 (WASTEWATER TREATMENT LAGOONS)

Groundwater samples were collected and submitted for laboratory analyses in August 1994. Results of the 1994 groundwater monitoring were submitted to EPA in November 1994 as a separate document. Monitoring and reporting will continue to EPA on an annual basis until a change in monitoring frequency is agreed upon by Cannon AFB and EPA.

3.5 LANDFILL NO. 3 (SWMU NO. 103)

A downgradient monitoring well was installed in October 1994. Results of groundwater sampling and analyses will be evaluated to ascertain the need for additional groundwater monitoring at this SWMU. The results and a recommendation for additional monitoring (if required) will be submitted to EPA Region VI in mid-1995 as an addendum to this Appendix I Phase II RFI report.

3.6 LANDFILL NO. 4 (SWMU NO. 104)

A downgradient monitoring well was installed in December 1994. Results of groundwater sampling and analyses will be evaluated to ascertain the need for additional groundwater monitoring at this SWMU. The results and a recommendation for additional monitoring (if required) will be submitted to EPA Region VI in mid-1995 as an addendum to this Appendix I Phase II RFI report.

3.7 ADDITIONAL RFI AT SWMU NOS. 109, 110, 111, AND 112 (FIRE TRAINING AREA NO. 4)

The USACE Work Plan for additional RFI activities at the Fire Training Area was approved by EPA in a letter dated 17 August 1993. The investigation of this SWMU is scheduled to occur following completion of construction of the new Fire Training Facility and subsequent de-activation of Fire Training Area No. 4. These activities are planned to begin in Calendar Year 1995.

3.8 SWMU NO. 113 (LANDFILL NO. 5)

NMED has primacy for the RFI at this SWMU, with EPA Region VI review and concurrence; thus, this SWMU will be investigated separately from the SWMUs listed in Cannon AFB's RCRA Part B Permit Appendixes. A Phase I RFI is planned to be completed by early 1997. The results of the Phase I RFI will be submitted to EPA as an independent document.

Groundwater samples are collected during the first and third quarters annually and submitted to the laboratory for chemical analyses. The specific methods for analyzing the samples are specified in the 1990 Compliance Agreement between NMED and Cannon AFB. Groundwater monitoring will continue until a change in monitoring is agreed upon by Cannon AFB and NMED. A decision for a change in monitoring will not be considered until after completion of the RFI for Landfill No.5 and the first year of post-closure groundwater sampling and analysis.

4.0
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APPENDIX A
USACE SCOPE OF SERVICES

RCRA Activities, Phase II to Appenidx I
Cannon Air Force Base, Clovis, New Mexico
CZQZ 91 7003; CZQZ 93 7007

A-E INDEFINITE DELIVERY WORK ORDER

SCOPE OF SERVICES

DACW45-93-D-0005

DELIVERY ORDER 13

US Army Corps of Engineers
Omaha District
Omaha, Nebraska

A-E INDEFINITE DELIVERY WORK ORDER
Scope of Services
RCRA Activities
Cannon Air Force Base, Clovis, New Mexico
CZQZ 91 7003; CZQZ 93 7007

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June 18, 1993

A-E INDEFINITE DELIVERY WORK ORDER
Scope of Services
RCRA Activities
Cannon Air Force Base, Clovis, New Mexico
CZQZ 91 7003; CZQZ 93 7007

I. Objective. This effort is to accomplish EPA Region VI mandated activities at certain Solid Waste Management Units located at Cannon AFB. Previously prepared planning documents are to be utilized and endorsed in accomplishment of this work.

I. Scope of Services. The A-E shall do field investigation and boundary type surveying to acquire data and accomplish the required work. A Plat Sheet and a supplementary report will be prepared based on this work effort.

A. Tasks of work.

1. Task One is Administrative Requirements -- Survey Plats & Notification Monuments for following Solid Waste Management Units (SWMUs).

SWMU	Site Name	SWMU	Site Name
34	AGE Drainage Ditch	96	Entomology
76	Sludge Weathering Pit	101	Wastewater Treatment Lagoons
78	Fire Training Area # 1	102	Wastewater Treatment Effluent
81	Solvent Disposal Site	104	Landfill No. 4
82	Landfill No. 2	105	Landfill No. 3
86-90	Engine Test Cell	106	Fire Training Area No. 2
95	NE Storm Drainage Area	107	Fire Training Area No. 3

98 Sanitary Sewer Line will have traverse points at the manholes only, the sewer right-of-way will not be bounded by corners.

2. Task Two is for one Boring at SWMU # 96 Old Entomology Rinse Area.

II. SCHEDULE

RCRA Activities
Cannon Air Force Base, Clovis, New Mexico

Award Work Order	June 1, 1993
Pre-Field Work Plans to CoE, AF	July 9, 1993
Pre-work safety MEETING @ Cannon AFB, NM	August 3, 1993
Mobilization	August 16, 1993
Demobilization MEETING @ Cannon AFB, NM	September 14, 1993
Demobilize	September 17, 1993
Send Out Pre-Draft Supplement Report >CoE, AF	November 12, 1993
Pre-Draft Supplement Conference Call	December 7, 1993
Distribute Draft Supplement	January 7, 1994
Send Out Final Supplement	March 11, 1994
Decision Document Published CoE, AF	March 25, 1994

III. Task 1 is for Administrative Requirements -- Survey Plat & Notification Monuments. Details are later in this scope.

Boundary corners will be established at the corners of each SWMU, through on-site committee decision. Sanitary Sewer line shall be traverse points and not bounding corners.

The SWMUs needing boundary corners (or traverse points) and platting are listed in the following table.

SWMU	Site Name	IRP Designation	Width	Length
34	AGE Drainage Ditch	(IRP SD-15)	20	1200
76	Sludge Weathering Pit	(IRP WP-14)	30	30
78	Fire Training Area No. 1	(IRP FT- 6)	100	100
81	Solvent Disposal Site	(IRP DP-16)	100	100
82	Landfill No. 2	(IRP LF- 2)	500	1500
86-90	Engine Test Cell	(IRP SD-11)	100	500
95	NE Storm Drainage Area	(IRP SD-20)	50	1500
96	Entomology	(IRP SD-17)	200	200
98	Sanitary Sewer Line		10	10,000
101	Wastewater Treatment Lagoons		1000	2500
102	Wastewater Treatment Effluent		10	300
104	Landfill No. 4	(IRP LF- 4)	500	600
105	Landfill No. 3	(IRP LF- 3)	300	2000
106	Fire Training Area No. 2	(IRP FT- 7)	100	300
107	Fire Training Area No. 3	(IRP FT- 8)	150	200

Provide a boundary survey and plat for all sites listed in the table. Provide a graphical index of all sites on a base map.

1.1 Coordination is necessary between Base elements. Surveyor is responsible for obtaining all reference ties to base control.

1.2 Exhibits.

Exhibit "A": Base Map showing all possible SWMUs.

Exhibit "B": EM 1110-1-1002, Survey Markers and Monumentation. Use a Type G monument with a 5/8 inch rebar and no concrete.

1.3 Materials.

1.3.1 Monuments. Custom manufactured caps shall be acquired by the A-E. The design in enclosed. Furnish other materials necessary for property corners.

1.3.2 Blank Mylar. Draw the plat in ink on an Omaha District plan sheet which will be furnished by the COE.

2.0 PROCESS. Do a boundary survey that complies with state statutes and the requirements stated herein. Assign state plan coordinates to each property corner set and each control monument found. Cannon AFB, Curry County is in the New Mexico east state plane zone.

The following is 40 CFR (Code of Federal Regulation) 264.116 "Survey plat":

"No later than the submission of the certification of closure of each hazardous waste disposal unit, the owner or operator must submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Regional Administrator, a survey plat indicating the location and dimensions of landfills cells or other hazardous waste disposal units with respect to permanently surveyed benchmarks. This plat must be prepared and certified by a professional land surveyor. The plat filed with the local zoning authority, or the authority with jurisdiction over local land use, must contain a note, prominently displayed, which states the owner's or operator's obligation to restrict disturbance of the hazardous waste disposal unit in accordance with the applicable Subpart G regulations."

3.0 FIELD PROCEDURES AND EQUIPMENT.

3.1 Angular Measure. All angles shall be measured four or more times (twice in the direct and twice in the inverted position). All odd-numbered pointings shall be in the direct and all even-numbered pointings shall be in the direct and all even-numbered pointings in the inverted position. The mean value of the angle shall be accepted as the observed value unless the maximum deviation from the mean exceeds five (5.0) seconds in which case the angle shall be remeasured. The make, model, serial number and resolution of the instrument or instruments shall be shown in the remarks column of each field book index in which angles are recorded. NOTE: A theodolite or total station is acceptable as long as the required accuracy is obtained.

3.2 Linear Measure. All distances greater than two hundred (200) feet shall be measured with an electronic distance measuring instrument. All distances of two hundred (200) feet or less shall be measured with a standardized steel tape unless the electronic distance measuring instrument is more accurate than one part in 10,000 (1:10,000) of the distance being measured. Corrections for temperature and sag shall be applied to taped distances where appropriate. The make, model, serial number, resolution and accuracy of the electronic distance measuring instrument, as stated by the manufacturer, shall be recorded in the remarks column of the field book index in each book where the instrument(s) are used. All electronically measured distances shall be corrected for deviation from standard barometric pressure and temperature, and for slope, curvature and refraction. All electronically measured distances shall be measured twice. Deviation of the two measurements shall not exceed 0.03 ft. or 1/10,000 of the distance, whichever is the least. If the deviation exceeds these limits, the course shall be remeasured.

4.0 MONUMENTATION, IDENTIFICATION AND REFERENCES. The maximum distance between boundary monuments shall not exceed 1,400 feet. All boundary monuments (angle points, on-line points, etc.) shall be designated by a logical numbering system. Marker documentation sheets shall be provided showing at least three ties to all monuments set in the field. Approximate directions and measured distances shall be illustrated by a sketch. Coordinates and approximate state plane system designation shall be shown on the sheets. If field features (trees, fence posts, etc.) are not available for ties, then witness posts shall be set. Fence posts or Carsonite markers are suitable for this purpose.

5.0 COMPUTATIONS.

5.1 All computations shall be performed on the New Mexico State Plane System east zone. The contractor shall compute and utilize a combination factor for grid and sea level correction. That factor shall be reported back to the government with computations. All traverse lines or loops shall close one in ten thousand (1/10,000) or better, unadjusted and shall then be adjusted by angular adjustment and compass rule or by the method of least squares. The angular closure shall be determined and adjusted prior to the computation of coordinates. The angular closure shall not exceed four (4) seconds per angle and shall be distributed in direct proportion to the number of angles involved. The final angular or bearing and length of each course shall be computed from the final adjusted coordinates.

5.2 Side Shots. The coordinates of points established by side shot shall be computed after the traverse has been computed and adjusted; however, side shots shall not be considered standard procedure but used only as a last resort in difficult terrain. Side shots shall be tied in from two different locations. Inverse computations shall be made to determine course lengths and bearings along the boundary line and/or fence line.

6.0 FIELD NOTES. All field notes, including those for electronically measured distances shall be recorded in hardbound field books. The leaves of the field books shall contain no less than 50 percent high grade rag stock (such as in K&E Field Book 82-0012). All notes shall be neatly entered and shall contain complete records of all field work done. No permanent lettering, writing or labeling shall be placed on the outside of the field book. Each notebook page used shall bear the date of the work recorded thereon and the first initials and last names of the personnel in the party shall be listed at the beginning of each day's work. The first three pages of each book shall be accounted for in the index.

7.0 COORDINATE LISTING. The horizontal coordinate of all control used and monuments located or installed shall be provided in tabular form on 8 1/2" x 11" sheets. The coordinate system used shall be indicated and combination factor used shall be shown.

8.0 COMPLETION OF SURVEY WORK. Completion of work shall include acceptable performance and delivery of the following materials:

Original field survey notes.
Original computations.
Tabulated sheet of State Plane Coordinates.
Marker documentation sheets for all monuments set.

Original Plats (3)
Auto-positive copy to CoE TM

IV. Task 2 is one boring at the sink rinse pit of the old Entomology Building, SWMU # 96, (IRP SD-17).

Drill one boring to 100' below ground surface at the point of the sink rinse pit. Soil samples will be taken at 10' intervals starting at the 10' depth and continuing to the bottom of the boring. The soil samples will be analyzed using the following methods. Ten percent Quality Control samples shall be taken by the A-E, and 10 % Quality Assurance samples shall be taken and shipped to MRD lab for Government QA.

The location of the sink rinse pit was surveyed during previous field work.

1. Collection of Analytical Samples.

1.0 Field Investigations. An endorsement of previously submitted CDAP shall be submitted by the A-E for approval before any field work is begun. This plan shall include, at a minimum, the A-E's methods, equipment, and procedures for carrying out all field work including drilling, soil, sediment, and decontamination procedures.

The A-E shall provide a qualified geologist or geotechnical engineer who shall be on site and responsible for all soil sampling during all soil sampling activities. The A-E shall notify the U.S. Army Corps of Engineers (USACE) representative at least one week prior to the initiation of any of the above field investigations so that a USACE representative can plan to be present for field oversight.

2.0 Soil Borings and Monitoring Well Installations (General). Soil borings will be required to investigate the vertical extent of site-specific contaminants. Guidance for all field activities may be obtained from CEMRD Policy Letter # 90-001 Installation of Ground-Water Monitoring Wells and Exploratory Borings at Hazardous Waste Sites. All borings for soil sampling will be drilled and sampled according to the following requirements.

2.1 Not used.
2.2 Not used.

2.3 Drilling Methods and Decontamination. All borings shall be drilled by a method of the A-E's choosing. The method(s) shall be proposed by the A-E and approved by the USACE prior to use. The method(s) shall also be discussed in the QAPP. Soil volume recovered shall be adequate for analytical requirements. Use of a 3-inch diameter split spoon is acceptable, and is recommended. If the sample volume still is not adequate, another sample shall be attempted from the same depth in a boring drilled immediately adjacent to the boring in which the sample failed. This shall be done at no additional cost to the Government. Some soil samples for chemical analysis may be obtained with a stainless steel hand auger. All sampling equipment shall be decontaminated before use by steam cleaning or using Liquinox or equivalent, followed by a tap water rinse, an isopropanol rinse, and a double

deionized water rinse. Rinse waters shall be contained in pump sprayers to prevent used rinse water from contaminating subsequent samples. The working face of the rig and drill rods shall be steam cleaned between holes. The rig shall be free of leaks which could contaminate the holes (i.e., hydraulic fluid, oil, gas, etc.). No grease shall be used on drill pipe joints; however, Teflon tape or vegetable oil is acceptable. Air quality shall be monitored in and near the hole during drilling using a photoionization detector (PID) or organic vapor detector (OVA).

2.4 Geotechnical Sampling Requirements. In addition to samples required for chemical analysis described in the Site Specific section of this Scope of Services, soil samples shall be taken for lithologic description as described below:

Test Type	Number of Tests
Gradation analysis (ASTM D 421 & 422)	Three in the boring

2.6 Monitoring Well Construction Diagrams. NOT USED.

2.7 Back filling. All borings shall be back filled by tamping the cuttings back into the hole or all borings shall be back filled with the grout mixture described in paragraph 4.5 and tremied into place. All borings shall be back filled immediately after the sampling is completed unless saturated conditions have been encountered or a monitoring well is installed. In borings encountering saturated conditions, a 24-hour ground-water level shall be measured before back filling. Borings left open overnight shall be covered to lessen the potential for injury to personnel and to minimize the potential for any surface drainage entering the boring.

2.8 Drill Cuttings. Unless otherwise noted in the Site Specific section of this Scope of Services, all drill cuttings are to segregated into uncontaminated-minimally contaminated, and contaminated cuttings. The A-E is to propose a field screening procedure and contamination level where uncontaminated- minimally cuttings can be safely distributed on the surface around the boring location and contaminated cuttings are drummed for later treatment and/or disposal by the A-E. Cuttings, when distributed around the boring are to be evenly distributed and leveled near the boring. Alternatively, uncontaminated cuttings may be disposed of at a site chosen by the site coordinator.The A-E shall determine a procedure for screening, treatment and disposal of any drill fluid used to drill a boring or development water produced during boring or monitoring well installation. The field procedures chosen by the A-E shall be presented to USACE for approval prior to starting.

2.9.2 Soil Borings/Sampling. All soil sampling locations shall be located horizontally. Each location shall be determined to the nearest foot, as measured from a permanent surface feature at or near each site.

2.9.3 Physical Features. At each site, all above ground and, where possible, underground physical features shall be either verified with previous report mapping or determined as required. All above ground physical features will be located/verified to the nearest foot. Permanent control monuments shall be placed in accessible locations within the limits of the work if existing permanent monuments are not located within 1000 feet of a site. One set of monuments is allowable for adjacent sites. These monuments shall be set no closer than 500-feet to each other. Coordinates and elevations shall be established to the closet 0.01-foot for each monument. The location, identification, coordinates and elevations of the wells and monuments shall be plotted on maps with a scale large enough to show their location with reference to other structures at the individual sites. A tabulated list of the monitoring wells and monuments, copies of all field books, and all computation sheets shall be prepared and submitted to the Contracting Officer's Representative (USACE). The tabulation shall consist of the designated number of the well or monument, the X and Y coordinates, and all the required elevations. These items shall be submitted to Omaha District no later than the Draft Project Report.

3.0 Sampling Techniques - Equipment and Methods.

3.1 Soil Sampling. Sampling for chemical analysis shall be performed using a stainless steel split-spoon sampler. Soil grab samples for volatile organic or semi-volatile analyses shall be obtained by subsampling the material retrieved in the split spoon. Subsampling shall be done immediately upon opening the split spoon, and shall be done as soon as possible once the split-spoon sample is taken from the boring. The portion of the split-spoon sample which represents slough shall not be subsampled.

All sampling devices and decontamination procedures shall be performed in a manner consistent with the most recent EPA guidelines, but as a minimum shall consist of steam cleaning, Liquinox,or equivalent, followed by a tap water rinse, an isopropanol rinse, and a double deionized water rinse.

Compositing of soil samples for total organic carbon, total recoverable petroleum hydrocarbons, and metals, shall be performed in a stainless steel bowl using stainless steel stirring devices that have been decontaminated prior to each compositing procedure. This decontamination procedure will be the same as that specified for sampling equipment.

Sampling equipment, sampling methods and decontamination procedures shall be clearly indicated by the A-E in the QAPP.

3.2 Water Source. Water for drilling, steam cleaning and other necessary field activities shall be arranged by the A-E and approved by the USACE. Chlorine-free water shall be used if a suitable source is available. The A-E shall be responsible for collecting and transporting all water to the drilling areas for required uses. The A-E shall sample the water prior to its use and test it for the same parameters specified for ground-water samples under the site-specific paragraphs of this scope and determine its chlorine content. The A-E shall also obtain the results of any additional analyses performed on the source of water in the past year, if available. This information and documentation of the source of the water (i.e. fire hydrant location, etc.) which was used and any impact it may have on any of the analytical results performed under this scope of services shall be included in both the Draft and Final Project reports. The A-E shall be responsible for providing any deionized water required to perform this work.

Analytical Plan and General Chemistry Section for Entomology Pit

1 General. Sampling activities and chemical analysis for the investigation at this site at Cannon AFB must follow appropriate procedures necessary to obtain defensible data. The following sections refer to the acquisition of good quality data generally found in ER-1110-1-263, 1 October 1990. These sections have been revised where necessary and included here for emphasis. All procedures and activities performed in the acquisition of data as described below must be included in the Chemical Data Acquisition Plan (QAPP) for approval.

2 Chemical Data Acquisition.

2.1 Definition and Responsibility. Chemical data acquisition (CDA) consists of all field activities, laboratory activities, and contract deliverables related to the acquisition and reporting of chemical data for HTW investigation or remedial activities, which would include applicable activities at Cannon AFB. Chemical Data Acquisition as described in the QAPP must be approved by the CO prior to initiation of field work. In the event corrections and comments on the draft are provided by the CO, the changes, documented by written annotated comments shall be incorporated by the authors in a revised plan before final approval is given. It should be noted that the purpose and contents of the QAPP are the same as the Sampling and Analysis Plan (SAP) required for Superfund investigations by the EPA. For this project, SAP, consisting of a Quality Assurance Project Plan (QAPP) and a Field Sampling Plan (FSP) will be used. Additional requirements by the State of New Mexico shall also be addressed.

2.2 Chemical Quality Data Management. USACE requires that Quality Control (QC) and Quality Assurance (QA) samples be collected and analyzed by the contract laboratory and the USACE QA laboratory, respectively. These QC and QA samples include splits or replicates of field samples. QC samples, help the contractor and contract laboratory to identify and diagnose problems related to sampling and analysis. QA samples, are sent to a USACE QA laboratory by overnight delivery for government monitoring of sampling and contract laboratory performance. The number of QA/QC samples to be taken shall be detailed in the QAPP under Chemical Data Quality Objectives. When the following procedures, performed by the USACE QA laboratory, demonstrate that chemical quality control contract requirements were not met, samples may be reanalyzed and/or re-collected at the expense of the prime contractor:

2.2.1 Inspection of QA samples to insure that sampling procedures correspond to Chemical Data Acquisition with regard to sample containers, preservation, labeling, chain of custody, etc.

2.2.2 Analyses of QA samples.

2.2.3 Evaluation of contractor deliverables specified for the acquisition of data.

2.2.4 Comparison of analytical results obtained by contract laboratory and USACE QA laboratory from split or replicate samples. The procedures for obtaining QA laboratory services are in Appendix E to ER 1110-1-263.

2.3 Not Used.

2.4 Contract Laboratory Validation. Any laboratory performing chemical analyses shall be validated by USACE Missouri River Division (CEMRD-ED-EC). Laboratories are validated for each environmental matrix and each specific analytical method to be employed. If the prime contractor selects a laboratory which has a current (within 1 year) validation for all analytes and matrices specific to its project, additional evaluation will not be necessary. If the prime contractor selects a laboratory which does not have a current validation, the laboratory shall be validated prior to approval of the QAPP. Commercial laboratory validation procedures are in Appendix C to ER 1110-1-263. Samples may not be subcontracted to another laboratory without the approval of CEMRD-ED-EC and unless the second laboratory is validated for the parameters concerned.

2.4.1 The prime contractor or the contract laboratory will hold or make available all project raw data for a period of ten (10) years after samples have been analyzed.

2.5 Chemical Data Acquisition elements of the QAPP include the following as a minimum.

2.5.1 Project Description. This section shall include a description of the work site and any unusual conditions. Anticipated project start and completion dates shall be estimated. This section shall also provide a summary of past and future work at the site including past multimedia chemical data of significance as well as a presentation of the multimedia sampling to be carried out in the present work effort. It is the intent at Cannon AFB to investigate the extent of contamination if any, at Landfill # 5.

2.5.2 Chemical Data Quality Objectives. This section shall include a description of the general scope of work and relevant background information as it relates to the acquisition of chemical analytical data. State the objectives of the project: what questions must be answered and what decisions must be made. Describe the level and extent of chemical data required to answer questions and support decisions during the project: the approach for sample collection, sample analysis, and QA/QC which will result in the required chemical data.

2.5.3 Contractor Project Organization and Functional Area Responsibilities. The project organization for the prime contractor and any subcontractors shall be clearly defined with a discussion of quality control responsibilities. The prime contractor's Quality Assurance (QA) Officer shall report to a responsible senior officer of the company (i.e., QA management shall be separate from project management). A list of all individuals shall be provided and will include QC officers for the various components (those responsible for initiating and carrying out corrective actions and those involved in the data reporting sequence) and all analytical laboratory personnel (supervisors, chemists, and technicians). Resumes of all non-laboratory AE/Contractor personnel listing education and experience are required, including personnel collecting samples. List the names of field personnel that will wear monitoring equipment. For laboratory personnel that are not included in the Lab Quality Management Plan, resumes listing education and experience are required.

2.5.4 Field Activities. Briefly summarize types of field activities required by the project.

2.5.5 List of Equipment, Containers, and Supplies to be taken to the Field. This section shall include all sample screening equipment to be used (brand, model, serial number) and a description of its calibration as well as sampling equipment, decontamination supplies and sample containers (specific numbers and types).

2.5.6 Sampling Locations. This section shall provide the location of each sampling point on a site map. These locations shall be identified by the Contractor after a visual inspection if they are not already specified. The rationale for the sampling location and frequency (including QA/QC) shall be addressed in the Section Data Quality Objectives.

2.5.7 Sampling and Preservation Procedures. The QAPP shall include a table, which lists sampling locations, matrix (waste, soil, water, etc.), number of field samples, number of split or replicate samples, etc. Specific sampling, preservation, etc., details shall be included. All details shall meet the requirements of one of the following: (a) EPA SW-846 method; (b) another EPA method; (c) ASTM method; (d) NIOSH method (for air sampling); or (e) another accepted published method. Container and preservation specifications shall meet all appropriate requirement. (see Appendix F to ER 1110-1-263). Each table entry shall include the reference, if any, from which the specifications were taken. Any modifications to the standard methods must be approved by the CO with the concurrence of the QA laboratory prior to their use. All methods should be referenced to the most recent edition of their source. If a standard method is not available, the Contractor or subcontractors shall propose a nonstandard method with validation data for approval by the CO.

2.5.8 Details of Sampling and Preservation Procedures. The composition and volume of sample containers shall be specified along with a description of their preparation and cleaning. Sampling equipment directly contacting the sample shall be stainless steel or Teflon. The QAPP shall describe the cleaning of equipment and precautions for prevention of sample cross contamination during collection. Any field screening methods employed to select samples for analyses shall be discussed in detail. Compositing and homogenizing procedures shall be included where appropriate. Sample containers, volumes, preservatives and holding times for the common analyses in low concentration are presented in Table 1 & Table 2. A more detailed table is presented in Table F-1 and F-2 of the Sample Handling Protocol (Appendix F).

2.5.8.1 Soil Sampling Procedure. Using stainless steel or Teflon sampling equipment enough solid is removed from a specified depth to fill the required containers. The volatile organic samples should be removed first with as little mixing as possible. The remaining soil shall be placed in a clean stainless steel bowl and mixed thoroughly with stainless steel implements (spoons, spades, etc.), then divided among the sample containers to be filled and properly preserved. QC and/or QA sample containers shall be filled from the same mixture as one of the samples. If other methodologies are warranted as specified by the Data Quality Objectives they must also be clearly defined in the QAPP. A separate Standard Operating Procedure (SOP) can be written and referenced in the QAPP.

2.5.9 Water Sampling Procedure. An attempt shall be made to obtain the most representative water samples where appropriate, which includes field blanks,etc. Containers to be analyzed for volatiles should be filled first allowing no headspace and with as little disturbance of the water as possible. If preservative is added to the bottles prior to shipment to the field, care must be taken not to overfill the containers and Ph must be measured on samples where a value is specified. Again, if water sampling is required, a separate SOP can be written or water sampling procedure can be incorporated in the SOP for soil sampling.

2.5.9.1 Other Matrices. Sampling methods and equipment used shall meet the requirements of EPA or NIOSH methods.

2.5.10 Field Documentation. The system for identifying and tracking the samples shall be described, and shall include the recording of field data in permanently bound notebooks along with the method of relating the field data to the proper samples. All field documentation shall be done in indelible ink. Daily Quality Control Reports shall be prepared daily, dated, signed by the site manager, and sent to the CO at a rate approved by the CO. These reports shall include (with respect to chemistry) weather information at the time of sampling, samples taken with reference given to appropriate sections of the QAPP, field instrument measurements and calibrations. Any deviations from the QAPP shall be stated.

2.5.11 Sample Chain of Custody and Transportation. All sample labeling, packing, transportation and chain of custody procedures shall follow the USACE Sample Handling Protocol (Appendix F to ER 1110-1-263).

2.5.12 Laboratory Analytical Procedures. Specific laboratory procedural details shall be included. Each method shall be specified exactly and in detail by one of the following: (a) reference to an EPA SW-846 method; (b) reference to another EPA method; (c) reference to an ASTM method; (d) reference to a NIOSH method (for air analysis); (e) reference to another accepted published method; (f) reference to an accepted published method with a description of any deviations from the published procedure; or (g) complete description of the procedure, e.g., copies of laboratory instructions. EPA SW-846 methods shall be used where possible. Generally, nonstandard methods are not allowed. In special cases that require the consideration of nonstandard methods, the contract laboratory shall be prepared to provide validation data. The use of proposed nonstandard methods requires prior approval of the CO. A list of sample preparation and analytical methods most frequently used is presented in Table D-2 (ER-1110-1-263). A table shall be included which lists for each matrix sample preparation method number, analytical method number, analytes and laboratory quantitation limits.

2.5.13 Preventive Maintenance. The instrument, including manufacturer, model, accessories, etc., shall be specified and preventive maintenance shall be described. Preventive maintenance shall be performed by qualified personnel. Records of repairs, adjustments and calibrations shall be maintained and available for inspection by the CO on request. This includes any field instrumentation.

2.5.14 Instrument Calibration and Frequency. Description of the procedure used for calibration and frequency of checks is required for each instrument or method including field instruments. These shall be consistent with the requirements of the contract and the analytical method.

2.5.15 Analytical Methods. Include the required concentration range and data on the sensitivity (detection limits), precision, and accuracy. Indicate how pre-existing data on sensitivity, precision, and accuracy were determined, and procedures to be used to validate the method. State source and purity of analytical reference materials and laboratory chemicals necessary to perform the analyses. Nominal detection limits for common analytes are given Appendix D Tables D-3 through D-6 of the ER-1110-1-263. DQO's for specific projects will affect the value of required detection limits and goals for precision, accuracy, and completeness.

2.5.16 Method Specific Data Quality Objectives. Provide objectives for precision, accuracy, detection limits, and completeness. DQO's for accuracy and precision established for each measurement parameter will be based on prior knowledge of the specific measurement system used and method validation studies employing replicate analyses, spikes, standards, calibrations, recoveries, control charts and project specific requirements. Completeness refers to the amount of valid data obtainable (by the specific method in the laboratory used with the instrument to be employed) from a measurement system compared to the expected amount of data, and is usually expressed as a percentage.

2.5.17 Quality Control Checks. Quality control checks are necessary to evaluate performance reliability for each measurement parameter. Describe procedures to assess the precision, accuracy and completeness of the measurement. The numbers and types of internal laboratory QC checks and samples proposed (e.g., blanks, duplicates, splits, spikes, surrogates, and reference standards, as applicable) shall be defined clearly. At a minimum these must be run at the rates prescribed in the individual methods. The laboratory's established practice for including control samples among the samples analyzed, and any additional controls required by the present project, shall be described. Describe the feedback systems used to identify problems by means of the results obtained from control samples. Limits of data acceptability shall be included. Results from laboratory internal quality control checks shall be reported with the analytical data.

2.5.18 Corrective Action. Plans for corrective actions to be taken when results appear unusual, questionable, or limits of acceptability are exceeded shall be included. When limits of acceptability are exceeded, information justifying the poor recovery or precision shall be documented. Describe how reestablishment of control is demonstrated.

2.5.19 Data Reduction, Validation, and Documentation. Equations, including units, required to calculate the concentration or value of the measured parameter, shall be included. Describe the data management systems which collect raw data, store data, and document quality control data. If statistical procedures are used for data review before reporting, include descriptions. Data validation procedures and organization shall be specified. The contract laboratory or the prime contractor hold and make available all project raw data for a period of ten (10) years after samples have been analyzed.

2.5.20 Chemical Data Quality Control Deliverables. The contractor shall address the frequency and content of chemical data quality control reports that shall be submitted during the project.

2.5.20.1 Daily Quality Control Report (DQCR) during field activities. (See Exhibit F for an example).

2.5.20.2 Daily Quality Control Report from the contract laboratory if appropriate.

2.5.20.3 Non-routine Occurrences. Include problems identified, corrective actions, and verbal/written instructions from USACE personnel for sampling or re-analysis. These reports of significant problems should be sent to the CO within 48 hours of the occurrence.

2.5.20.4 Data Report to the QA Laboratory. The contractor's data must be submitted to the designated quality assurance laboratory (for data validation and comparison purposes) as soon as it is available. This submittal should include all sample, blank and internal quality control results such as spike and surrogate recoveries and agreement between replicate analyses. Interim data reports may be requested if the project warrants them. The following are minimum data reporting requirements:

2.5.20.4.1 Sample Ids. The contractor shall prepare a tabular presentation which matches contract laboratory sample Ids to QA laboratory sample Ids. This table shall identify all Field Duplicates and Field Blanks as such and match with their corresponding field samples where applicable.

2.5.20.4.2 Sample Receipt. The contractor shall complete and report a "Cooler Receipt Form" for all shipments for purposes of noting problems in sample packaging, chain-of-custody, and sample preservation. An example form is available from the Missouri River Division Laboratory.

2.5.20.4.3 The Quality Assurance (QA) Laboratory for this project shall be the Corps of Engineers, Missouri River Division Laboratory (CEMRD-EP-LC). The QA lab shall be notified approximately one (1) week prior to any QA sample shipments being shipped to the CEMRD laboratory. Saturday shipment arrivals shall be cleared with the lab in advance.

The QA shipping address is: Telephone: (402) 444-4314

CORPS OF ENGINEERS, Laboratory
ATTN: Sample Custodian
420 South 18th Street
Omaha, NE 68102-2586

2.5.20.4.4 MRD Project Identification of QA Samples. The A/E shall be responsible for assigning the Project ID " MRD LIMS #2008 to the labels, chain-of-custody records, and all correspondence for all QA samples shipped to the MRD Laboratory throughout the duration of this project.

2.5.20.4.5 Disposal of QA Samples. The A/E is required to fill out the attached form titled " Characterization of Environmental Samples for Disposal" which will assist in the disposal of the QA samples.

2.5.20.4.6 General Organic And Inorganic Reporting. For each analytical method run, the contractor shall report all analytes for each sample as a detected concentration or as less than the specific limits of quantitation. Generally, all samples with out-of-control spike recoveries being blamed on matrix interferences shall be designated as such. All soil samples shall be reported on a dry-weight basis with percent moisture also reported unless otherwise approved. The contractor shall also report dilution factors for each sample as well as the date of extraction (if applicable) and date of analysis.

2.5.20.4.7 Internal Quality Control Reporting (at a minimum, internal quality control samples shall be analyzed at rates specified in the specific methods or higher rates if required to meet project specific Data Quality Objectives):

2.5.20.4.8 Laboratory Blanks (Method Blanks and Instrument Blanks). All analytes shall be reported for each laboratory blank. All non-blank sample results shall be designated as corresponding to a particular laboratory blank in term of analytical batch processing.

2.5.20.4.9 Surrogate Spike Samples. Surrogate Spike Recoveries shall be reported with all organic method reports where appropriate (i.e. when the method requires surrogate spikes). The report shall also specify the control limits for surrogate spike results as well as the spiking concentration. Any out-of-control recoveries (as defined in the specified method) shall result in the sample being rerun (both sets of data are to be reported) at no additional cost to the government.

2.5.20.4.10 Matrix Spike Samples. Matrix Spike Recoveries shall be reported for all organic and inorganic analyses. All general sample results shall be designated as corresponding to a particular matrix spike sample. The report shall indicate what field sample was spiked even if it was not a Corps of Engineers project sample. The report shall also specify the control limits for matrix spike results for each method for each matrix.

2.5.20.4.11 Laboratory Duplicates and/or Matrix Spike Duplicate Pairs. Relative Percent Difference shall be reported for all duplicate pairs as well as analyte/matrix specific control limits.

2.5.20.5 QUALITY CONTROL SUMMARY REPORT (QCSR). This document addresses quality control practices employed and summarizes the DQCR. Issues covered in this report shall include a discussion of all data points which may have been influenced or compromised and their impact on the Data Quality Objectives or remedial decisions. An example of the elements required for this level of effort are presented below, but are not limited to the following items:

2.5.20.5.1 Project Description - Elements of this include report organization and site description.

2.5.20.5.2 Laboratory Quality Control Activities - Elements are a summary of planned laboratory quality control activities, a summary of any deviations from planned activities, and a summary of the evaluation of the data quality for each analysis and matrix.

2.5.20.5.3 Field Quality Control Activities - Elements are a summary of planned field quality control activities, a summary of any deviations from planned activities, and a summary of the evaluation of the quality of the sampling.

2.5.20.5.4 Data Presentation and Evaluation - Elements are an assessment of sampling and analysis techniques, an evaluation of the data quality of each matrix and parameter, and an evaluation of the usability of the data.

2.5.20.5.5 Lessons Learned - A summary of field or analytical procedures that could be changed or modified to better characterize chemical contamination in future work efforts.

2.5.20.5.6 DQCR Consolidation - Daily Quality Control Reports are to be consolidated and summarized.

3 Analytical Requirements. The following matrix-specific analytical methods are recommended for the soil samples taken from the from the sites along with appropriate digestion methods must be specified in the QAPP unless otherwise approved by the Corps of Engineers. These methods must be EPA-approved and consistent with any applicable current State of New Mexico requirements as well as meeting specific Data Quality Objectives. The objectives and rationale and end data use for these methods must be clearly stated in the QAPP. These methods must be followed explicitly and all quality control procedures detailed in the respective methods unless otherwise authorized by the Corps of Engineers. Analytical and statistical control parameters are outlined in the section of this Scope of Services concerned with chemical data acquisition and must be consistent with the ER-1110-1-263, 1 October 1990.

3.1 Soil. Soil samples taken from the previously documented sites shall be analyzed by approved EPA methods as described in the current edition SW-846, unless otherwise indicated. These methods must be detailed as described above for the QAPP.

3.1.1 Total Metals.

3.1.1.1 Target Analyte List (TAL) metals are aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc. The TAL metals shall be analyzed by Methods 3050/6010 except for Arsenic, selenium, and sometimes thallium shall be analyzed by the respective graphite furnace methods 3050/7060, 3050/7740 and 3050/7841. Mercury shall be analyzed by cold vapor Method 7471.

3.1.1.2 Priority Pollutant List (PPL) metals are antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium,and zinc. The PPL metals shall be analyzed by Methods 3050/6010 except for Arsenic, selenium, and sometimes thallium shall be analyzed by the respective graphite furnace methods 3050/7060, 3050/7740 and 3050/7841. Mercury shall be analyzed by cold vapor Method 7471.

3.1.1.3 RCRA metals are arsenic, cadmium, chromium, copper, mercury, selenium, silver and zinc. Arsenic, and selenium shall be analyzed by the respective graphite furnace methods 3050/7060, and 3050/7740. Mercury shall be analyzed by cold vapor Method 7471.

3.1.2 Volatile organics shall be analyzed by 8240 for all compounds listed in the Targeted Compound List (TCL) of this method unless otherwise approved. For lower detection limits Method 8240 may be combined with the use of a capillary column. The use of Method 8260 will accomplish the same purpose. (This analysis shall also include a ten peak library search for the tentative identification of compounds not on the TCL). The GC/MS methods are recommended based upon their potential for positive identification.

3.1.3 Semi-volatile organics shall be prepared by methods 3540 or 3550 and analyzed by method 8270 for all compounds in the Targeted Compound List (TCL) of this method unless otherwise approved by the Corps. In addition, a twenty peak library search shall tentatively identify compounds not listed in the TCL. Appropriate extract cleanup methods shall also be performed where needed as specified in Section 7.2 of this method.

3.1.4 Pesticides/PCBs shall be analyzed by EPA Method 3550/8080

3.1.5 Herbicides shall be analyzed by EPA Method 8150

3.1.6 Total Petroleum Recoverable Hydrocarbons (TRPH) shall be analyzed by EPA Method 9071/418.1

3.1.7 Total Petroleum Hydrocarbons (TPH) shall be analyzed by the Cal.

LUFT Mod. EPA 8015 for Light and Heavy Hydrocarbons.

3.2 Water. Water Sample analyses are not required at this time, however, should it be required the following applies. Water samples shall be analyzed by approved EPA methods as described in the current edition SW-846, unless otherwise indicated. These methods must be detailed as described above for the QAPP.

3.2.1 Total Metals.

3.2.1.1 Target Analyte List (TAL) metals are aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc. The TAL metals shall be analyzed by Methods 3005/6010 except for Arsenic, and selenium which shall be analyzed by the respective graphite furnace methods 3005/7060, and 3005/7740. Mercury shall be analyzed by cold vapor Method 7471.

3.2.1.2 Priority Pollutant List (PPL) metals are antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc. The PPL metals shall be analyzed by Methods 3005/6010 except for Arsenic, and selenium which shall be analyzed by the respective graphite furnace methods 3005/7060, and 3005/7740. Mercury shall be analyzed by cold vapor Method 7471.

3.2.1.3 RCRA metals are arsenic, cadmium, chromium, copper, mercury, selenium, silver and zinc. Arsenic, and selenium shall be analyzed by the respective graphite furnace methods 3005/7060, and 3005/7740. Mercury shall be analyzed by cold vapor Method 7471.

3.2.2 Volatile organics shall be analyzed by 8240 for all compounds listed in the Targeted Compound List of this method unless otherwise approved. (This analysis shall also include a ten peak library search for the tentative identification of compounds not on the TCL). This method is recommended based upon its potential for positive identification.

3.2.3 Semi-volatile organics shall be prepared by methods 3510 or 3520 and analyzed by method 8270 for all compounds in the Targeted Compound List (TCL) of this method unless otherwise approved by the Corps. In addition, a twenty peak library search shall tentatively identify compounds not listed in the TCL. Appropriate extract cleanup methods shall also be performed where needed as specified in Section 7.2 of this method.

3.2.4 Total Recoverable Petroleum Hydrocarbons shall be analyzed by EPA Method 418.1.

3.2.5 Pesticides/PCBs shall be analyzed by EPA Method 3520/8080.

3.2.6 Herbicides shall be analyzed by EPA Method 8150.

4 <u>Site-Specific Investigations</u>. This site has been exposed to pesticide/PCBs and possible herbicides, thus the analytes of primary concern will be from those sources.

4.1 <u>Soil Samples</u>. USEPA SW-846 Methods and protocols shall be followed for Organic and Inorganic analyses. Detection Limits shall be such that the DQOs are attained and not necessarily the SW-846 suggested detection limits. These Detection limits shall be referred to as Reporting Limits and shall be specified in the QAPP using tables. Samples of Reporting Limits are attached to the Chemical Supplement to the Scope of Services.

4.1.1 Analysis. Ten (10) soil samples, shall be analyzed by methods specified in 3.1, for the following:

4.1.1.1 Volatile Organic Compounds (VOC)

4.1.1.2 Semi-Volatile Organic Compounds (BNA)

4.1.1.3 Total TAL Metals (23)

4.1.1.4 Pesticides/PCBs

4.1.1.5 Herbicides

4.1.1.5 TRPH by EPA Method 9071/418.1

5 VALIDATION OF SW-846 ANALYTICAL DATA.

Since EPA SW-846 methods will be used instead of the EPA CLP, the term "Data Validation" shall be meant as using the EPA CLP Functional Guidelines to evaluate SW-846 generated data where applicable.

All "critical" samples or a minimum ten percent (10%) of all samples, will be subjected to a complete data validation in accordance with USEPA functional guidelines for data analyses. The rest of the samples shall undergo a QC review.

Critical data as defined by OSWER directive "Guidance for Data Useability in Risk Assessment" (EPA 540/G-90/008, October 1990) are those data considered to be crucial for the purposes of the risk assessment. A minimum of one sample per source, per sample medium, per exposure pathway will be considered critical for those analytes to be used in the risk assessment. If this definition results in more than one sample which could be chosen for a given source (medium and exposure pathway), then the sample to be considered "critical" shall be the one for which analysis indicated the largest number of chemicals of concern are present at detectable levels.

EPA SW-846 constituents for this site include volatile organic compounds, semi-volatile organic compounds, organochlorined pesticides and PCBs, chlorinated herbicides, total petroleum hydrocarbons, metals and total organic carbon.

5.1 Full Data Validation of Volatile and Semi-volatile Organic Compounds shall follow guidance for the major categories listed below, as contained in the 1988 Functional Guidelines for Evaluating Organics Analyses or Draft 1990 Revised 1991 National Functional Guidelines for Organic Data Review. **

- Holding Times
- GC/MS Tuning and Performance
- Calibration
  - Chromatographic Resolution
  - Initial
  - Continuing
- Blanks
- Surrogate Recovery
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicates
- Internal Standards Performance
- TCL Compound Identification
- Compound Quantitation and Reported Detection Limits or CRQLs(1990-91)
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data for a Case
- Laboratory Control Samples (1990-91)
- Regional Quality Assurance and Quality Control(1990-91)

** To be Decided

The specific QC criteria stated in the Cannon AFB Quality Assurance Project Plan (QAPP) for analytes (Tables ---) shall be used to assess precision and accuracy. Sample data shall be validated in accordance with the 1988 or 1990-91 Organic Guidelines.

5.2 Full Data Validation of the Organochlorinated Pesticides and PCBs shall include the following major categories, as contained in the 1988 Organic Guidelines.

Holding Times
Instrument Performance
Calibration
  Initial
  Continuing
Blanks
Surrogate Recovery
Matrix Spike/ Matrix Spike Duplicate
Internal Standards Performance
Compound Identification
Compound Quantitation and Reported Detection Limits
Overall Assessment of Data for a Case

The specific QC criteria stated in the Cannon AFB Quality Assurance Project Plan (QAPP) for SW-846 analytes (Tables) shall be used to assess precision and accuracy. Sample data shall be validated in accordance with the 1988 Organic Guidelines to the CLP methods.

5.3 Full Data Validation of Metals shall include the following major categories, as contained in the 1988 Functional Guidelines.

Holding Times
Calibration
  Initial
  Continuing
Blanks
ICP Interference Check Sample
Laboratory Control Sample
Duplicate Sample
Matrix Spike Sample
Furnace Atomic Absorption QC
ICP Serial Dilution
Sample Result Verification
Field Duplicate
Overall Assessment of Data for a Case

The specific QC criteria stated in the Cannon AFB Quality Assurance Project Plan (QAPP) for SW-846 analytes (Tables) shall be used to assess precision and accuracy. Sample data shall be validated in accordance with the 1988 Inorganic Guidelines to the CLP methods.

5.4 Full Data Validation of other Analytes

Full data validation of other analytes shall consist of the applicable portions of the following, as defined by QA/QC specifications contained in the Cannon AFB QAPP and the analytical methodology:

5.4.1 Evaluation of spike recoveries (matrix spikes and control sample spikes) and duplicate analysis precision (field duplicates, laboratory duplicates, and matrix spike duplicates) with data outside of the accuracy and precision limits specified in Table ---qualified as estimated, "J" (or rejected, "R" if, in the professional judgment of the validator, the data are unusable).

5.4.2 Evaluation of laboratory and field blank contamination with validation of data from samples associated with contaminated blanks, following guidance from 1988 or 1990-91 Organic Guidelines, as summarized in the Cannon AFB QAPP.

5.4.3 Evaluation of compliance to holding time limits, with data outside of the holding time limits specified in Tables--- of the QAPP qualified as estimated (or rejected if, in the professional judgment of the validator, the data are unusable).

5.4.4 Evaluation of calibration and tuning information to determine compliance with specifications contained within the individual methodologies.

5.4.5 Evaluation of compound quantitation with recalculation of at least 10 percent of the value from the raw data. If problems are found, additional data calculations will be checked.

5.4.6 A narrative overall assessment of data for a case will be provided, as described in the 1988 or 1990-91 Organic Guidelines and summarized in the Cannon AFB QAPP.

5.5 QC REVIEW OF NON-CRITICAL SAMPLE DATA PACKAGES

5.5.1 Review of Volatile and Semi-volatile Organic Analyses

Volatile and Semi-volatile organic analytical data shall undergo evaluation of:

Holding Times
Blanks
Surrogate Recovery
Matrix Spike/Matrix Spike Duplicates
Field Duplicates
Overall Assessment of Data for a Case
Completeness of Data Package

5.5.2 Review of Pesticides/PCBs Analyses

Pesticides and PCBs analytical data shall undergo evaluation of:

Holding Times
Blanks
Surrogate Recovery
Matrix Spike/Matrix Spike Duplicates
Field Duplicates
Overall Assessment of Data for a Case
Completeness of Data Package

5.5.3 Review of Other Analytical Data

Other analytical data shall undergo where applicable, evaluation of:

Holding Times
Blank Contamination
Spike Recoveries (matrix spikes, surrogate spikes, laboratory control sample spikes.
Duplicate analysis precision (field duplicates, laboratory duplicates, and matrix spike duplicates
Overall Assessment of Data for a Case
Completeness of Data Package

TABLE 1
SOIL SAMPLING SPECIFICATIONS

PARAMETER	CONTAINER[1]	SAMPLE PRESERVATION[2]	MAXIMUM HOLDING TIME[3] EXTRACTION	ANALYSIS
Volatile Organics	2 x 40 Ml G, Septa vial	Ice to 4°C	-	14 d
B/N/A	1 x 8 oz wide mouth jar, G	Ice to 4°C	7 d	40 d
PCBs/ Pesticides	1 x 8 oz wide mouth jar, G	Ice to 4°C	7 d	40 d
Metals	1 x 8 oz wide mouth jar, G	Ice to 4°C	-	6 months
TRPH	1 x 8 oz wide mouth jar, G	Ice to 4°C	-	28 d
TPH Light & Heavy	2-40 ml Septa Lined Vials	Ice to 4°C	14 d	40 d
Herbicides	1 x 8 oz wide mouth jar, G	Ice to 4°C	7 d	40 d

[1] All containers must have Teflon-lined seals (Teflon-lined septa for all VOA vials). G = Glass; P = High density polyethylene.

[2] Sample preservation will be done in the field immediately upon sample collection. If samples are filtered in the field, differential pressure methods and 45 micron filters will be used. Preservation is added after filtration. VOA samples must never be filtered.

[3] When only one holding time is given, it implies total holding time from sampling until analysis.

TABLE 2 SD-17

SOIL SAMPLES

	QUALITY CONTROL (A-E) SAMPLES					QUALITY ASSURANCE (MRD) SAMPLES			
Matrix Parameter	# of Field Samples	# of Dups/ Splits*	# of Sampler Rinsates	# of Trip Blanks	Total AE Samples	QA Dups/ Splits	QA Sampler Rinsates	QA Trip Blanks	Total QA
SOIL SAMPLES VOLATILE ORGANICS	10	1	0	0	11	1	0	0	1
SEMI-VOLATILE ORGANICS	10	1	0	0	11	1	0	0	1
TOTAL METALS	10	1	0	0	11	1	0	0	1
HERBICIDES	10	1	0	0	11	1	0	0	1
TRPH	10	1	0	0	11	1	0	0	1
PEST/PCB'S	10	1	0	0	11	1	0	0	1

* Field duplicates should be taken from the areas having the highest potential for contamination.

TABLE 3
REPORTING LIMITS FOR VOLATILE ORGANICS BY GC/MS[1]
(8240)[2]

Compounds[3]	Water (μg/L)	Low Soil (μg/Kg)
Chloromethane	10	10
Bromomethane	10	10
Vinyl chloride	2	10
Chrlorethane	10	10
Acetone	10	10
Carbon Disulfide	5	5
1,1-Dichloroethene	5	5
1,1-Dichloroethane	5	5
1,2-Dichloroethene (total)	5	5
Methylene Chloride	5	5
Chloroform	5	5
1,2-Dichloroethene	5	5
2-Butanone	10	10
1,1,1-Trichloroethane	5	5
Carbon tetrachloride	5	5
Bromodichloromethane	5	5
1,2-Dichloromethane	5	5
cis-1,3-Dichloroprene	5	5
Trichloroethene	5	5
Dibromochloromethane	5	5
1,1,2-Trichloroethane	5	5
Benzene	5	5
trans-1,3-Dichloropropene	5	5
Bromoform	5	5
4-Methyl-2-pentanone	10	10
2-Hexanone	10	10
Tetrachloroethene	5	5
Toluene	5	5
1,1,2,2-Tetrochloroethane	5	5
Chlorobenzene	5	5
Ethyl benzene	5	5
Styrene	5	5
Xylenes (total)	5	5

[1] Specific quantitation limits are highly dependent. The reporting limits listed herein are provided for guidance and may not always be achievable. Reporting limits listed for soil are based on wet weight. Reporting limits calculated by the laboratory for soil, calculated on dry weight basis, will be higher.

[2] EPA SW-846, 3rd Edition (1986)

[3] 2-Chloroethyl vinyl ether and vinyl acetate are not reported by the laboratory.

TABLE 4
REPORTING LIMITS
FOR SEMIVOLATILE ORGANICS BY GS/MS[1]
(8270)[2]

Compounds[3]	Water (µg/L)	Low Soil (µg/Kg)
Phenol	10	330
bis (2-Chlorethyl)ether	10	330
2-Chlorophenol	10	330
1,3-Dichlorobenzene	10	330
1,4-Dichlorobenzene	10	330
Benzyl alcohol	10	330
1,2-Dichlorobenzene	10	330
2-Methylphenol	10	330
4-Methylphenol	10	330
N-Nitroso-di-n-dipropylamine	10	330
Hexachloroethane	10	330
Nitrobenzene	10	330
Isophorone	10	330
2-Nitrophenol	10	330
2,4-Dimethylphenol	10	330
Benzoic Acid	50	1600
2,2'-Oxybis(1-chloropropane)	10	330
2,-Dichlorophenol	10	330
1,2,4-Trichlorozenzene	10	330
Napthalene	10	330
4-Chloroaniline	10	330
Hexachlorobutadiene	10	330
4-Chloro-3-methylphenol	10	330
2-Methylnaphthalene	10	330
Hexachlorocyclopentadiene	10	330
2,4,6-Trichlorophenol	10	330
2,4,5-Trichlorophenol	50	1600
2-Chloronaphthalene	10	330
2-Nitroaniline	50	1600
Dimethylphthalate	10	330
Acenaphthylene	10	330
2,6-Dinitrotoluene	10	330
3-Nitroaniline	50	1600
Acenaphthene	10	330
2,4-Dinitrophenol	50	1600
4-Nitrophenol	50	1600
Dibenzofuran	10	330
2,4-Dinitrotoluene	10	330

TABLE 4
(Continued)

Compounds[3]	Water (µg/L)	Low Soil (µg/Kg)
Diethylphthalate	10	330
4-Chlorophenylphenyl ether	10	330
Fluorene	10	330
4-Nitroaniline	50	1600
4,6-Dinitro-2-methylphenol	50	1600
N-nitrosodiphenylamine	10	330
4-Bromophenylphenyl ether	10	330
Hexachlorobenzene	10	330
Pentachlorophenol	50	1600
Phenanthrene	10	330
Anthracene	10	330
Carbazole	10	330
Di-n-butylphthalate	10	330
Fluoranthene	10	330
Pyrene	10	330
Butylbenzylphthalate	10	330
3,3'-Dichlorobenzidine	20	660
Benzo(a)anthracene	10	330
Chrysene	10	330
bis(2-Ethylhexyl)phthalate	10	330
Di-n-octylphthalate	10	330
Benzo(b)fluoranthene	10	330
Benzo(k)fluroranthene	10	330
Benzo(a)pyrene	10	330
Indeno (1,2,3-cd)pyrene	10	330
Dibenz(a,h)anthracene	10	330
Benzo(g,h,i)perylene	10	330

[1] Specific quantitation limits are highly matrix dependent. The reporting limits listed herein are provided for guidance and may not always be achievable. Reporting limits listed for soil are based on wet weight. Reporting limits calculated by the laboratory for soil, calculated on dry weight basis, will be higher.

[2] EPA SW-846, 3rd Edition (1986).

[3] Benzyl alcohol and benzoic acid are not reported by the laboratory.

TABLE 5

REPORTING LIMITS FOR ORGANOCHLORINE PESTICIDES AND PCBs[1] (8080)[2]

Compounds[3]	Water (µg/L)	Low Soil (µg/Kg)
alpha-BHC	0.05	1.7
beta-BHC	0.05	1.7
delta-BHC	0.05	1.7
gamma-BHC (Lindane)	0.05	1.7
Heptachlor	0.05	1.7
Aldrin	0.05	1.7
Heptachlor epoxide	0.05	1.7
Endosulfan I	0.05	1.7
Dieldrin	0.10	3.3
4,4'-DDE	0.10	3.3
Endrin	0.10	3.3
Endosulfan II	0.10	3.3
4,4,-DDD	0.10	3.3
Endosulfan sulfate	0.10	3.3
4,4'-DDT	0.10	3.3
Methoxychlor	0.5	17.0
Endrin ketone	0.10	3.3
gamma-Chlordane	0.05	1.7
Toxaphene	5.0	170.0
alpha-Chlordane	0.05	1.7
Aroclor-1016	1.0	33.0
Aroclor-1221	1.0	33.0
Aroclor-1232	1.0	67.0
Aroclor-1242	2.0	33.0
Aroclor-1248	1.0	33.0
Aroclor-1254	1.0	33.0
Aroclor-1260	1.0	33.0

[1] Specific quantitation limits are highly matrix dependent. The reporting limits listed herein are provided for guidance and may not always be achievable. Reporting limits listed are based on wet weight. Reporting limits calculated by the laboratory for soil, calculated on dry weight basis, will be higher.

[2] EPA SW-846, 3rd Edition (1986).

[3] BHT= benzene hexachloride
DDT= 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane (Dichlorodipenyltrichloroethane)
DDD= Dichlorodiphenyldichloroethane
DDE= Dichlorodiphenyldichloroethane
PCBs= Polychlorinated biphenyls (Aroclors)

TABLE 6

REPORTING LIMITS FOR TARGET ANALYTE LIST METALS[1]

	ICP[2]		AA-DA[3]		AA-GF[4]	
Analyte	Water µg/L	Soil mg/Kg	Water µg/L	Soil mg/Kg	Water µg/L	Soil mg/Kg
Aluminum, Al	100	10	-	-	-	-
Antimony, Sb	60	6	-	-	-	-
Arsenic, As	-	-	-	-	5	0.5
Barium, Ba	10	1	-	-	-	-
Beryllium, Be	2	0.2	-	-	-	-
Cadmium, Cd	5	0.5	-	-	-	-
Calcium, Ca	200	20	-	-	-	-
Chromium, Cr	10	1	-	-	-	-
Cobalt, Co	10	1	-	-	-	-
Copper, Cu	20	2	-	-	-	-
Iron, Fe	100	10	-	-	-	-
Lead, Pb	-	-	-	-	3	0.5
Magnesium, Mg	200	20	-	-	-	-
Manganese, Mn	10	1	-	-	-	-
Mercury, Hg	-	-	0.2[5]	0.1[5]	-	-
Nickel, Ni	40	4	-	-	-	-
Potassium, K	5000	500	-	-	-	-
Selenium, Se	-	-	-	-	5	0.5
Silver, Ag	10	1	-	-	-	-
Sodium, Na	5000	500	-	-	-	-
Thallium, Tl	-	-	-	-	5	0.5
Vanadium, V	10	1	-	-	-	-
Zinc, Zn	20	2	-	-	-	-

1 All methods contained in EPA SW-846, 3rd Edition (1986).
2 ICP = Inductively Coupled Plasma; Method 6010
3 AA-DA = Atomic Absorption - Direct Aspiration; Method 7470 for aqueous samples and Method 7471 for soil samples.
4 AA-GF = Atomic Absorption - Graphite Furnace; Method 7060 for Arsenic, Method 7421 for Lead, Method 7740 for Selenium, Method 7841 for Thallium.
5 Cold Vapor Technique

TABLE 7

QC ACCEPTANCE CRITERIA FOR VOLATILES IN LABORATORY CONTROL SAMPLES[1] (GC/MS) (8240)[2]

Parameter	Accuracy (Percent Recovery)		Precision RPD (%)	
	Water	Soil/Sediment	Water	Soil/Sediment
1,1-Dichloroethene	61-145	59-172	14	22
Trichloroethene	71-120	62-137	14	24
Benzene	76-127	66-142	11	21
Toluene	76-125	59-139	13	21
Chlorobenzene	75-130	60-133	13	21

[1] Acceptance criteria listed are from Form III, 3rd Edition, SW-846, Rev. 0, September 1986

[2] EPA SW-846, 3rd Edition (1986).

GC/MS = Gas chromatography/mass spectrometry
RPD = Relative percent difference.

The laboratory control samples are spiked with the five chemicals to represent all of the VOCs listed in Table_____. The results for the LCS are evaluated for precision and accuracy to determine whether the laboratory was in control for the analysis.

TABLE 8

QC ACCEPTANCE CRITERIA FOR VOLATILES IN LABORATORY CONTROL SAMPLES[1] (GC/MS) (8270)[2]

	Accuracy (Percent Recovery)		Precision RPD (%)	
Parameter	Water	Soil/Sediment	Water	Soil/Sediment
Phenol	12-89	26-90	42	35
2-Chlorophenol	27-123	25-102	40	50
1,4-Dichlorobenzene	36-97	28-104	28	27
N-Nitroso-di-N-propylamine	41-116	41-126	38	38
1,2,4-Trichlorozenzene	39-98	38-107	28	23
4-Chloro-3-methylphenol	23-97	26-103	42	33
Acenaphthene	46-118	31-137	31	19
4-Nitrophenol	10-80	11-114	50	50
2,4-Dinitrotoluene	24-96	28-89	38	47
Pentathlorophenol	9-103	17-109	50	47
Pyrene	26-127	35-142	31	47

[1] Acceptance criteria listed are from Form III, 3rd Edition, SW-846, Rev. 0, September 1986

[2] EPA SW-846, 3rd Edition (1986).

GC/MS = Gas chromatography/mass spectrometry
RPD = Relative percent difference.

The laboratory control samples are spiked with the eleven chemicals to represent all of the BNAs listed in Table____. The results for the LCS are evaluated for precision and accuracy to determine whether the laboratory was in control for the analysis.

TABLE 9

QC ACCEPTANCE CRITERIA FOR VOLATILES IN LABORATORY CONTROL SAMPLES[1] (GC/MS) (8080)[2]

Parameter	Accuracy (Percent Recovery)		Precision RPD (%)	
	Water	Soil/Sediment	Water	Soil/Sediment
Aldrin	40-120	34-132	22	43
Gamma-BHC (Lindane)	56-123	46-127	15	50
4,4'-DDT	38-127	23-134	27	50
Dieldrin	52-126	31-134	18	38
Endrin	56-121	42-139	21	45
Heptachlor	40-131	35-130	20	31

Acceptance criteria listed are from Form III, 3rd Edition, SW-846, Rev. 0, September 1986

[2] EPA SW-846, 3rd Edition (1986).

GC/MS = Gas chromatography/mass spectrometry
RPD = Relative percent difference.

The laboratory control samples are spiked with the six chemicals to represent all of the Pest. listed in Table_____. The results for the LCS are evaluated for precision and accuracy to determine whether the laboratory was in control for the analysis.

TABLE 10

QC ACCEPTANCE CRITERIA[1] FOR METALS FOR LABORATORY CONTROL SAMPLES AND MATRIX SPIKES/ MATRIX DUPLICATE SAMPLES

Parameter	Method[2]	Matrix	Accuracy (% Recovery)	Precision (RPD) %
Metals-ICP[3]	3005/6010	Water	75-125	20
	3050/6010	Soil	75-125	20
Antimony	3005/6010	Water	75-125	20
	CLP[4]/6010	Soil	75-125	20
Arsenic-GFAA	7060	Water	75-125	20
	3050/7060	Soil	75-125	20
Lead-GFAA	3020/7421	Water	75-125	20
	3050/7421	Soil	75-125	20
Selenium-GFAA	7740	Water	75-125	20
	3050/7740	Soil	75-125	20
Mercury-CVAA	7470	Water	75-125	20
	7471	Soil	75-125	20
Thallium-GFAA	3020/7841	Water	75-125	20
	3050/7841	Soil	75-125	20

[1] Guidance provided by USEPA CLP Statement of Work for Inorganics Analysis, SOW No. 788, Rev. 2/89 and 6/89.
[2] EPA SW-846, 3rd Edition (1986)
[3] See Section 8 for list of ICP metals
[4] Section III, Page D-5, Contract Laboratory Program SOW for Inorganics Analysis (March 1990) sample preparation

RPD = Relative percent difference
ICP = Inductively coupled plasma spectrometry
GFAA = Graphite furnace atomic absorption
CVAA = Cold Vapor atomic absorption

For analysis of total metals, water samples will not be filtered prior to digestion.

TABLE 11

DATA QUALITY OBJECTIVES FOR ACCURACY (SURROGATE SPIKE RECOVERIES) FOR ORGANIC PARAMETERS (WATER AND SOIL SAMPLES)

		Accuracy as % Recovery	
Fraction	Surrogate Compound	Water	Soil/Sediment
Purgeable Volatile	1,2-Dichlorethane-d4	76-114	70-121
	Toluene-d8	88-110	81-117
	4-Bromofluorobenzene	86-115	74-121
Semivolatile Base/Neutral Fraction	2-Fluorobiphenyl	43-116	30-115
	Nitrobenzene-d5	35-114	23-120
	Terphenyl-d14	33-141	18-137
Semivolatile Acid Fraction	2-Flurophenol	21-100	25-121
	Phenol-d5	10-94	24-113
	2,4,6-Tribromophenol	10-123	19-122
Pesticide	Dibutylchlorendate	41-135	33-155

Source: SW-846, 3rd Edition (USEPA, 1986) for volatile and semivolatile analyses. For pesticides, these limits are based on laboratory historical data and are evaluated and updated periodically. If limits are updated during analysis of samples, an Addendum will be filed to amend the QAPP.

TABLE 12
DATA QUALITY OBJECTIVES FOR ACCURACY (MATRIX SPIKE RECOVERIES) AND PRECISION (RELATIVE PERCENT DIFFERENCE) FOR ORGANIC PARAMETERS[1]

Fraction/Parameter	Soil		Water	
	Percent Recovery	Relative Percent Difference	Percent Recovery	Relative Percent Difference
Purgeable Volatiles				
Benzene	66-143	21	76-127	11
Chlorozbenzene	60-133	21	75-130	13
1,1-Dichloroethene	59-162	22	61-145	14
Toluene	59-139	21	76-125	13
Trichloroethene	62-137	24	71-120	14
Semivolatiles				
1,4-Dichlorobenzene	28-104	27	36-97	28
Pyrene	35-142	36	26-127	31
1,2,4-Trichlorobenzene	38-107	23	39-98	28
2-Chlorophenol	25-102	50	27-123	40
Phenol	26-90	35	12-110	42
N-Nitroso-di-n-propylamine	41-126	38	41-116	38
4-chloro-3-methylphenol	26-103	33	23-97	42
Acenaphthene	31-137	19	46-118	31
4-nitrophenol	11-114	50	10-80	50
2,4-Dinitrotoluene	28-89	47	24-96	38
Pentachlorophenol	17-109	47	9-103	50

(continued on next page)

TABLE 13
DATA QUALITY OBJECTIVES FOR ACCURACY (MATRIX SPIKE RECOVERIES) AND PRECISION (RELATIVE PERCENT DIFFERENCE) FOR ORGANIC PARAMETERS[1]
(Continued)

Fraction/Parameter	Soil		Water	
	Percent Recovery	Relative Percent Difference	Percent Recovery	Relative Percent Difference
Pesticides				
4,4,DDT	23-134	50	38-127	27
Aldrin	34-132	43	40-120	22
Gamma-BHC (Lindane)	46-127	50	56-123	15
Dieldrin	31-134	38	52-126	18
Endrin	42-139	45	56-121	21
Heptachlor	35-130	31	40-131	20

[1] Guidance provided by U.S. EPA. Contract Laboratory Program (CLP) Statement of Work for Organic analyses, Document Number OLM010.0 with revision OLM01.1, Dec. 1990.

Characterization of Environmental Samples for Disposal

In order to properly dispose of samples, Federal and State Hazardous Waste Regulations require that the generator determine whether or not the sample is a hazardous waste. To assist the laboratory in making this determination, you are requested to answer the following questions concerning the site and respective contamination.

Instructions: Do not guess or hypothesize. Only provide answers that you can reasonable ascertain are accurate. If you do not know the answer, indicate in the blank that you do not know the answer by answering "Unknown". Please respond to all questions.

Site Name: _____

Address of Site: _____

_____

Sample Date: _____

Sample Identification Number:

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

1. Indicate by sample identification number which samples are background samples (if none, write none):

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

2. Were unopened containers of chemicals found on site? _____
   Were unopened chemicals known to have been stored on site? _____
   Is the contamination from this storage area? _____
   List unused, unopened chemicals found at the storage site: (see back explanation)

   _____
   _____
   _____
   _____

3. Is the site a manufacturing facility? _____
   If yes, identify the industry: _____

_____

4. Is the contamination at the site from the use of solvents? _____

   If yes, identify the solvents: _____

_____

Characterization of Environmental Samples for Disposal
(Continued)

5. Is a process such as parts decreasing, electroplating, etc., the suspected cause of cause of the contamination? _____

If yes, identify the process: _____

6. Do you suspect the sample to have any of the following contaminants? Circle all that you suspect.

Asbestos PCB's Jet Fuel POL

7. What other contaminants do you expect to find in these samples?

_____
_____
_____
_____

8. Briefly describe how this site was contaminated: _____

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

9. Your Name: _____ Telephone: _____

Explanation of Characterization Questionnaire

Site Name: Indicate the name of the site where the samples were taken. For example, Fire Training Pit FTP 001, Landfill #10 Ft. Dix, etc.

Site Address: Write the address of the site.

Sampling Date: Indicate the date these samples were taken at the site.

Sample Identification Number: Identify each sample. This number in most cases should be the same as the identification number on the chain of custody form. Each sample should have a unique number. Be sure to identify each sample.

Question number 1 will assist us in segregating potentially clean samples - the background samples from the contaminated samples.

Question number 2 has been asked to determine whether the sample would be p or U-listed. If the sample is contaminated with a commercial chemical product or an off-specification chemical, the chemical itself would be P-listed or U-listed. This chemical would have to be a virgin chemical, i.e. a chemical that was manufactured, however, it had not yet been used for its intended purpose. For example, if the just manufactured chemicals were all stored on a particular concrete pad, and analysis of the pad showed trace amounts of that chemical, then the pad would be considered a P or U-listed waste. Once the listed waste contaminated the soil or water, the entire mixture would also become P or U-listed.

Question number 3 will help us to identify whether the waste is K-listed. If the manufacturing process can be defined, the sample may be considered to be waste from a process listed on the K-list. For example, if you are investigating a landfill and you know that the waste in the landfill came from a certain manufacturing process, that waste may also be K-listed as well as the contaminated soil and water.

Question number 4 will assist us in determining if the sample contains an F-listed waste.

Question number 5 will assist us in determining if the sample contains a K or F listed waste. If the answer to the question is identified on the K or F-list.

Question number 6 will assist us in identifying any other contaminants that may require that special handling provisions be employed during disposal.

Question number 7 requests that you identify any contaminants you may expect to find in the sample that would impact the characterization of the sample as a RCRA hazardous waste.

Question number 8 asks you to describe how the site was contaminated. Identify any processes or procedures which led to the resultant contamination.

Question number 9 asks you for your name and telephone number. If we have questions concerning the information on this form, we will contact you.

Thank you.

VI. Specific Services Required.

(1) Report. supplements will be prepared to the original Report.

(2) Laboratory Qualification and Validation. The Laboratory that will be used in this project must be validated on an analysis per media basis.

(3) Submittals.

The following is a list of the submittals. The schedule of submittals, required numbers, and distribution appear elsewhere.

Documents (A-E LQMP) necessary for MRD Laboratory validation.

Chemical Data Acquisition Plan, from previous work orders

Pre-Field Work

Health and Safety Plan (OSHA 1910.120), endorsement of previous plan

Field Work

Daily Quality Reports

After Field Work

Quality Control Summary Report
Original field survey notes.
Original computations.
Tabulated sheet of State Plane Coordinates.
Marker documentation sheets for all monuments set.

Plat Original # 1. Plat of boundary surveyed, with evidence of filing with local authorities.
Plat Original # 2. Plat of boundary surveyed, furnished to Cannon AFB for forwarding to EPA Region VI.
Plat Original # 3. Plat of boundary surveyed, furnished to Cannon AFB for their retention.
Auto-positive copy to CoE TM

During Sample Analysis Validation

Analytical Data

After Data Interpretation

Pre-draft supplement Report for internal review

Draft supplement Report for general review

Final supplement Report

Decision Document, revised.

(4) Plan Submittals. This section only covers plan submittals which are required prior to commencement of any on-site activity. The laboratory validation section discusses the A-E Laboratory Quality Management Plan (A-E LQMP). This plan must be submitted as soon as possible to initiate the laboratory validation process.

(a) General. The A-E, shall prepare a field schedule, and endorse Plans discussed below. All Plans must be reviewed and approved by the Contracting Officer (CO) prior to commencement of that work effort.

(b) Field Schedule. A field schedule shall be submitted outlining the order of fieldwork. As a minimum, the schedule should identify the tasks being conducted and the time required for each task.

(e) A-E SSHP. Previous A-E SSHP shall be checked for this effort and endorsed.

4. Site-Specific Investigations.

4.1 Investigations. The investigation shall follow this scope and as prepared in the subsequent Work Plan. The Chemical Analysis program shall follow this scope. The Chemical Data Acquisition Plan (CDAP) items shall follow this scope.

3. NOT USED.

4. Special Considerations. All materials and data gathered and developed in the performance of this work listed in this Scope shall be the property of the Corps of Engineers, Omaha District. The materials and data shall not be used or distributed by the A-E without the specific written permission from the Corps of Engineers, Omaha District.

5. Project Management.

a. Project Manager. The A-E shall assign a Project Manager. This individual shall oversee the performance of the entire project, administer all instructions from the COE, and answer or obtain answers to all questions from the COE during and after work.

b. Coordination. During the prosecution of the work under the contract, the A-E shall coordinate all field work with the Chief of Environmental Planning and shall keep in close liaison with the Corps of Engineers Technical Manager (USACE TM). All requests made upon the A-E shall be referred to the USACE TM.

6. Base Support. The A-E shall coordinate all requests for Base support services through the Chief of Environmental Planning's representative. To avoid conflicts and schedule delays, (on the part of both parties) the A-E shall request all Base support services well in advance of their anticipated time of need. Likewise, it is anticipated that the Base will provide the following information and support to the A-E in a timely fashion upon request:

a. Existing Plans. The Base will provide the A-E with existing engineering plans, drawings, diagrams, aerial photographs, and other information necessary to evaluate the site being investigated.

b. Utilities. The A-E and Base shall locate and mark all underground utilities in the vicinity of each site prior to any drilling or digging. The Base representative will provide assistance to the A-E by directing the A-E to the appropriate Base office/personnel or company with the pertinent information (i.e. utilities and sewer & hydrant line location maps). The A-E shall contact and coordinate any necessary site work with the appropriate personnel.

c. Permits. The Base will issue to the A-E any required or appropriate drilling or digging permits necessary for the completion of the field work. The Base will provide assistance to the A-E by providing the necessary permit forms and directing the A-E to the appropriate authority with the pertinent information. The A-E shall contact and coordinate any necessary site work with the appropriate personnel. Drilling/digging permits shall be strictly adhered to. Failure to comply with permit restrictions and required coordination with Base offices shall result in immediate revocation.

d. Security. Physical security procedures will be necessary for this project. No restricted sites or secure areas need to be entered to carry out this project.

e. Staging Area. The Base will provide a staging area for the A-E and any subcontractors to store equipment, supplies, in addition to any "drummed" materials.

f. Water Supply. The Base can provide water and potable water.

g. Equipment Cleanup. Decontamination area shall be designated by the Base. Sampling wastes shall be handled according to EPA and New Mexico ARARs. A contract modification may be necessary to dispose of wastes.

VII. Travel and Meetings. The A-E shall perform the following travel as part of the contract requirement, and the cost thereof shall be included with the contract cost. Responsible representatives from the appropriate disciplines shall attend meetings and/or make the following listed trips:

a. Field Work. All travel and/or mobilization required to obtain field data necessary to complete the Assessment as detailed herein.

b. Meetings. Attendance by the A-E will be required at 2 meetings noted below.

(1) Pre-Field Work Safety Meeting a few days before the field work shall start. The purpose of this meeting will be to discuss the field schedule; and allow the Base offices, Flight Line offices, Government, and the A-E to air any concerns, conflicts or problems regarding the field work which is about to start. Meeting will be at Cannon AFB.

(2) Demobilization Meeting to insure the completion of the field work is smooth, such as the sampling wastes are properly stored. Meeting will be at Cannon AFB.

(3) not used.

VIII. General.

a. Government Provided Use previously provided materials and documents.

b. Review of Progress and Technical Adequacy.

(1) The A-E, under this contract, will interpose no objection nor restriction to the Contracting Officer's designation of another A-E for the purpose of reviewing the adequacy and correctness of the work performed under this contract.

(2) The A-E shall submit monthly progress report to the USACE PM. The monthly progress report shall indicate work performed and problems incurred during the month. The monthly progress reports shall list costs separately to aid the USACE TM in confirming payment requests.

c. Meeting Notes and Confirmation Notices.

(1) Meeting Notes. The A-E will be responsible for taking notes and preparing the reports of all meetings. Three (3) sets of meeting notes shall be prepared in typed form. The three sets shall be furnished the USACE TM. The notes will be provided within approximately seven days after the meeting. All discrepancies shall be discussed with the USACE TM, and if necessary the A-E shall resubmit the report. This report shall include the following items as a minimum:

(a) The date and place the meeting was held with a list of attenders. The roster shall include name, organization, and phone number.

(b) Written comments presented by attenders shall be attached to each report with the meeting action noted. Action shall be "A" for Approved comment, "D" for Disapproved comment, "W" for a comment that has been Withdrawn, and "E" for a comment that has an Exception noted.

(c) Comments made during the meeting, decisions affecting criteria changes, must be recorded in the basic meeting notes. Any augmentation of written comments should be documented by the meeting notes.

(2) Confirmation Notices. The A-E will be required to provide a record of all discussions, verbal directions, telephone conversations, etc., participated in by the A-E and/or his representatives on matters relative to this project and the work, irrespective of whom the other participants may have been. These records, entitled "Confirmation Notices", will be numbered sequentially and shall fully identify participating personnel, subjects discussed, and any conclusions reached. The A-E shall forward to the USACE TM within five (5) work days, a reproducible copy of said confirmation notices. Distribution of said confirmation notices will by made by the Government.

(3) Expert Testimony. All technical consultants required for the investigation provided by the A-E shall be qualified to give expert witness testimony, if required. In the event of litigation, the contract will be modified or a new contract issued to the A-E for the additional services.

IX. Submittals Distribution.

US Army Engineer District, Omaha Attn: Marvin Taylor, CEMRO-ED-EC 215 North 17 th Street Omaha, Nebraska 68102-4978	6 bound copies of all reports 1 unbound file copy 402-221-7181 Fax 402-221-7796
US Army Missouri River Division Attn: CEMRD-ED-C 12565 West Center Road Omaha, Nebraska 68144	6 bound copies of all reports
US Army Missouri River Division Lab Attn: CEMRD-ED-LC 420 South 18 Street Omaha, Nebraska 68102	1 bound copy of all reports
Commander, 27 FW/CC Attn: Dr. Janice Stowell, 27 CSG/CEV Environmental Management Cannon AFB, New Mexico 88103-5128	6 bound copies of drafts 12 bound copies of finals 1 unbound file copy 505-784-4639 Fax old 505-784-2739 Fax CoE 505-784-7118
Command, HQ ACC/CEVR Attn: David Dentino 129 Andrews Street, Suite 346 Langley AFB, Virginia 23665-2769	1 copy of drafts 2 copies of finals 804-764-4613 Fax 804-764-5363

Attn: Names and addresses may change during the work order.

Electronic media

1 set each IBM compatible format 3.5" disk Word Perfect 5.0 Files of finals:

Attn: Marvin Taylor, CEMRO-ED-EC

Attn: Dr. Janice Stowell, 27 CSG/CEV

☺ end of scope of work ☺

APPENDIX B
1993 W-C FIELD BORING LOG

HTW DRILLING LOG

HOLE NO. 0962

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Layne Environmental Services
SHEET 1 OF 12 SHEETS	
3. PROJECT: Cannon AFB RCRA Activities	4. LOCATION: Old Entomology Rinse Area (SWMU # 96)
5. NAME OF DRILLER: D. Werner	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Hollow Stem Auger 3¾" ID 7½" OD; 8" Bullet Bit; 3" OD Stainless Steel SS w/ liner; 2" OD Steel SS	8. HOLE LOCATION: Rinse Sink Pit Area
	9. SURFACE ELEVATION: 4279.32
	10. DATE STARTED: 11-9-93 / 11. DATE COMPLETED: 11-10-93
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 102'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Grain Size		3	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY) Semi-VOC	OTHER (SPECIFY) Herb/Pest/PCB	OTHER (SPECIFY) TRPH/Cyd/TCO	21. TOTAL CORE RECOVERY
	10	10	10	10	10	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	Cement-Bentonite Grout			David A. Pulgher; Checked by: Andrew Chandler

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
9		Clay orange to brown-orange to red-orange, slightly silty to silty, slightly moist (CL)					Started drilling @ 1013 on 11-9-93
4278	1						
4277	2						
4276	3						
4275	4						
4274	5						

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 2 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4274	5	Clay orange to brown-orange to red-orange, silty with occassional orange silt streaks, scattered cream caliche nodules & pockets, slightly moist (CL)	OVA on Sample = 0ppm	CAN096-0962-6005		5	Collected lithology sample from 5 to 7' @ 1018
				1' Recovery		5	
4273	6					7	
						8	
4272	7						
4271	8						
4270	9						
4269	10		OVA on Sample = 0ppm		CAN096-0962-9010	6	Collected analytical sample from 10' to 13' @ 1025
					CAN096-0962-0661	8	Collected field duplicate sample from 10' to 13' @ 1035
4268	11				18' Recovery	10	
						12	
4267	12	Sand orange to red-orange, very fine grained, subangular, well sorted, very silty, clayey, predominantly quartz grains with < 5% orange grains, slightly moist (SM)			1' Recovery	6	Had to take an additional 1' split spoon sample to recover enough soil for analytical samples
						6	
4266	13						
4265	14						

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 3 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Sand orange to red-orange as above (SM)					
4264	15	Silt red-orange to brown-red, sandy, very clayey, slightly moist (ML)	OVA on Sample: 0 ppm	CAN096-0962-6015		4	Collected lithology Sample from 15' to 17' @ 1045
						9	
4263	16	Clay, orange to red-orange, silty, scattered tan, cream & tan-orange caliche nodules & pockets, slightly moist (CL)		1.5' Recovery		5	
						9	
4262	17						
4261	18						
4260	19						
4259	20		OVA on Sample: 0 ppm		CAN096-0962-0020	7	Collected analytical Sample from 20' to 22' @ 1055
						17	
4258	21				2' Recovery	85	
		Caliche tan-orange to cream, silty to very silty, very clayey, trace sand, very slightly moist				180	
4257	22						
4256	23	Clay red-orange to orange, silty to very silty, scattered tan-orange & cream caliche streaks, nodules & pockets, slightly moist (CL)					
4255	24						

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 4 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4255	24	Clay red-orange to orange, silty to very silty, scattered tan-orange & cream caliche streaks, nodules & pockets, slightly moist (CL)					
4254	25	Silt orange, clayey to very clayey, slightly sandy, slightly moist (ML)	OVA on Sample = 0 ppm	CAN096-0962-4025		25	Collected geotechnical sample from 25' to 27' @ 1115
						70	
4253	26	Clay red-orange orange, silty to very silty, scattered tan-orange & cream caliche streaks, nodules & pockets, slightly moist (CL)		1.9' Recovery		56	
						50	
4252	27						
4251	28						
4250	29						
4249	30		OVA on Sample = 0 ppm		CAN096-0962-0030 MS/MSD	23	Collected analytical sample from 30' to 33' @ 1125
		Sand orange, fine grained, subangular, well sorted, silty, predominantly quartz with 5% orange grains, rare dark colored grains, slightly moist (SM)				9	Collected additional sample for MS/MSD
4248	31				1.9' Recovery	7	
						10	
4247	32				1' Recovery	9	Had to take an additional 1' split spoon sample to recover enough soil for analytical samples.
						10	
4246	33						

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 5 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4245	34	Sand orange, fine grained, subangular, well sorted, silty to very silty, clayey, predominantly quartz with 5% orange grains, slightly moist (SM)					
4244	35		OVA on Sample = 0 ppm	CAN096-0962-6035		6	Collected lithology sample from 35' to 37' @ 1155
		Becoming light orange to orange with scattered tan-orange to cream caliche nodules & pockets				30	
4243	36			1.8' Recovery		26	
						30	
4242	37						
4241	38						
4240	39						
4239	40		OVA on Sample = 0ppm		CAN096-0962-0040	25	Collected analytical sample from 40' to 42' @ 1205
4238	41				CAN096-0962-0601	50	Collected MRD duplicate sample from 40' to 42' @ 1205
					2' Recovery	36	
						70	
4237	42						
4236	43						

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 6 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4236	43	Sand light to medium orange, fine grained, subangular, well sorted, predominantly quartz with 5-10% orange grains, silty, slightly clayey, slightly moist, scattered tan-orange caliche nodules & pockets (SM)					
4235	44						
4234	45		OVA on sample: 0 ppm	CAN096-0962-6045		30	Collected lithology sample from 45' to 46.5' @ 1235
						60	
4233	46	Caliche tan-orange, cream, & white, silty, clayey, very dense, trace sand, very slightly moist		1.5' Recovery		250	
4232	47						
4231	48	Sand light to medium orange, fine grained, well sorted, subangular, silty, slightly clayey to clayey, predominantly quartz with 5-10% orange grains, scattered tan-orange caliche nodules & pockets, slightly moist (SM)					
4230	49						
4229	50		OVA on sample: 0 ppm		CAN096-0962-0050	90	Collected analytical sample from 50' to 51.5' @ 1255
						250	
4228	51				1.5' Recovery	300	
		Caliche very light orange tan-orange, clayey, silty, slightly sandy, very slightly moist					
4227	52	Sand light to medium orange, fine to medium grained (SM)					

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 7 OF 12 SHEETS

LEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4226	53	Sand light to medium orange, fine to medium grained, subangular to subrounded, well sorted, predominantly quartz with 10-15% orange and <5% dark colored grains, slightly silty, rare clay, slightly moist (SM)					
4225	54						
4224	55		OVA on Sample: 0ppm	CAN096-0962-4055		20	Collected geotechnical sample from 55' to 57' @ 1325
4223	56			2' Recovery		29	
						30	
						36	
4222	57						
4221	58						
4220	59	Caliche tan-orange, silty, clayey, sandy, very dense, very slightly moist					
4219	60		OVA on Sample: 0ppm		CAN096-0962-0060	500	Collected analytical sample from 60' to 62' @ 1350
4218	61	Sand orange, fine to medium grained, subangular to subrounded, well sorted, predominantly quartz with 5-10% orange & <5% dark colored grains, silty, trace clay, slightly moist (SM)			1.7' Recovery	40	
						50	
						75	
4217	62						

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 8 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4217	62	Sand orange, fine to medium grained, sub angular to subrounded, well sorted, predominantly quartz with 10% orange & <5% dark colored grains, silty, trace clay, slightly moist (SM)					
4216	63						
4215	64						
4214	65		OVA on Sample = 0 ppm	CAN096-0962-6065		60	Collected lithology sample from 65' to 67' @ 1410
						41	
4213	66			1.8' Recovery		47	
						55	
4212	67						
4211	68						
4210	69						
4209	70	Sand orange, medium grained, subangular to subrounded, well sorted, predominantly quartz with 10% orange & 5-10% dark colored grains, trace silt, trace tan-orange caliche pockets & nodules, slightly moist (SP)	OVA on Sample = 0 ppm		CAN096-0962-0070	50	Collected analytical sample from 70' to 71.5' @ 1435
						140	
4208	71				1.5' Recovery	140	

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 9 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4207	72	Sand orange, medium grained, subangular to subrounded, well sorted, predominantly quartz with 10% orange & 5-10% dark colored grains, trace scattered tan-orange caliche pockets & nodules, trace silt, slightly moist (SP)					
4206	73						
4205	74						
4204	75		OVA on Sample = 0 ppm	CAN096-0962-6075		26	Collected lithology sample from 75' to 77' @ 1445
						60	
4203	76			1.9' Recovery		54	
						75	
4202	77						
4201	78						
4200	79						
4199	80	Sand orange, medium grained, sub-rounded, well sorted predominantly quartz with 10-15% orange grains, dark colored specks & grains, trace silt & clay, slightly moist (SP)	OVA on Sample = 0 ppm		CAN096-0962-0080	20	Collected analytical sample from 80' to 81.5' @ 1615
4198	81				1.5' Recovery	74	

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 10 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4198	81	Sand orange, medium grained, subrounded, well sorted, predominantly quartz with 10-15% orange grains, dark colored specks & grains, trace silt & clay, slightly moist (SP)	OVA on Sample: 0ppm		CAN096-0962-0080 1.5' Recovery	87	
4197	82						
4196	83						
4195	84						
4194	85		OVA on Sample: 0 ppm	CAN096-0962-4085		21	Collected geotechnical Sample from 85' to 87' @ 1640
						38	
4193	86			1.9' Recovery		42	
						51	
4192	87						
4191	88	Decreasing silt & clay					
4190	89						
4189	90		OVA on Sample: 0ppm		CAN096-0962-0090 1.5' Recovery	30	Collected analytical Sample from 90' to 91.5' @ 1650

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 11 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4188	91	Sand orange, medium grained, subrounded, well sorted, predominantly quartz with 10-15% orange grains, trace dark colored specks & grains, rare silt, slightly moist to moist (SP)	OVA on Sample: 0 ppm		CAN096-0962-0090	70	
					1.5' Recovery	108	
4187	92						
4186	93						
4185	94						
4184	95		OVA on Sample: 0 ppm	CAN096-0962-6095		21	Collected lithology sample from 95' to 97' @ 1715
						27	
4183	96	Trace scattered tan-orange caliche nodules & pockets		1.9' Recovery		134	
						148	
4182	97						
4181	98						
4180	99						
4179	100						

HTW DRILLING LOG

HOLE NO. 0962

PROJECT Cannon AFB RCRA Activities

INSPECTOR David A. Kubeczko

SHEET 12 OF 12 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
4179	100	Sand orange, medium grained, sub-rounded, well sorted, predominantly quartz with 10-15% orange grains, trace dark colored sparks & grains, occasional tan-orange caliche pockets & nodules & calcareous pockets, slightly moist to moist (SP)	OVA on Sample: 0ppm		CAN096-0962-0100	28	Collected analytical sample from 100' to 102' @ 1740
4178	101					50	
					2' Recovery	74	
						98	
4177	102	Bottom of borehole = 102'					Stopped drilling @ 102' @ 1745 on 11-9-93 Secured Site
4176	103						11-10-93 Grouted borehole with cement-bentonite grout from surface to 102' Grout Mixture 30 bags Portland cement 140 pounds powdered bentonite 215 gallon water
4175	104						800 Tremied grout to bottom of borehole
4174	105						910 Pulled augers
4173	106						1140 Placed metal spike into grout at surface
4172	107						
4171	108						
4170	109						

APPENDIX C
CHEMICAL ANALYSIS DATA VALIDATION REPORT

1.0 GENERAL OVERVIEW

This report discusses analytical data quality for samples taken from the one boring, number 0962, from the Old Entomology Rinse Area at Cannon Air Force Base. A total of eleven soil samples and one aqueous Decontamination water sample were submitted to Enseco-Rocky Mountain Analytical (RMAL) for analysis. The reporting and analysis of the samples followed the requirements described in the Quality Assurance Project Plan Remedial Investigation, Cannon Air Force Base, Clovis, New Mexico (W-C, September 1991a) (QAPP) and the Quality Assurance Project Plan, Addendum No. 2 (W-C, November 1993c) (QAPP Addendum). In accordance with Section 1.0 of the QAPP Addendum these data underwent a full validation. As specified in Section 9.2.2 of the QAPP, the data validation procedures and guidance followed the "Data Validation and QC Review of Analytical Laboratory Data Packages" (SOP No. 13). Quality Assurance and Quality Control parameters applied during the validation process were in accordance with modifications to Section 4.0 in the QAPP Addendum, Quality Assurance Objectives for Measurement of Data. The following sections outline the quality control indicators examined in this validation and define the qualifiers applied to the results.

1.1 QUALITY CONTROL PARAMETERS

Full validation of samples included a review of the following quality control indicators when they apply to the analysis being reviewed:

- Compliance with technical holding times (collection to extraction and analysis) to assess the validity of results

- Evaluation of instrument performance to assess chromatographic resolution and instrument sensitivity

- Evaluation of initial and continuing calibrations to assess whether the instrument was capable of producing acceptable qualitative and quantitative data

- Evaluation of method blanks, aqueous Decontamination rinsate blanks, and ambient blanks to determine the existence and magnitude of contamination resulting from laboratory and/or field activities

- Evaluation of surrogate recoveries and internal standard recoveries to discern any potential matrix effects or losses during the extraction process

- Evaluation of matrix spike and matrix spike duplicate MS/MSD data to assess acceptable compound recovery by the laboratory at the time of sample analysis in comparison to the historical precision and accuracy of the analytical method and to discern any potential matrix effects

- Evaluation of laboratory control samples to assess the accuracy of the analytical method and the laboratory performance

- Evaluation of field quality assurance and quality control (e.g. field duplicates)

- Evaluation of data to assess proper identification of target analytes

- Evaluation of compound quantitation and reporting limits to assess whether they are accurate

- Evaluation of tentatively identified compounds to assess qualitative identification accuracy

- Evaluation of the system performance through careful examination of the ongoing data acquisition

Following the comprehensive review of the data with respect to the above criteria and the subsequent assignment of the appropriate data qualifiers, an overall assessment of the data was made. The overall assessment addresses the accuracy, precision, and completeness of the data as well as expresses concerns and comments on the quality and usability of the data.

1.2 DATA QUALIFIERS AND DEFINITIONS

Following the data validation process, all results were classified as accepted (either as reported or qualified as estimated) or rejected depending on whether or not deficiencies were found in the quality control parameters which would effect the quality or reliability of the data. Qualifiers were assigned in accordance with the guidance provided in the QAPP, and where appropriate to the SW-846 method, in Functional Guidelines. In instances where appropriate guidance was not provided by the Functional Guidelines or the QAPP, professional judgement was used to evaluate the data.

Since no guidance is provided in the QAPP or the Functional Guidelines as to how to qualify field duplicates based on agreement between the sample values reported, the following criteria have been utilized. If both values reported are >5X the reporting limit, the relative percent difference (%RPD) between the sample and its duplicate should be <50 percent for aqueous samples and <100 percent for soil samples. If either value reported is <5X the reporting limit, the %RPD should be <3X the reporting limit. Results outside these limits will result in qualification of the compound result as estimated.

Per Functional Guidelines, positive sample results for analytes which were also detected in an associated blank have been qualified as not detected (U) at the reported value (or at the reporting limit, if it is greater than the reported sample result) where the sample result is less than ten times the amount reported in the blank for the common laboratory contaminants, as listed in the Functional Guidelines. Where analytes not classified as common laboratory contaminants have been detected in the sample and the blank, the sample result has been qualified as not detected if the sample result is less than five times the blank result.

Throughout this report, sample results which were reported as not detected at the reporting limit have been qualified as "ND" by the laboratory. These results have been changed to "U" for purposes of this report and will be reported in the resultant database tables as "U." The two qualifiers are functionally equivalent.

All analytes reported as detected below the reporting limit have been qualified as estimated (J).

The following describes the qualifiers utilized in this validation effort and what they indicate:

"U" - The analyte was analyzed for, but was not detected; the associated value is the sample reporting limit.

"J" - The analyte was positively identified, but the associated numerical value is the approximate concentration of the analyte in the sample.

"NJ" - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification" and the associated numerical value represents its approximate concentration.

"UJ" - The analyte was not detected. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

"R" - The sample result(s) is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

1.3 W-C COMMENT QUALIFIERS

Woodward-Clyde (W-C) has established a list of comment qualifiers which are associated with all qualified results in order to classify the reason or reasons for qualification. These comment qualifiers are annotated on the laboratory sample results summary sheets. Following are the comment qualifiers which were utilized throughout this validation.

"H" - Required holding times for extraction or analysis were not met.

"C" - Quality control requirements concerning calibration were not met.

"L" - Laboratory blank contamination exists.

"F" - Field blank contamination exists.

"T" - Quality control requirements concerning instrument tuning were not met.

"S" - Surrogate recovery was outside of the appropriate acceptance limits.

"M" - MS/MSD results did not meet the appropriate QC criteria.

"D" - Precision, as assessed by the field duplicate samples, was not within acceptable limits.

"I" - Internal standard areas were outside of the acceptable range or internal standard retention time shifts were observed.

"R" - Reported results were outside of the calibration range demonstrated by the laboratory.

"P" - Pesticide results differed by more than 25 percent between the primary column and the confirmation column.

"A" - Furnace atomic absorption metals post-digestion spike recoveries were outside of the limits set forth in Functional Guidelines.

"E" - Laboratory control samples were outside of the appropriate acceptance limits.

"V" - Target compounds reported as detected below the reporting limit in volatile, semivolatile, pesticide/PCB and herbicide analyses.

2.0 DATA VALIDATION REPORT

2.1 INTRODUCTION

Eleven soil samples from the Cannon Old Entomology rinse area boring and one aqueous Decontamination water sample were sent to RMAL for analysis. In accordance with the Methods specified in Table 8-2 of the QAPP Addendum, samples were analyzed for volatiles, semi-volatiles, organochlorine pesticides and PCBs, herbicides, metals, total petroleum hydrocarbons (TPH), gasoline range organics (GRO), and total chromatographable organics (TCO). Following is a cross-reference of the W-C sample ID with the laboratory ID for the samples analyzed.

W-C ID	RMAL ID
CAN096-0962-0681[1]	032225-0001-SA
CAN096-0962-0010	032225-0002-SA
CAN096-0962-0661	032225-0003-SA
CAN096-0962-0020	032225-0004-SA
CAN096-0962-0030	032225-0005-SA
CAN096-0962-0040	032225-0006-SA
CAN096-0962-0050	032225-0007-SA
CAN096-0962-0060	032225-0008-SA
CAN096-0962-0070	032225-0009-SA
CAN096-0962-0080	032225-0010-SA
CAN096-0962-0090	032225-0011-SA
CAN096-0962-0100	032225-0012-SA

[1] Decontamination Water

Throughout this report, samples from this boring will be referred to by their four-character numerical suffix, -XXXX. Samples from any other boring will be referred to using the full sample identification.

2.2 VOLATILE ORGANIC ANALYSIS

Eleven soil samples and one aqueous sample were analyzed for volatile organic compounds by EPA method 8240. The results of the validation follow.

2.2.1 Quality Control Parameters

Holding Times. All samples were analyzed within the 14-day holding time criteria specified in Table 5-2 of the QAPP addendum. No data qualification was required on the basis of holding times.

GC/MS Tuning. A GC/MS tune was provided for every instrument used to analyze samples and for each twelve hour period in which samples were analyzed. No transcription or calculation errors were found, and the tune criteria listed in the Functional Guidelines were met by the laboratory for each GC/MS tune associated with the sample data. No qualifications were made on the basis of GC/MS tune data.

Calibration. Approximately 10% of the relative response factors (RRF), average relative response factors, and percent relative standard deviations (%RSD) were recalculated to evaluate whether the initial calibration being used to quantitate results was accurate. No errors were found in the recalculations performed.

Initial calibration data was provided for the soils analyses and the aqueous analysis. For both initial calibrations the average RRFs met the criterion of being greater than 0.05 for all target analytes. The %RSDs were within the 30 percent criterion, with the exception of bromomethane in the initial calibration associated with the soil samples which was reported at 52.8%. Results for bromomethane have been qualified as estimated (J/UJ) in the associated soil samples.

Four continuing calibrations were associated with the reporting of these samples. Continuing calibration verifications were present for the instruments used to analyze samples and for each twelve hour shift in which samples were analyzed. All RRFs were above the 0.05 criterion, and the recalculations of RRFs performed for several of the analytes agreed with the reported results. Percent differences (%D) between the initial calibration and the continuing calibrations were above the 25%D criterion for some compounds in the three continuing calibrations associated with the soil samples, and qualification of data, (as detailed below), was required. Percent differences reported for the continuing calibration associated with the aqueous sample were within the 25%D acceptance criteria, and no qualification of data was necessary.

The continuing calibraton conducted at 2202 hours on 11/19/93 was associated with samples -0030, -0040, -0050, -0060, -0070, -0080, -0090, and -0100. The %D excceded the 25% acceptance criteria for the following compounds, and associated sample data for these compounds have been qualified as estimated (`J' or `UJ').

Compound	%D
Chloromethane	36.0%
Bromomethane	42.0%
Acetone	30.4%
1,2-Dichloroethane-d4	30.2%
1,2-Dichloroethane	28.9%
Tetrachlorethene	40.9%
Bromoform	28.6%

The continuing calibraton conducted at 0904 hours on 11/22/93 was associated with samples -0661, -0010, and -0020. The %D excceded the 25% acceptance criteria for the following compounds, and associated sample data for these compounds have been qualified as estimated (`J' or `UJ').

Compound	%D
Bromomethane	47.1%
1,2-Dichloroethane-d4	30.5%
1,2-Dichloroethane	26.7%
Tetrachlorethene	43.3%

The continuing calibration conducted at 0959 hours on 11/19/93 was associated with the duplicate control samples (DCS) associated with the soils samples. The %D exceeded the 25% acceptance criteria for the some compounds. However, as the %D reported outside of acceptance limits were associated with the DCS, no qualification of sample data was necessary.

Blanks. An appropriate method blank was analyzed for each analytical batch on the instrument used to analyze the samples. All target analytes were reported as non-detects in the method blanks associated with the soil samples, and no qualification of soil data on the basis of method blanks was necessary.

The method blank associated with the aqueous decontamination water sample had a reported detection of 1,1,2,2-tetrachloroethane at 2.4 µg/L. As the associated sample result for 1,1,2,2-tetrachloroethane, for sample -0681, was reported at 2.6 µg/L, less than 10 times the concentration in the method blank, in accordance with the validation guidelines the results has been qualified as non-detect at the reporting limit.

Surrogate Recovery. Approximately 30 percent of the surrogate recoveries were recalculated and no errors were found in calculation or in transcription. All surrogate recoveries were within the control limits presented in Table 4-7 of the QAPP Addendum, with the exception of toluene-d8 in aqueous sample -0681, reported below the 90-110% recovery acceptance limits at 84% recovery. The laboratory reanalyzed the sample but toluene-d8 was still reported below the acceptance limit. Results from the initial analysis have been reported, and in accordance with the validation guidelines the sample data for 0681 have been qualified as estimated ('J' or 'UJ').

Matrix Spike/Matrix Spike Duplicate. MS/MSD results were reported for sample -0005 in this laboratory package. At least 25 percent of the percent recoveries and RPDs were recalculated and no calculation errors were found. Percent recoveries (%R) of the spiked compounds and precision (RPD) between MS and MSD analyses were within the control limits listed in Table 4-8 of the QAPP Addendum.

Field Duplicates. One set of field duplicates was analyzed as part of this laboratory package: -0010 and its duplicate, -0661. Acetone and methylene chloride were reported in both

samples; acetone at 150 µg/kg and 690 µg/kg, and methylene chloride at 4.5 µg/kg and 16 µg/kg, in samples -0010 and -0661 respectively. Toluene was detected in the duplicate -0661 at 16 µg/kg, but was not detected in the sample. According to the guidelines discussed in section 1.2, the results for methylene chloride and toluene are acceptable, but the RPD for acetone was 129%, which exceeds the 100% acceptance limit and in accordance with the validation guidelines all associated soil acetone results have been qualified as estimated, and flagged "J". No other qualification of the data has been made as a result of the field duplicates.

Internal Standards Performance. Internal standard areas were between 50 percent and 150 percent with reference to the continuing calibration standard. Retention times were checked to identify any retention time shifts that may have occurred in the internal standards. None were found. No data have been qualified on the basis of internal standard performance.

Laboratory Control Samples. DCS and single control samples (SCS) were analyzed to assess the accuracy and precision of the instrumentation at the time of sample analysis. The results for the DCS were within the control limits in Table 4-6a of the QAPP Addendum, and those for the SCS were within the limits listed in Table 4-7 of the QAPP Addendum. Several reported results for the DCS and SCS were recalculated and no calculation or transcription errors were found.

Compound Identification. Relative retention times of the target analytes were checked and all positively identified compounds had relative retention times within 0.06 RRT units of the applicable continuing calibration standard. Positive results were verified against the appropriate mass spectra. No qualifications have been made on the basis of compound identification.

Compound Quantitation and Reported Detection Limits. All values which were recalculated agreed with the reported results and no transcription errors were found. The correct RRFs and internal standards were used in the calculations that were checked. Reporting limits and positively identified compounds were corrected for percent moisture and no dilution factors needed to be taken into account as no samples were diluted. No qualifications have been made on the basis of incorrect quantitation. Target compounds

detected below the reporting limit have been qualified as estimated, and flagged "J", by the laboratory and validator due to potential inaccuracy.

Tentatively Identified Compounds. Spectra of tentatively identified compounds (TICs) were examined against library-standard spectra to ensure that the tentative identifications were as accurate as possible. All samples reported one TIC, except sample -0010 which identified no TICs. The reporting of the TICs were judged by the reviewer to be inaccurate as the mass spectrum did not satisfy the identification criteria. These identifications have been changed to "Unknown" and qualified as estimated "NJ".

System Performance. In general, the reconstructed ion chromatograms had good, stable baselines, good resolution, and no peak tailing or splitting problems. Internal standard retention time shifts also were not a problem. No reasons have been found to believe that the system was not performing sufficiently, and no data have been qualified on the basis of poor system performance.

2.2.2 Overall Assessment

The data are assessed to be suitable for use with the qualifications noted by the data reviewer. Throughout the analyses, the system was in control and no anomalies were found. In addition, the quality assurance objectives of accuracy, precision, and completeness were satisfied.

Accuracy and precision (based on MS/MSD results, Laboratory Control Samples, and Duplicate analyses) were found to be acceptable, as %Rs and %RPDs were within the control limits established in the QAPP Addendum. Completeness, defined as the percentage of analytical results which are judged to be valid, including estimated "J" values in accordance with section 13.3 of the QAPP, was 100 percent. This satisfies the completeness goal of 90 percent specified in the QAPP.

2.3 SEMIVOLATILE ORGANIC ANALYSIS

Eleven soil samples and one aqueous sample were analyzed for semi-volatile organic compounds by EPA method 8270. The results of the validation follow.

2.3.1 Quality Control Parameters

Holding Times. Soil samples were extracted within 14 days of collection and were analyzed within 40 days of extraction. The aqueous sample was extracted within 7 days of collection and was analyzed within 40 days of extraction. No data qualification was necessary on the basis of holding times.

GC/MS Tuning. A GC/MS tune was provided for every instrument used to analyze samples and for each twelve hour period in which samples were analyzed. No transcription or calculation errors were found, and the tune criteria listed in the Functional Guidelines were met by the laboratory for each GC/MS tune associated with these sample analyses. No qualifications were made on the basis of GC/MS tune data.

Calibration. Data for two initial calibrations were provided. Several RRF, average relative response factors, and percent relative standard deviations (%RSD) were recalculated to ensure that the initial calibration being used to quantitate results was accurate. No errors were found in the recalculations done. The average RRFs met the criterion of being greater than 0.05 for all target analytes, and the %RSDs met the criterion of being less than 30 percent for all target analytes, with two exceptions. The initial calibration associated with the aqueous samples analyzed on 11/09/93 had two analytes with %RSDs greater than 30 percent, 4,6-Dinitro-2-methylphenol and 3,3'-Dimethylbenzidine. Results for these compounds in the associated sample, CAN096-0962-0681, have been qualified as estimated, UJ.

Continuing calibration verifications were analyzed for each 12-hour period samples were analyzed. All RRFs were >0.05. Percent differences were <25 percent, with the following exceptions.

Continuing Calibration Date	Analyte	Associated Samples	Qualification
11/23/93	2,4-Dimethylphenol	All soil samples	UJ
	Hexachlorobutadiene		UJ
	4-Nitrophenol		UJ
	Bis(2-ethylhexyl) phthalate		UJ
	Di-n-octyl phthalate		UJ
11/17/93	bis(2-chloroisopropyl)ether	Aqueous sample	UJ
	1,2,4-Trichlorobenzene		UJ
	Di-n-butylphthalate		UJ

Recalculated values agreed with reported values, and qualifications were made as noted in the table above.

Blanks. A method blank was extracted with each batch of samples, and analysis resulted in no target compounds being detected.

No target analytes were reported as detected in the aqueous decontamination water sample associated with these samples, CAN096-0962-0681, and no qualifications were made on the basis of the aqueous decontamination water sample.

Surrogate Recovery. At least ten percent of surrogate recoveries were recalculated, and no errors were found in calculation or in transcription of the results. All surrogate recoveries were within the control limits listed in Table 4-7 of the QAPP Addendum.

Matrix Spike/Matrix Spike Duplicate. MS/MSD results were reported for sample CAN096-0962-0030 in this laboratory package. At least ten percent of the %RPDs and %Rs were recalculated, and no calculation errors were detected. Percent recoveries (%Rs) of the spiked compounds and precision between the MS and MSD were within the control limits listed in Table 4-8 of the QAPP Addendum, and no qualifications have been made on the basis of the MS/MSD.

Field Duplicates. One set of field duplicates was analyzed as part of this laboratory package: -0010 and its duplicate, -0661. All results in both samples were reported as not detected. According to the guidelines discussed in section 1.2, the results of these field duplicates are acceptable, and no qualification of the data has been made as a result of the field duplicates.

Internal Standards Performance. Internal standard areas were between 50 percent and 150 percent with reference to the continuing calibration standard. Retention times were checked to identify any retention time shifts that may have occurred in the internal standards. None were found. No data have been qualified on the basis of poor internal standard performance.

Laboratory Control Samples. DCS and SCS were analyzed, and the results were within the control limits listed in Tables 4-6b and 4-7, respectively, of the QAPP Addendum.

Compound Identification. All TCL compounds were reported as not detected in all samples. All major peaks in sample chromatograms were accounted for (i.e. internal standard, surrogate, or TIC). No qualifications have been made on the basis of compound identification.

Compound Quantitation and Reported Detection Limits. No positively identified compound results existed in this data package, and therefore results could not be recalculated. Reporting limits were adjusted for percent moisture; and no dilutions were performed, so no dilution factors needed to be taken into account.

Tentatively Identified Compounds. Spectra of TICs were examined against library-standard spectra to ensure that the tentative identifications were as accurate as possible. All reported TICs matched the corresponding standard spectrum well enough to be considered tentatively identified or were found in the method blank and have, therefore, not been reported as tentatively identified in the samples, with one exception. TIC spectra in the aqueous decontamination water sample, CAN096-0962-0681, for Bromo-1,3-cyclopentadiene; (threo-2-Bromo-1-methylpropyl)cyanimide; and 5-Methyl-2-(N-ethyl-p-chlorophenylamino)-2-thiozoline were not considered by the reviewer to match the standard spectra adequately enough to meet the criteria of functional guidelines. These TIC identifications have been changed to

"unknown". In accordance with the validation guidelines, all TICs have been qualified as "NJ".

System Performance. In general, the reconstructed ion chromatograms have good, stable baselines, good resolution, and no peak tailing or splitting problems. Internal standard retention time shifts also were not a problem. No reasons have been found to believe that the system was not performing sufficiently, and no data have been qualified on the basis of poor system performance.

2.3.2 Overall Assessment

The data are assessed to be suitable for use with the qualifications noted by the data reviewer. Throughout the analyses, the system was in control; and no anomalies were found. In addition, the quality assurance objectives of accuracy, precision, and completeness were satisfied.

Accuracy and precision (based on MS/MSD results, Laboratory Control Samples, and Duplicate analyses) were found to be acceptable, since %Rs and %RPDs were within the control limits established in the QAPP Addendum. Completeness, defined as the percentage of analytical results which are judged to be valid including estimated "J" values in accordance with section 13.3 of the QAPP, was 100 percent. This satisfies the completeness goal of 90 percent specified in the QAPP.

2.4 PESTICIDE/PCB ANALYSIS

Eleven soil samples and one aqueous sample were analyzed for pesticide and PCB compounds by EPA method 8080. The results of the validation follow.

2.4.1 Quality Control Parameters

Holding Times. Samples were extracted within fourteen days of collection, and were analyzed within forty days of extraction and no data qualification was required.

Instrument Performance. The average retention times of analytes in the ICAL and the retention times of the CCAL were within 0.15 minutes, the window used by the software for target compound identification. Analysis of evaluation mix B demonstrated that breakdown of 4,4'-DDT and Endrin both individually and combined were below 20% breakdown.

Calibration. All target compounds for both columns for both initial calibrations met the 20% RSD acceptance criteria specified in method 8000 and no data qualification was necessary.

One of the continuing calibration standards bracketing sample CAN096-0962-0001 had a 16%D for methoxychlor on one column and was biased high, exceeding the 15%D criteria specified in method 8000. As no target compounds were reported as detected, no sample data qualification was required. All other continuing calibration standards were within acceptance limits and no data qualification was necessary.

The analytical sequence was run in compliance with SW-846 methodology. An instrument blank and check standard were analyzed after every 10 samples.

Blanks. Two method blanks were extracted and analyzed with the batch of samples. No TCL compounds were reported as detected in either method blank, and the reporting limits met the criteria listed in Table 4-5c of the QAPP Addendum.

The decontamination water associated with these samples, CAN096-0962-0681 DW, had no target analytes detected and no qualifications were made on the basis of the decontamination water.

Surrogate Recovery. Surrogate recoveries were within the control limits given for dibutylchlorendate (DBC) in Table 4-7c of the QAPP Addendum, 41-135 percent recovery and no qualification on the basis of surrogate recoveries was necessary. One or more surrogate recoveries for 10% of the sample data were recalculated by the reviewer and no calculation or transcription errors were found.

Matrix Spike/Matrix Spike Duplicate. MS/MSD results were reported for sample CAN096-0962-0005 associated with the samples in this boring. Percent recoveries of the spiked compounds and precision between the MS and MSD were within the control limits listed in

Table 4-6c of the QAPP Addendum, and no qualification on the basis of the MS/MSD performance was necessary. It should be noted that the following compounds exceeded the linear range of the instrument in both the MS and MSD samples: Dieldrin, Endrin, 4,4'DDT and Dibutylchlorendate. Due to the mis-spiking of the target compounds, the percent recoveries for the MS/MSDs may not accurately reflect the sample matrix performance. No sample data have been qualified on the basis of the laboratory spiking the MS/MSD samples above the linear range of the instrument. One or more analytes for 10% of the sample data were recalculated by the reviewer and no calculation or transcription errors were found.

Field Duplicates. Sample -0661 was the duplicate of sample -0010. All sample results were within 3 X the reporting limit as specified in section 1.2 of the original QAPP with the exception of 4,4'-DDT. In sample -0010 4,4'-DDT was reported as non-detect, and in the filed duplicate a result of 17 µg/kg was reported. In accordance with the validation guidelines all associated soils results for 4,4'-DDT have been qualified as estimated, and flagged "J/UJ". No other data qualification on the basis of field duplicate results was required.

Laboratory Control Samples. DCS and SCS were analyzed and the results were within the control limits listed in Table 4-6c of the QAPP Addendum. It should be noted that the surrogate concentrations in all DCSs (water and soil) and all target compounds in DCS-2 (water) and DCS-1 and DCS-2 (soil) exceeded the calibration range of the instrument. Due to the mis-spiking of the target compounds, the percent recoveries for the DCSs may not accurately reflect the system performance. No sample data have been qualified on the basis of the laboratory spiking these control samples above the linear range of the instrument. One or more analytes in 10% of the sample data were recalculated by the reviewer and no calculation or transcription errors were found.

Compound Identification. All positively identified compounds were confirmed as detected on two dissimilar columns and results on the two columns were within 25%D of each other. Quantitation summary sheets were examined to determine that transcription errors had not occurred. Chromatograms were reviewed, and the retention times for several compounds reported as not detected were checked against RMALs SOP for pesticide identification and no errors were found. No GC/MS verification was necessary because compounds were not detected at high concentrations in these samples.

Compound Quantitation and Reported Detection Limits. Sample data was quantitated using an external standard $1/x^2$ weighted linear regression. Target compounds detected below the reporting limit have been qualified as estimated, and flagged "J", by the laboratory and the validator due to potential inaccuracy. One or more analytes for 10% of the sample data were recalculated by the reviewer and no calculation or transcription errors were found. Reporting limits were correctly adjusted for sample preparation and percent moisture.

2.4.2 Overall Assessment

The data are assessed to be suitable for use as reported by the laboratory. Throughout the analyses, the system was in control and no anomalies were found. In addition, the quality assurance objectives of accuracy, precision, and completeness were satisfied.

Accuracy and precision (based on MS/MSD results, Laboratory Control Samples, and Duplicate analyses) were found to be acceptable, as %Rs and %RPDs were within the control limits established in the QAPP Addendum. Completeness, defined as the percentage of analytical results which are judged to be valid, including estimated "J" values, in accordance with Section 13.3 of the QAPP, was 100 percent. This satisfies the completeness goal of 90 percent specified in the QAPP.

2.5 HERBICIDE ANALYSIS

Eleven soil samples and one aqueous sample were analyzed for herbicide compounds by EPA method 8150. The results of the validation follow.

2.5.1 Quality Control Parameters

Holding Times. Samples were extracted within fourteen days of collection, and were analyzed within forty days of extraction and no data qualification was required.

Calibration. All target compounds for both columns for the initial calibration met the 20% RSD acceptance criteria specified in method 8000 and no data qualification was necessary.

Two continuing calibration standards bracketing the aqueous DCS samples had a maximum percent difference of 17%D, 26%D and 32%D for dicamba, MCPP and MCPA respectively on one column and was biased low, exceeding the 15%D criteria specified in method 8000. As these target compounds were not reported as part of the DCS, no sample data qualification was considered necessary. Two continuing calibration standards bracketing sample CAN096-0962-0001 had a maximum percent difference of 20% for dalapon and was biased high. As the associated sample data were all non-detect, no sample data qualification was necessary. The calibration standard analyzed after samples -0002 through -0005 MSD exceeded the 15%D criteria for dalapon with a 16%D and was biased high. As all associated sample data were non-detect, no sample data qualification was necessary. The calibration standard analyzed after samples -0006 through -0012 exceeded the 15%D acceptance criteria for dalapon (17%D), MCPA (16%D) and dichloroprop (16%D) and were all biased high. As all associated sample data were reported as non-detect, no data qualification was required. All other continuing calibration standards were within acceptance limits and no data qualification was necessary.

Blanks. Two method blanks were extracted and analyzed with the batch of samples. No TCL compounds were reported as detected in either method blank, and the reporting limits met the criteria listed in Table 4-5e of the QAPP Addendum.

The decontamination water associated with these samples, CAN096-0962-0681 DW, had no target analytes detected and no qualifications were made on the basis of the decontamination water.

Surrogate Recovery. Surrogate recoveries were within the control limits given for 2,4-Dichlorophenyl Acetic Acid (DCAA) in Table 4-6e of the QAPP Addendum, 51-138 percent recovery for waters and 63-129 percent recovery for soils, and no qualification on the basis of surrogate recoveries was necessary. One or more surrogate recoveries for 10% of the sample data were recalculated by the reviewer and no calculation or transcription errors were found.

Matrix Spike/Matrix Spike Duplicate. MS/MSD results were reported for sample CAN096-0962-0005 associated with the samples in this boring. Percent recoveries of the spiked compounds for the MS and MSD were within the control limits listed in Table 4-6e of the

QAPP Addendum. The precision as measured by %PRD, for 2,4,5-T and 2,4,5-TP was 25% and 37% respectively, exceeding the acceptance limits of 23% and 26%, respectively. As these compounds were not reported as detected, and as the percent recoveries for the MS and the MSD analyses were within limits, no qualification on the basis of the MS/MSD performance was considered necessary. One or more analytes in 10% of the sample data were recalculated by the reviewer and no calculation or transcription errors were found.

Field Duplicates. Sample -0661 was the duplicate of sample -0010. All sample results were within 3X the reporting limit as specified in section 1.2 of the original QAPP. No data qualification was required.

Laboratory Control Samples. DCS and SCS were analyzed and the results were within the control limits listed in Table 4-6e of the QAPP Addendum and no data qualification on the basis of laboratory control samples was necessary. One or more analytes for 10% of the sample data were recalculated by the reviewer and no calculation or transcription errors were found.

Compound Identification. All positively identified compounds (surrogates and spiked analytes) were confirmed as detected on two dissimilar columns and results on the two columns were within 25%D of each other. Quantitation summary sheets were examined to determine that transcription errors had not occurred. Chromatograms were reviewed, and the retention times for several compounds reported as not detected were checked against RMAL's SOP for herbicide identification. No errors in identification or transcription were found.

Compound Quantitation and Reported Detection Limits. Sample data was quantitated using an internal standard $1/x^2$ weighted linear regression. One or more analytes for 10% of the sample data were recalculated by the reviewer and no calculation or transcription errors were found. Reporting limits were adjusted for sample preparation and percent moisture.

2.4.2 Overall Assessment

The data are assessed to be suitable for use as reported by the laboratory. Throughout the analyses, the system was in control and no anomalies were found. In addition, the quality assurance objectives of accuracy, precision, and completeness were satisfied.

Accuracy and precision (based on MS/MSD results, Laboratory Control Samples, and Duplicate analyses) were found to be acceptable, as %Rs and %RPDs were within the control limits established in the QAPP Addendum, with the exceptions noted above. Completeness, defined as the percentage of analytical results which are judged to be valid, including estimated "J" values, in accordance with Section 13.3 of the QAPP, was 100 percent. This satisfies the completeness goal of 90 percent specified in the QAPP.

2.5 METALS ANALYSIS

Eleven soil samples and one aqueous sample were analyzed for metals. The analytical methods are listed in Table 8-2 of the QAPP Addendum. The results of the validation follow.

2.5.1 Quality Control Parameters

Holding Times. Metals samples were analyzed within the 6-month holding time, with the exception of Mercury which was analyzed within the 28-day holding time. No qualifications were made on the basis of holding times.

Calibration. The initial calibration for the metals analyzed by ICP was established for each metal by a blank and one standard. For those metals analyzed by GFAA, a blank and three standards were used in producing an initial calibration, and the correlation coefficients were 0.995 or greater, with the exception of the Thallium correlation coefficient which was 0.989. All results for Thallium were associated with this initial calibration and have been qualified as estimated, UJ. The initial calibration for the Mercury analyses included a blank and four standards, and the correlation coefficient was greater than 0.995.

Initial and continuing calibration verifications were present for all analyses, and those from the ICP and the GFAA were within 90 to 110 percent recovery from the appropriate initial calibration. Those for Mercury were between 80 to 120 percent recovery from the initial calibration.

Blanks. No target metals were reported as detected for the ICP, GFAA, or Mercury analyses in any method blank. The preparation blank associated with the soil samples was reported to contain iron at 51.5 mg/kg and zinc at 12.0 mg/kg. Zinc has been qualified as not detected

at the reported value in all soil samples, as zinc results in these samples are less than five times the concentration of zinc in the associated preparation blank.

ICP Interference Check Sample. An interference check sample was analyzed at the beginning and at the end of each analytical sequence. The results for all analytes in both check standards were within 20 percent of the true value. No qualifications were necessary on the basis of the ICP interference check samples.

Laboratory Control Samples. DCS were analyzed for both soil and aqueous matrices, and the results for all the metals were within the control limits listed in Table 4-6d of the QAPP Addendum. Transcription was checked from the raw data and at least ten percent of the results were recalculated. No errors were found, and no qualifications have been made on the basis of the laboratory control sample results.

Matrix Spike/Matrix Spike Duplicate. MS/MSD results were reported for sample -0030 in this laboratory package. Control limits for percent recovery and %RPDs are provided in Table 4-6d of the QAPP Addendum. These control limits were achieved with the exception of barium, calcium, nickel and selenium. Barium was recovered within the %R limits in the spike and its duplicate, however, the %RSD was 33% indicating poor precision. Calcium was recovered at 138 percent in the matrix spike duplicate outside the upper control limit. Manganese was recovered at 171 percent above the upper control limit in the MS and within limits at 120 percent in the MSD giving a 35 percent RPD. Selenium was recovered at 60 percent and 67 percent in the matrix spike and its duplicate, below the lower control limit. Because of the possible low bias in the analyses, results for selenium have been qualified as estimated (J) if they are above the reporting limit, and as estimated (UJ) if they are reported as not detected. Because of the possible high bias in the analysis, results for calcium and manganese have been qualified as estimated (J) if they are reported as detected. Because of the precision discrepancies in the analyses, results for barium and nickel have been qualified as estimated (J/UJ). Limits were not included in Table 4-6d for Thallium, however matrix spike recoveries were 83%/85%, and no qualifications have been made to Thallium results. No errors in calculation or transcription were found in those results that were recalculated for any of the metals.

Furnace Atomic Absorption QC. Duplicate injections were not performed with these analyses, as they are not a requirement of the GFAA methodology in SW-846. Post-digestion spike recoveries were within the control limits of 85 percent to 115 percent listed in the Functional Guidelines with the following exceptions:

Analyte	Sample ID	Spike Recovery
arsenic	CAN096-0962-0060	124 percent
	CAN096-0962-0070	125 percent
lead	CAN096-0962-0020	80 percent
	CAN096-0962-0060	80 percent
selenium	CAN096-0962-0681	81 percent
	CAN096-0962-0010	84 percent
	CAN096-0962-0661	76 percent
	CAN096-0962-0020	56 percent
	CAN096-0962-0030	78 percent
	CAN096-0962-0040	77 percent
	CAN096-0962-0050	76 percent
	CAN096-0962-0060	78 percent
	CAN096-0962-0080	84 percent
thallium	CAN096-0962-0681	76 percent
	CAN096-0962-0020	64 percent
	CAN096-0962-0030	82 percent
	CAN096-0962-0040	70 percent
	CAN096-0962-0050	76 percent
	CAN096-0962-0060	51 percent
	CAN096-0962-0070	78 percent
	CAN096-0962-0080	82 percent
	CAN096-0962-0100	82 percent

Analytical results for the analytes in the table above were qualified as estimated (J/UJ), based on these post-digestion spike recoveries, with the exception of lead in sample CAN096-0962-0020 as the sample absorbance was greater than 50% of the spike absorbance.

ICP Serial Dilution. ICP serial dilution was not required or performed on samples in this SDG.

Field Duplicates. One set of field duplicates was analyzed as part of this laboratory package: -0010 and its duplicate, -0661. Results for the duplicate samples were within 3X the reporting limit of each other where the results were less than 5X the reporting limit, and had a %RPD of less than 100 percent when the results were greater than 5X the reporting limit. No qualifications were made on the basis of the duplicate samples.

Sample Result Verification. At least 10 percent of results were recalculated from the raw data to verify the reported results. No errors were found in transcription or calculation and no anomalies were found in the raw data, such as negative absorbances, omissions, or illegible results. Results were within the calibration ranges for positively reported analytes. No qualifications were made on the basis of these findings.

2.5.2 Overall Assessment

The data are assessed to be suitable for use with the qualifications noted by the data reviewer. Throughout the analyses, the system was in control and no anomalies were found. In addition, the quality assurance objectives of accuracy, precision and completeness were satisfied.

Accuracy and precision (based on MS/MSD results, Laboratory Control Samples, and Duplicate analyses) were found to be acceptable since %Rs and %RPDs were within the control limits established in the QAPP Addendum except as noted for barium, cadmium, nickel, and selenium. Completeness, defined as the percentage of analytical results which are judged to be valid, including estimated "J" values, in accordance with section 13.3 of the QAPP, was 100 percent. This satisfies the completeness goal of 90 percent specified in the QAPP.

2.7 TOTAL PETROLEUM HYDROCARBON ANALYSIS

Eleven soil samples and one aqueous sample were analyzed for TPH by EPA method 418.1. The results of the validation follow.

2.7.1 Quality Control Parameters

Holding Times. The 28-day holding time from collection to analysis was met for the samples analyzed for TPH from this laboratory package, and no qualification was made on the basis of holding time.

Calibration. Three standards and a blank were used to establish the initial calibration for this analysis, and the correlation coefficient was acceptable. The continuing calibration verifications analyzed were recovered at 90-110 percent. No qualifications were required on the basis of calibration.

Blanks. Petroleum hydrocarbons were not detected in the initial calibration blank, the associated continuing calibration blanks, the preparation blank, or the method blank. An aqueous decontamination water sample, CAN096-0962-0681, was analyzed for TPH. No petroleum hydrocarbons were detected in the aqueous decontamination water sample, and no qualifications have been made on the basis of the blank contamination.

Spike Recoveries. Spike recovery data provided with this analysis includes Duplicate/Laboratory Control Samples and an MS/MSD. The accuracy and precision of the DCS sets and the MS/MSD analysis (CAN096-0962-0030) are within the control limits provided in Table 4-6f of the QAPP Addendum, and no qualifications have been made on the basis of spike recoveries.

Field Duplicates. A field duplicate pair was analyzed for TPH in association with these sample analyses, CAN096-0962-0010 and CAN096-0962-0661, and the results were reported as not detected for both samples. According to the guidelines discussed in Section 1.2, the precision between the field duplicates is acceptable; and no qualification of the data has been made.

Evaluation of Compound Quantitation. A recalculation of ten percent of the results for these samples was performed and no errors in calculation or in transcription were found. The results included a correction for percent moisture.

System Performance. The infrared spectra of the standards and the samples had good, stable baselines and no reasons were found to believe the system was out of control at the time of analysis.

2.7.2 Overall Assessment

Sample results are considered to be usable without any qualifications. The quality assurance objectives of accuracy, precision, and completeness have been met with respect to these samples.

Accuracy and precision (based on MS/MSD results, field duplicate results and Duplicate Laboratory Control Samples) were found to be acceptable, as %Rs and %RPDs were within the control limits established in the QAPP Addendum. Completeness, defined as the percentage of analytical results which are judged to be valid including estimated "J" values in accordance with section 13.3 of the QAPP, was 100 percent. This satisfies the completeness goal of 90 percent specified in the QAPP.

2.8 GASOLINE RANGE ORGANICS ANALYSIS

Eleven soil samples and one aqueous sample were analyzed for GRO by modified EPA method 8015. In accordance with Table 4-5f of the QAPP Addendum the GRO results are to be used for characterization evaluation and have been reported on a qualititative basis. The results of the validation follow.

2.8.1 Quality Control Parameters

Holding Times. All samples were analyzed within 14 days, therefore, the 28-day holding time from collection to analysis was met for the samples analyzed for GRO from this laboratory package, and no qualification were made on the basis of holding time. All samples were analyzed within 14 days of sample collection.

Calibration. A five point initial calibration was analyzed, and the average total response factor from this initial calibration was used to calculate the sample results. The %RSD for this average total calibration factor was 4.8%. Recalculations were made at each step in the determination of the average total calibration factor, and no errors were found. Continuing calibrations were analyzed at a 10% frequency, and all %Ds were less than ten percent. At least ten percent of these %Ds were recalculated and no errors were found.

Blanks. Method blanks were analyzed for each matrix. At least ten percent of these results were recalculated and all transcriptions were checked, no errors in calculation or transcription were found. GRO was reported as not detected in these blanks and in the associated aqueous decontamination water sample, CAN096-0962-0681. No qualifications have been made on the basis of the blank results.

Surrogate Recoveries. The laboratory QC limits for surrogate spike recoveries for GRO were used as QC limits for surrogate spike recoveries were not listed in the QAPP Addendum. Surrogate recoveries were within the laboratory control limits of 75-125 percent recovery for aqueous samples and 75-125 percent recovery for soil samples. Recalculation of several surrogate recovery results was performed and transcription checked. No errors in calculation or transcrption were found, and no qualifications have been made on the basis of surrogate recoveries.

Spike Recoveries. Spike recovery data provided with this analysis includes duplicate control samples and an MS/MSD. The precision of the MS/MSD analysis (CAN096-0962-0030) is within the control limits provided in Table 4-6f of the QAPP Addendum. The accuracy of the MS/MSD analysis was not within the QAPP Addendum control limits (62%/64%R, where the QAPP Addendum lower limit is 75%), however, since the results are reported on a qualitative, not quantitative basis, no qualifications have been made to the data on this basis. The accuracy and precision of the SCS samples and DCS sets are within the control limits provided in Table 4-6f of the QAPP Addendum, and no qualifications have been made on the basis of the SCS and DCS samples.

Field Duplicates. A field duplicate pair was analyzed for GRO in association with these sample analyses, CAN096-0962-0010 and CAN096-0962-0661, and the results were reported

as PRESENT for both samples. The precision between the field duplicates is judged to be acceptable; and no qualification of the data has been made.

Evaluation of Compound Quantitation. A recalculation of ten percent of the results for these samples was performed and no errors in calculation or in transcription were found. Results which were below the laboratory reporting limit, but above the IDL have been reported as PRESENT with a qualifying notation added by the laboratory to denote this fact.

System Performance. The chromatograms of the standards and the samples had good, stable baselines and no reasons were found to believe the system was out of control at the time of analysis.

2.8.2 Overall Assessment

Sample results are considered to be usable without any qualifications. The quality assurance objectives of accuracy, precision, and completeness have been met with respect to this sample.

Accuracy and precision (based on MS/MSD results, field duplicate results and Laboratory Control Samples) were found to be acceptable, as %Rs and %RPDs were within the control limits established in the QAPP Addendum with the exception of the MS/MSD results discussed above. Completeness, defined as the percentage of analytical results which are judged to be valid including estimated "J" values in accordance with section 13.3 of the QAPP, was 100 percent. This satisfies the completeness goal of 90 percent specified in the QAPP.

2.9 TOTAL CHROMATOGRAPHABLE ORGANICS ANALYSIS

Eleven soil samples and one aqueous sample were analyzed for TCO by modified EPA method 8015. In accordance with Table 4-5f of the QAPP Addendum the TCO results are to be used for characterization evaluation and have been reported on a qualititative basis. The results of the validation follow.

2.9.1 Quality Control Parameters

Holding Times. The 28-day holding time from collection to analysis was met for the samples analyzed for TCO from this laboratory package, and no qualification was made on the basis of holding time.

Calibration. A five point initial calibration was analyzed, and the average total response factor from this initial calibration was used to calculate the sample results. The %RSDs for the individual calibration factors were less than 20%. Recalculations were made at each step in the determination of the average total calibration factor, and no errors in calculation were found. The correlation coefficient for the surrogate O-terphenyl was greater than 0.995. Continuing calibrations were analyzed at a 10% frequency, and all %Ds were less than 20 percent. At least ten percent of these %Ds were recalculated and no errors in calculation were found.

Blanks. Method blanks were analyzed for each matrix. At least ten percent of these results were recalculated and all transcriptions were checked, no errors in calculation or transcription were found. TCO was reported as not detected in these blanks and in the associated aqueous decontamination water sample, CAN096-0962-0681. No qualifications have been made on the basis of the blank results.

Surrogate Recoveries. The laboratory QC limits for surrogate spike recovereis for TCO were used as the surrogate recovery QC limits were not listed in the QAPP Addendum. Surrogate recoveries were within the laboratory control limits of 36-141 percent recovery for aqueous samples and 54-141 percent recovery for soil samples. Recalculation of several surrogate recovery results was performed and transcription checked. No errors in calculation or transcription were found, and no qualifications have been made on the basis of surrogate recoveries.

Spike Recoveries. Spike recovery data provided with this analysis includesLaboratory Control Samples (single control samples and duplicate control samples) and an MS/MSD. The accuracy and precision of the MS/MSD analysis (CAN096-0962-0030), the SCS samples, and the DCS sets are within the control limits provided in Table 4-6f of the QAPP Addendum. No qualifications have been made on the basis of spike recoveries.

Field Duplicates. A field duplicate pair was analyzed for TCO in association with these sample analyses, CAN096-0962-0010 and CAN096-0962-0661, and the results were reported as not detected for sample -0010 and "PRESENT" above the reporting limit for sample -0661. The precision between the field duplicates is judged to be unacceptable; and qualification of all soil sample data has been made.

Evaluation of Compound Quantitation. A recalculation of ten percent of the results for these samples was performed and no errors in calculation or in transcription were found. Results which were below the laboratory reporting limit, but above the IDL have been reported as PRESENT with a qualifying notation added by the laboratory to denote this fact.

System Performance. The chromatograms of the standards and the samples had good, stable baselines and no reasons were found to believe the system was out of control at the time of analysis.

2.9.2 Overall Assessment

Sample results are considered to be usable as qualified. The quality assurance objectives of accuracy, precision, and completeness have been met with respect to this sample.

Accuracy and precision (based on MS/MSD results, field duplicate results and Laboratory Control Samples) were found to be acceptable, as %Rs and %RPDs were within the control limits established in the QAPP Addendum. Precision was considered acceptable in the MS/MSD and DCS results, although it was not acceptable in the field duplicate results, the reviewer has made the judgement that the results should be considered useable with a cautionary qualifier as a results of the field duplicate results. Completeness, defined as the percentage of analytical results which are judged to be valid including estimated "J" values in accordance with section 13.3 of the QAPP, was 100 percent. This satisfies the completeness goal of 90 percent specified in the QAPP.

APPENDIX D
ANALYTICAL DATABASE PRINTOUT

DATA QUALIFIERS

"U" The analyte was analyzed for, but was not detected; the associated value is the sample reporting limit.

"J" The analyte was positively identified, but the associated numerical value is the approximate concentration of the analyte in the sample.

"UJ" The analyte was not detected. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

W-C COMMENT QUALIFIERS

"C" Quality control requirements concerning calibration were not met.

"L" Laboratory blank contamination exists.

"M" MS/MSD results did not meet the appropriate QC criteria.

"D" Precision, as assessed by the field duplicate samples, was not within acceptable limits.

"A" Furnace atomic absorption metals post-digestion spike recoveries were outside of the limits set forth in Functional Guidelines.

"V" Target compounds reported as detected below the reporting limit in volatile, semivolatile, pesticide/PCB, and herbicide analyses.

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0010	Aluminum	7090	10.7		mg/kg	
CAN096-0962-0010	Antimony		6.4	U	mg/kg	
CAN096-0962-0010	Arsenic	2.1	0.54		mg/kg	
CAN096-0962-0010	Barium	68	1.1	J	mg/kg	M
CAN096-0962-0010	Beryllium	0.59	0.21		mg/kg	
CAN096-0962-0010	Cadmium		0.54	U	mg/kg	
CAN096-0962-0010	Calcium	5400	21.5	J	mg/kg	M
CAN096-0962-0010	Chromium	8.5	1.1		mg/kg	
CAN096-0962-0010	Cobalt	3.3	1.1		mg/kg	
CAN096-0962-0010	Copper	7.2	2.1		mg/kg	
CAN096-0962-0010	Iron	8530	10.7		mg/kg	
CAN096-0962-0010	Lead	6.3	0.54		mg/kg	
CAN096-0962-0010	Magnesium	1370	21.5		mg/kg	
CAN096-0962-0010	Manganese	59.9	1.1	J	mg/kg	M
CAN096-0962-0010	Mercury		0.11	U	mg/kg	
CAN096-0962-0010	Nickel	6.1	4.3		mg/kg	
CAN096-0962-0010	Potassium	1310	536		mg/kg	
CAN096-0962-0010	Selenium		0.54	UJ	mg/kg	AM
CAN096-0962-0010	Silver		1.1	U	mg/kg	
CAN096-0962-0010	Sodium	205	536		mg/kg	
CAN096-0962-0010	Thallium		0.54	UJ	mg/kg	C
CAN096-0962-0010	Vanadium	16.8	1.1		mg/kg	
CAN096-0962-0010	Zinc		16.5	U	mg/kg	L
CAN096-0962-0010	Aldrin		1.8	U	ug/kg	
CAN096-0962-0010	Aroclor 1016		35	U	ug/kg	
CAN096-0962-0010	Aroclor 1221		35	U	ug/kg	
CAN096-0962-0010	Aroclor 1232		35	U	ug/kg	
CAN096-0962-0010	Aroclor 1242		35	U	ug/kg	
CAN096-0962-0010	Aroclor 1248		35	U	ug/kg	
CAN096-0962-0010	Aroclor 1254		35	U	ug/kg	
CAN096-0962-0010	Aroclor 1260		35	U	ug/kg	
CAN096-0962-0010	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0010	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0010	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0010	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0010	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0010	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0010	4,4'-DDD		3.5	U	ug/kg	
CAN096-0962-0010	4,4'-DDE		3.5	U	ug/kg	
CAN096-0962-0010	4,4'-DDT		3.5	UJ	ug/kg	D
CAN096-0962-0010	Dieldrin		3.5	U	ug/kg	
CAN096-0962-0010	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0010	Endosulfan II		3.5	U	ug/kg	
CAN096-0962-0010	Endosulfan sulfate		3.5	U	ug/kg	
CAN096-0962-0010	Endrin		3.5	U	ug/kg	
CAN096-0962-0010	Endrin ketone		3.5	U	ug/kg	
CAN096-0962-0010	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0010	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0010	Methoxychlor		18	U	ug/kg	
CAN096-0962-0010	Toxaphene		180	U	ug/kg	
CAN096-0962-0010	Acetone	150	27	J	ug/kg	D
CAN096-0962-0010	Benzene		13	U	ug/kg	
CAN096-0962-0010	Bromodichloromethane		13	U	ug/kg	
CAN096-0962-0010	Bromoform		13	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0010	Bromomethane		27	UJ	ug/kg	C
CAN096-0962-0010	2-Butanone (MEK)		27	U	ug/kg	
CAN096-0962-0010	Carbon disulfide		13	U	ug/kg	
CAN096-0962-0010	Carbon tetrachloride		13	U	ug/kg	
CAN096-0962-0010	Chlorobenzene		13	U	ug/kg	
CAN096-0962-0010	Chloroethane		27	U	ug/kg	
CAN096-0962-0010	Chloroform		13	U	ug/kg	
CAN096-0962-0010	Chloromethane		27	U	ug/kg	
CAN096-0962-0010	Dibromochloromethane		13	U	ug/kg	
CAN096-0962-0010	1,1-Dichloroethane		13	U	ug/kg	
CAN096-0962-0010	1,2-Dichloroethane		13	UJ	ug/kg	C
CAN096-0962-0010	1,1-Dichloroethene		13	U	ug/kg	
CAN096-0962-0010	1,2-Dichloroethene (total)		13	U	ug/kg	
CAN096-0962-0010	1,2-Dichloropropane		13	U	ug/kg	
CAN096-0962-0010	cis-1,3-Dichloropropene		13	U	ug/kg	
CAN096-0962-0010	trans-1,3-Dichloropropene		13	U	ug/kg	
CAN096-0962-0010	Ethylbenzene		13	U	ug/kg	
CAN096-0962-0010	2-Hexanone		27	U	ug/kg	
CAN096-0962-0010	Methylene chloride	4.5	13	J	ug/kg	V
CAN096-0962-0010	4-Methyl-2-pentanone (MIBK)		27	U	ug/kg	
CAN096-0962-0010	Styrene		13	U	ug/kg	
CAN096-0962-0010	1,1,2,2-Tetrachloroethane		13	U	ug/kg	
CAN096-0962-0010	Tetrachloroethene		13	UJ	ug/kg	C
CAN096-0962-0010	Toluene		13	U	ug/kg	
CAN096-0962-0010	1,1,1-Trichloroethane		13	U	ug/kg	
CAN096-0962-0010	1,1,2-Trichloroethane		13	U	ug/kg	
CAN096-0962-0010	Trichloroethene		13	U	ug/kg	
CAN096-0962-0010	Vinyl acetate		27	U	ug/kg	
CAN096-0962-0010	Vinyl chloride		27	U	ug/kg	
CAN096-0962-0010	Xylenes (total)		13	U	ug/kg	
CAN096-0962-0010	Phenol		350	U	ug/kg	
CAN096-0962-0010	bis(2-Chloroethyl) ether		350	U	ug/kg	
CAN096-0962-0010	2-Chlorophenol		350	U	ug/kg	
CAN096-0962-0010	1,3-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0010	1,4-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0010	Benzyl alcohol		350	U	ug/kg	
CAN096-0962-0010	1,2-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0010	2-Methylphenol		350	U	ug/kg	
CAN096-0962-0010	bis(2-Chloroisopropyl)ether		350	U	ug/kg	
CAN096-0962-0010	4-Methylphenol		350	U	ug/kg	
CAN096-0962-0010	N-Nitroso-di-n-propylamine		350	U	ug/kg	
CAN096-0962-0010	Hexachloroethane		350	U	ug/kg	
CAN096-0962-0010	Nitrobenzene		350	U	ug/kg	
CAN096-0962-0010	Isophorone		350	U	ug/kg	
CAN096-0962-0010	2-Nitrophenol		350	U	ug/kg	
CAN096-0962-0010	2,4-Dimethylphenol		350	UJ	ug/kg	C
CAN096-0962-0010	Benzoic acid		1700	U	ug/kg	
CAN096-0962-0010	bis(2-Chloroethoxy)methane		350	U	ug/kg	
CAN096-0962-0010	2,4-Dichlorophenol		350	U	ug/kg	
CAN096-0962-0010	1,2,4-Trichlorobenzene		350	U	ug/kg	
CAN096-0962-0010	Naphthalene		350	U	ug/kg	
CAN096-0962-0010	4-Chloroaniline		350	U	ug/kg	
CAN096-0962-0010	Hexachlorobutadiene		350	UJ	ug/kg	C
CAN096-0962-0010	4-Chloro-3-methylphenol		350	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0010	2-Methylnaphthalene		350	U	ug/kg	
CAN096-0962-0010	Hexachlorocyclopentadiene		350	U	ug/kg	
CAN096-0962-0010	2,4,6-Trichlorophenol		350	U	ug/kg	
CAN096-0962-0010	2,4,5-Trichlorophenol		1700	U	ug/kg	
CAN096-0962-0010	2-Chloronaphthalene		350	U	ug/kg	
CAN096-0962-0010	2-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0010	Dimethyl phthalate		350	U	ug/kg	
CAN096-0962-0010	Acenaphthylene		350	U	ug/kg	
CAN096-0962-0010	3-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0010	Acenaphthene		350	U	ug/kg	
CAN096-0962-0010	2,4-Dinitrophenol		1700	U	ug/kg	
CAN096-0962-0010	4-Nitrophenol		1700	UJ	ug/kg	C
CAN096-0962-0010	Dibenzofuran		350	U	ug/kg	
CAN096-0962-0010	2,4-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0010	2,6-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0010	Diethyl phthalate		350	U	ug/kg	
CAN096-0962-0010	4-Chlorophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0010	Fluorene		350	U	ug/kg	
CAN096-0962-0010	4-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0010	4,6-Dinitro-2-methylphenol		1700	U	ug/kg	
CAN096-0962-0010	N-Nitrosodiphenylamine		350	U	ug/kg	
CAN096-0962-0010	4-Bromophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0010	Hexachlorobenzene		350	U	ug/kg	
CAN096-0962-0010	Pentachlorophenol		1700	U	ug/kg	
CAN096-0962-0010	Phenanthrene		350	U	ug/kg	
CAN096-0962-0010	Anthracene		350	U	ug/kg	
CAN096-0962-0010	Di-n-butyl phthalate		350	U	ug/kg	
CAN096-0962-0010	Fluoranthene		350	U	ug/kg	
CAN096-0962-0010	Pyrene		350	U	ug/kg	
CAN096-0962-0010	Butyl benzyl phthalate		350	U	ug/kg	
CAN096-0962-0010	3,3'-Dichlorobenzidine		710	U	ug/kg	
CAN096-0962-0010	Benzo(a)anthracene		350	U	ug/kg	
CAN096-0962-0010	bis(2-Ethylhexyl)phthalate		350	UJ	ug/kg	C
CAN096-0962-0010	Chrysene		350	U	ug/kg	
CAN096-0962-0010	Di-n-octyl phthalate		350	UJ	ug/kg	C
CAN096-0962-0010	Benzo(b)fluoranthene		350	U	ug/kg	
CAN096-0962-0010	Benzo(k)fluoranthene		350	U	ug/kg	
CAN096-0962-0010	Benzo(a)pyrene		350	U	ug/kg	
CAN096-0962-0010	Indeno(1,2,3-cd)pyrene		350	U	ug/kg	
CAN096-0962-0010	Dibenz(a,h)anthracene		350	U	ug/kg	
CAN096-0962-0010	Benzo(g,h,i)perylene		350	U	ug/kg	
CAN096-0962-0010	2,4-D		43	U	ug/kg	
CAN096-0962-0010	2,4-DB		110	U	ug/kg	
CAN096-0962-0010	2,4,5-T		11	U	ug/kg	
CAN096-0962-0010	2,4,5-TP (Silvex)		11	U	ug/kg	
CAN096-0962-0010	Dalapon		110	U	ug/kg	
CAN096-0962-0010	Dicamba		11	U	ug/kg	
CAN096-0962-0010	Dichlorprop		21	U	ug/kg	
CAN096-0962-0010	Dinoseb		21	U	ug/kg	
CAN096-0962-0010	MCPA		5400	U	ug/kg	
CAN096-0962-0010	MCPP		5400	U	ug/kg	
CAN096-0962-0010	Percent Moisture	6.8	0.1		percent	
CAN096-0962-0020	Aluminum	6460	11		mg/kg	
CAN096-0962-0020	Antimony		6.6	U	mg/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0020	Arsenic	2.3	0.55		mg/kg	
CAN096-0962-0020	Barium	89.1	1.1	J	mg/kg	M
CAN096-0962-0020	Beryllium	0.76	0.22		mg/kg	
CAN096-0962-0020	Cadmium		0.55	U	mg/kg	
CAN096-0962-0020	Calcium	70000	21.9	J	mg/kg	M
CAN096-0962-0020	Chromium	10.2	1.1		mg/kg	
CAN096-0962-0020	Cobalt	2.8	1.1		mg/kg	
CAN096-0962-0020	Copper	4.5	2.2		mg/kg	
CAN096-0962-0020	Iron	5270	11		mg/kg	
CAN096-0962-0020	Lead	3.6	0.55		mg/kg	
CAN096-0962-0020	Magnesium	5030	21.9		mg/kg	
CAN096-0962-0020	Manganese	194	1.1	J	mg/kg	M
CAN096-0962-0020	Mercury		0.11	U	mg/kg	
CAN096-0962-0020	Nickel	8.2	4.4		mg/kg	
CAN096-0962-0020	Potassium	2150	549		mg/kg	
CAN096-0962-0020	Selenium		1.1	UJ	mg/kg	AM
CAN096-0962-0020	Silver	0.37	1.1		mg/kg	
CAN096-0962-0020	Sodium	292	549		mg/kg	
CAN096-0962-0020	Thallium		1.1	UJ	mg/kg	AC
CAN096-0962-0020	Vanadium	20.4	1.1		mg/kg	
CAN096-0962-0020	Zinc		11.7	U	mg/kg	L
CAN096-0962-0020	Aldrin		1.9	U	ug/kg	
CAN096-0962-0020	Aroclor 1016		36	U	ug/kg	
CAN096-0962-0020	Aroclor 1221		36	U	ug/kg	
CAN096-0962-0020	Aroclor 1232		36	U	ug/kg	
CAN096-0962-0020	Aroclor 1242		36	U	ug/kg	
CAN096-0962-0020	Aroclor 1248		36	U	ug/kg	
CAN096-0962-0020	Aroclor 1254		36	U	ug/kg	
CAN096-0962-0020	Aroclor 1260		36	U	ug/kg	
CAN096-0962-0020	alpha-BHC		1.9	U	ug/kg	
CAN096-0962-0020	beta-BHC		1.9	U	ug/kg	
CAN096-0962-0020	delta-BHC		1.9	U	ug/kg	
CAN096-0962-0020	gamma-BHC (Lindane)		1.9	U	ug/kg	
CAN096-0962-0020	alpha-Chlordane		1.9	U	ug/kg	
CAN096-0962-0020	gamma-Chlordane		1.9	U	ug/kg	
CAN096-0962-0020	4,4'-DDD		3.6	U	ug/kg	
CAN096-0962-0020	4,4'-DDE		3.6	U	ug/kg	
CAN096-0962-0020	4,4'-DDT		3.6	UJ	ug/kg	D
CAN096-0962-0020	Dieldrin		3.6	U	ug/kg	
CAN096-0962-0020	Endosulfan I		1.9	U	ug/kg	
CAN096-0962-0020	Endosulfan II		3.6	U	ug/kg	
CAN096-0962-0020	Endosulfan sulfate		3.6	U	ug/kg	
CAN096-0962-0020	Endrin		3.6	U	ug/kg	
CAN096-0962-0020	Endrin ketone		3.6	U	ug/kg	
CAN096-0962-0020	Heptachlor		1.9	U	ug/kg	
CAN096-0962-0020	Heptachlor epoxide		1.9	U	ug/kg	
CAN096-0962-0020	Methoxychlor		19	U	ug/kg	
CAN096-0962-0020	Toxaphene		190	U	ug/kg	
CAN096-0962-0020	Acetone	240	22	J	ug/kg	D
CAN096-0962-0020	Benzene		11	U	ug/kg	
CAN096-0962-0020	Bromodichloromethane		11	U	ug/kg	
CAN096-0962-0020	Bromoform		11	U	ug/kg	
CAN096-0962-0020	Bromomethane		22	UJ	ug/kg	C
CAN096-0962-0020	2-Butanone (MEK)		22	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0020	Carbon disulfide		11	U	ug/kg	
CAN096-0962-0020	Carbon tetrachloride		11	U	ug/kg	
CAN096-0962-0020	Chlorobenzene		11	U	ug/kg	
CAN096-0962-0020	Chloroethane		22	U	ug/kg	
CAN096-0962-0020	Chloroform		11	U	ug/kg	
CAN096-0962-0020	Chloromethane		22	U	ug/kg	
CAN096-0962-0020	Dibromochloromethane		11	U	ug/kg	
CAN096-0962-0020	1,1-Dichloroethane		11	U	ug/kg	
CAN096-0962-0020	1,2-Dichloroethane		11	UJ	ug/kg	C
CAN096-0962-0020	1,1-Dichloroethene		11	U	ug/kg	
CAN096-0962-0020	1,2-Dichloroethene (total)		11	U	ug/kg	
CAN096-0962-0020	1,2-Dichloropropane		11	U	ug/kg	
CAN096-0962-0020	cis-1,3-Dichloropropene		11	U	ug/kg	
CAN096-0962-0020	trans-1,3-Dichloropropene		11	U	ug/kg	
CAN096-0962-0020	Ethylbenzene		11	U	ug/kg	
CAN096-0962-0020	2-Hexanone		22	U	ug/kg	
CAN096-0962-0020	Methylene chloride	3.1	11	J	ug/kg	V
CAN096-0962-0020	4-Methyl-2-pentanone (MIBK)		22	U	ug/kg	
CAN096-0962-0020	Styrene		11	U	ug/kg	
CAN096-0962-0020	1,1,2,2-Tetrachloroethane		11	U	ug/kg	
CAN096-0962-0020	Tetrachloroethene		11	UJ	ug/kg	C
CAN096-0962-0020	Toluene	9.4	11	J	ug/kg	V
CAN096-0962-0020	1,1,1-Trichloroethane		11	U	ug/kg	
CAN096-0962-0020	1,1,2-Trichloroethane		11	U	ug/kg	
CAN096-0962-0020	Trichloroethene		11	U	ug/kg	
CAN096-0962-0020	Vinyl acetate		22	U	ug/kg	
CAN096-0962-0020	Vinyl chloride		22	U	ug/kg	
CAN096-0962-0020	Xylenes (total)		11	U	ug/kg	
CAN096-0962-0020	Phenol		360	U	ug/kg	
CAN096-0962-0020	bis(2-Chloroethyl) ether		360	U	ug/kg	
CAN096-0962-0020	2-Chlorophenol		360	U	ug/kg	
CAN096-0962-0020	1,3-Dichlorobenzene		360	U	ug/kg	
CAN096-0962-0020	1,4-Dichlorobenzene		360	U	ug/kg	
CAN096-0962-0020	Benzyl alcohol		360	U	ug/kg	
CAN096-0962-0020	1,2-Dichlorobenzene		360	U	ug/kg	
CAN096-0962-0020	2-Methylphenol		360	U	ug/kg	
CAN096-0962-0020	bis(2-Chloroisopropyl)ether		360	U	ug/kg	
CAN096-0962-0020	4-Methylphenol		360	U	ug/kg	
CAN096-0962-0020	N-Nitroso-di-n-propylamine		360	U	ug/kg	
CAN096-0962-0020	Hexachloroethane		360	U	ug/kg	
CAN096-0962-0020	Nitrobenzene		360	U	ug/kg	
CAN096-0962-0020	Isophorone		360	U	ug/kg	
CAN096-0962-0020	2-Nitrophenol		360	U	ug/kg	
CAN096-0962-0020	2,4-Dimethylphenol		360	UJ	ug/kg	C
CAN096-0962-0020	Benzoic acid		1800	U	ug/kg	
CAN096-0962-0020	bis(2-Chloroethoxy)methane		360	U	ug/kg	
CAN096-0962-0020	2,4-Dichlorophenol		360	U	ug/kg	
CAN096-0962-0020	1,2,4-Trichlorobenzene		360	U	ug/kg	
CAN096-0962-0020	Naphthalene		360	U	ug/kg	
CAN096-0962-0020	4-Chloroaniline		360	U	ug/kg	
CAN096-0962-0020	Hexachlorobutadiene		360	UJ	ug/kg	C
CAN096-0962-0020	4-Chloro-3-methylphenol		360	U	ug/kg	
CAN096-0962-0020	2-Methylnaphthalene		360	U	ug/kg	
CAN096-0962-0020	Hexachlorocyclopentadiene		360	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0020	2,4,6-Trichlorophenol		360	U	ug/kg	
CAN096-0962-0020	2,4,5-Trichlorophenol		1800	U	ug/kg	
CAN096-0962-0020	2-Chloronaphthalene		360	U	ug/kg	
CAN096-0962-0020	2-Nitroaniline		1800	U	ug/kg	
CAN096-0962-0020	Dimethyl phthalate		360	U	ug/kg	
CAN096-0962-0020	Acenaphthylene		360	U	ug/kg	
CAN096-0962-0020	3-Nitroaniline		1800	U	ug/kg	
CAN096-0962-0020	Acenaphthene		360	U	ug/kg	
CAN096-0962-0020	2,4-Dinitrophenol		1800	U	ug/kg	
CAN096-0962-0020	4-Nitrophenol		1800	UJ	ug/kg	C
CAN096-0962-0020	Dibenzofuran		360	U	ug/kg	
CAN096-0962-0020	2,4-Dinitrotoluene		360	U	ug/kg	
CAN096-0962-0020	2,6-Dinitrotoluene		360	U	ug/kg	
CAN096-0962-0020	Diethyl phthalate		360	U	ug/kg	
CAN096-0962-0020	4-Chlorophenyl phenyl ether		360	U	ug/kg	
CAN096-0962-0020	Fluorene		360	U	ug/kg	
CAN096-0962-0020	4-Nitroaniline		1800	U	ug/kg	
CAN096-0962-0020	4,6-Dinitro-2-methylphenol		1800	U	ug/kg	
CAN096-0962-0020	N-Nitrosodiphenylamine		360	U	ug/kg	
CAN096-0962-0020	4-Bromophenyl phenyl ether		360	U	ug/kg	
CAN096-0962-0020	Hexachlorobenzene		360	U	ug/kg	
CAN096-0962-0020	Pentachlorophenol		1800	U	ug/kg	
CAN096-0962-0020	Phenanthrene		360	U	ug/kg	
CAN096-0962-0020	Anthracene		360	U	ug/kg	
CAN096-0962-0020	Di-n-butyl phthalate		360	U	ug/kg	
CAN096-0962-0020	Fluoranthene		360	U	ug/kg	
CAN096-0962-0020	Pyrene		360	U	ug/kg	
CAN096-0962-0020	Butyl benzyl phthalate		360	U	ug/kg	
CAN096-0962-0020	3,3'-Dichlorobenzidine		720	U	ug/kg	
CAN096-0962-0020	Benzo(a)anthracene		360	U	ug/kg	
CAN096-0962-0020	bis(2-Ethylhexyl)phthalate		360	UJ	ug/kg	C
CAN096-0962-0020	Chrysene		360	U	ug/kg	
CAN096-0962-0020	Di-n-octyl phthalate		360	UJ	ug/kg	C
CAN096-0962-0020	Benzo(b)fluoranthene		360	U	ug/kg	
CAN096-0962-0020	Benzo(k)fluoranthene		360	U	ug/kg	
CAN096-0962-0020	Benzo(a)pyrene		360	U	ug/kg	
CAN096-0962-0020	Indeno(1,2,3-cd)pyrene		360	U	ug/kg	
CAN096-0962-0020	Dibenz(a,h)anthracene		360	U	ug/kg	
CAN096-0962-0020	Benzo(g,h,i)perylene		360	U	ug/kg	
CAN096-0962-0020	2,4-D		44	U	ug/kg	
CAN096-0962-0020	2,4-DB		110	U	ug/kg	
CAN096-0962-0020	2,4,5-T		11	U	ug/kg	
CAN096-0962-0020	2,4,5-TP (Silvex)		11	U	ug/kg	
CAN096-0962-0020	Dalapon		110	U	ug/kg	
CAN096-0962-0020	Dicamba		11	U	ug/kg	
CAN096-0962-0020	Dichlorprop		22	U	ug/kg	
CAN096-0962-0020	Dinoseb		22	U	ug/kg	
CAN096-0962-0020	MCPA		5500	U	ug/kg	
CAN096-0962-0020	MCPP		5500	U	ug/kg	
CAN096-0962-0020	Percent Moisture	8.9	0.1		percent	
CAN096-0962-0030	Aluminum	4430	10.8		mg/kg	
CAN096-0962-0030	Antimony		6.5	U	mg/kg	
CAN096-0962-0030	Arsenic	1.1	0.54		mg/kg	
CAN096-0962-0030	Barium	15	1.1	J	mg/kg	M

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0030	Beryllium	0.29	0.22		mg/kg	
CAN096-0962-0030	Cadmium		0.54	U	mg/kg	
CAN096-0962-0030	Calcium	19900	21.5	J	mg/kg	M
CAN096-0962-0030	Chromium	4.5	1.1		mg/kg	
CAN096-0962-0030	Cobalt	1.6	1.1		mg/kg	
CAN096-0962-0030	Copper	3	2.2		mg/kg	
CAN096-0962-0030	Iron	3880	10.8		mg/kg	
CAN096-0962-0030	Lead	2.8	0.54		mg/kg	
CAN096-0962-0030	Magnesium	5490	21.5		mg/kg	
CAN096-0962-0030	Manganese	45.9	1.1	J	mg/kg	M
CAN096-0962-0030	Mercury		0.11	U	mg/kg	
CAN096-0962-0030	Nickel	3.4	4.3		mg/kg	
CAN096-0962-0030	Potassium	1860	538		mg/kg	
CAN096-0962-0030	Selenium		1.1	UJ	mg/kg	AM
CAN096-0962-0030	Silver		1.1	U	mg/kg	
CAN096-0962-0030	Sodium	219	538		mg/kg	
CAN096-0962-0030	Thallium		0.54	UJ	mg/kg	AC
CAN096-0962-0030	Vanadium	13.1	1.1		mg/kg	
CAN096-0962-0030	Zinc		8.1	U	mg/kg	L
CAN096-0962-0030	Aldrin		1.8	U	ug/kg	
CAN096-0962-0030	Aroclor 1016		35	U	ug/kg	
CAN096-0962-0030	Aroclor 1221		35	U	ug/kg	
CAN096-0962-0030	Aroclor 1232		35	U	ug/kg	
CAN096-0962-0030	Aroclor 1242		35	U	ug/kg	
CAN096-0962-0030	Aroclor 1248		35	U	ug/kg	
CAN096-0962-0030	Aroclor 1254		35	U	ug/kg	
CAN096-0962-0030	Aroclor 1260		35	U	ug/kg	
CAN096-0962-0030	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0030	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0030	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0030	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0030	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0030	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0030	4,4'-DDD		3.5	U	ug/kg	
CAN096-0962-0030	4,4'-DDE		3.5	U	ug/kg	
CAN096-0962-0030	4,4'-DDT		3.5	UJ	ug/kg	D
CAN096-0962-0030	Dieldrin		3.5	U	ug/kg	
CAN096-0962-0030	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0030	Endosulfan II		3.5	U	ug/kg	
CAN096-0962-0030	Endosulfan sulfate		3.5	U	ug/kg	
CAN096-0962-0030	Endrin		3.5	U	ug/kg	
CAN096-0962-0030	Endrin ketone		3.5	U	ug/kg	
CAN096-0962-0030	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0030	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0030	Methoxychlor		18	U	ug/kg	
CAN096-0962-0030	Toxaphene		180	U	ug/kg	
CAN096-0962-0030	Acetone	28	11	J	ug/kg	CD
CAN096-0962-0030	Benzene		5.4	U	ug/kg	
CAN096-0962-0030	Bromodichloromethane		5.4	U	ug/kg	
CAN096-0962-0030	Bromoform		5.4	UJ	ug/kg	C
CAN096-0962-0030	Bromomethane		11	UJ	ug/kg	C
CAN096-0962-0030	2-Butanone (MEK)		11	U	ug/kg	
CAN096-0962-0030	Carbon disulfide		5.4	U	ug/kg	
CAN096-0962-0030	Carbon tetrachloride		5.4	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0030	Chlorobenzene		5.4	U	ug/kg	
CAN096-0962-0030	Chloroethane		11	U	ug/kg	
CAN096-0962-0030	Chloroform		5.4	U	ug/kg	
CAN096-0962-0030	Chloromethane		11	UJ	ug/kg	C
CAN096-0962-0030	Dibromochloromethane		5.4	U	ug/kg	
CAN096-0962-0030	1,1-Dichloroethane		5.4	U	ug/kg	
CAN096-0962-0030	1,2-Dichloroethane		5.4	UJ	ug/kg	C
CAN096-0962-0030	1,1-Dichloroethene		5.4	U	ug/kg	
CAN096-0962-0030	1,2-Dichloroethene (total)		5.4	U	ug/kg	
CAN096-0962-0030	1,2-Dichloropropane		5.4	U	ug/kg	
CAN096-0962-0030	cis-1,3-Dichloropropene		5.4	U	ug/kg	
CAN096-0962-0030	trans-1,3-Dichloropropene		5.4	U	ug/kg	
CAN096-0962-0030	Ethylbenzene		5.4	U	ug/kg	
CAN096-0962-0030	2-Hexanone		11	U	ug/kg	
CAN096-0962-0030	Methylene chloride		5.4	U	ug/kg	
CAN096-0962-0030	4-Methyl-2-pentanone (MIBK)		11	U	ug/kg	
CAN096-0962-0030	Styrene		5.4	U	ug/kg	
CAN096-0962-0030	1,1,2,2-Tetrachloroethane		5.4	U	ug/kg	
CAN096-0962-0030	Tetrachloroethene		5.4	UJ	ug/kg	C
CAN096-0962-0030	Toluene	5.1	5.4		ug/kg	V
CAN096-0962-0030	1,1,1-Trichloroethane		5.4	U	ug/kg	
CAN096-0962-0030	1,1,2-Trichloroethane		5.4	U	ug/kg	
CAN096-0962-0030	Trichloroethene		5.4	U	ug/kg	
CAN096-0962-0030	Vinyl acetate		11	U	ug/kg	
CAN096-0962-0030	Vinyl chloride		11	U	ug/kg	
CAN096-0962-0030	Xylenes (total)		5.4	U	ug/kg	
CAN096-0962-0030	Phenol		350	U	ug/kg	
CAN096-0962-0030	bis(2-Chloroethyl) ether		350	U	ug/kg	
CAN096-0962-0030	2-Chlorophenol		350	U	ug/kg	
CAN096-0962-0030	1,3-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0030	1,4-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0030	Benzyl alcohol		350	U	ug/kg	
CAN096-0962-0030	1,2-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0030	2-Methylphenol		350	U	ug/kg	
CAN096-0962-0030	bis(2-Chloroisopropyl)ether		350	U	ug/kg	
CAN096-0962-0030	4-Methylphenol		350	U	ug/kg	
CAN096-0962-0030	N-Nitroso-di-n-propylamine		350	U	ug/kg	
CAN096-0962-0030	Hexachloroethane		350	U	ug/kg	
CAN096-0962-0030	Nitrobenzene		350	U	ug/kg	
CAN096-0962-0030	Isophorone		350	U	ug/kg	
CAN096-0962-0030	2-Nitrophenol		350	U	ug/kg	
CAN096-0962-0030	2,4-Dimethylphenol		350	UJ	ug/kg	C
CAN096-0962-0030	Benzoic acid		1700	U	ug/kg	
CAN096-0962-0030	bis(2-Chloroethoxy)methane		350	U	ug/kg	
CAN096-0962-0030	2,4-Dichlorophenol		350	U	ug/kg	
CAN096-0962-0030	1,2,4-Trichlorobenzene		350	U	ug/kg	
CAN096-0962-0030	Naphthalene		350	U	ug/kg	
CAN096-0962-0030	4-Chloroaniline		350	U	ug/kg	
CAN096-0962-0030	Hexachlorobutadiene		350	UJ	ug/kg	C
CAN096-0962-0030	4-Chloro-3-methylphenol		350	U	ug/kg	
CAN096-0962-0030	2-Methylnaphthalene		350	U	ug/kg	
CAN096-0962-0030	Hexachlorocyclopentadiene		350	U	ug/kg	
CAN096-0962-0030	2,4,6-Trichlorophenol		350	U	ug/kg	
CAN096-0962-0030	2,4,5-Trichlorophenol		1700	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0030	2-Chloronaphthalene		350	U	ug/kg	
CAN096-0962-0030	2-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0030	Dimethyl phthalate		350	U	ug/kg	
CAN096-0962-0030	Acenaphthylene		350	U	ug/kg	
CAN096-0962-0030	3-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0030	Acenaphthene		350	U	ug/kg	
CAN096-0962-0030	2,4-Dinitrophenol		1700	U	ug/kg	
CAN096-0962-0030	4-Nitrophenol		1700	UJ	ug/kg	C
CAN096-0962-0030	Dibenzofuran		350	U	ug/kg	
CAN096-0962-0030	2,4-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0030	2,6-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0030	Diethyl phthalate		350	U	ug/kg	
CAN096-0962-0030	4-Chlorophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0030	Fluorene		350	U	ug/kg	
CAN096-0962-0030	4-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0030	4,6-Dinitro-2-methylphenol		1700	U	ug/kg	
CAN096-0962-0030	N-Nitrosodiphenylamine		350	U	ug/kg	
CAN096-0962-0030	4-Bromophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0030	Hexachlorobenzene		350	U	ug/kg	
CAN096-0962-0030	Pentachlorophenol		1700	U	ug/kg	
CAN096-0962-0030	Phenanthrene		350	U	ug/kg	
CAN096-0962-0030	Anthracene		350	U	ug/kg	
CAN096-0962-0030	Di-n-butyl phthalate		350	U	ug/kg	
CAN096-0962-0030	Fluoranthene		350	U	ug/kg	
CAN096-0962-0030	Pyrene		350	U	ug/kg	
CAN096-0962-0030	Butyl benzyl phthalate		350	U	ug/kg	
CAN096-0962-0030	3,3'-Dichlorobenzidine		710	U	ug/kg	
CAN096-0962-0030	Benzo(a)anthracene		350	U	ug/kg	
CAN096-0962-0030	bis(2-Ethylhexyl)phthalate		350	UJ	ug/kg	C
CAN096-0962-0030	Chrysene		350	U	ug/kg	
CAN096-0962-0030	Di-n-octyl phthalate		350	UJ	ug/kg	C
CAN096-0962-0030	Benzo(b)fluoranthene		350	U	ug/kg	
CAN096-0962-0030	Benzo(k)fluoranthene		350	U	ug/kg	
CAN096-0962-0030	Benzo(a)pyrene		350	U	ug/kg	
CAN096-0962-0030	Indeno(1,2,3-cd)pyrene		350	U	ug/kg	
CAN096-0962-0030	Dibenz(a,h)anthracene		350	U	ug/kg	
CAN096-0962-0030	Benzo(g,h,i)perylene		350	U	ug/kg	
CAN096-0962-0030	2,4-D		43	U	ug/kg	
CAN096-0962-0030	2,4-DB		110	U	ug/kg	
CAN096-0962-0030	2,4,5-T		11	U	ug/kg	
CAN096-0962-0030	2,4,5-TP (Silvex)		11	U	ug/kg	
CAN096-0962-0030	Dalapon		110	U	ug/kg	
CAN096-0962-0030	Dicamba		11	U	ug/kg	
CAN096-0962-0030	Dichlorprop		22	U	ug/kg	
CAN096-0962-0030	Dinoseb		22	U	ug/kg	
CAN096-0962-0030	MCPA		5400	U	ug/kg	
CAN096-0962-0030	MCPP		5400	U	ug/kg	
CAN096-0962-0030	Percent Moisture	7	0.1		percent	
CAN096-0962-0040	Aluminum	2470	10.5		mg/kg	
CAN096-0962-0040	Antimony		6.3	U	mg/kg	
CAN096-0962-0040	Arsenic	0.71	0.52		mg/kg	
CAN096-0962-0040	Barium	29	1	J	mg/kg	M
CAN096-0962-0040	Beryllium		0.21	U	mg/kg	
CAN096-0962-0040	Cadmium		0.52	U	mg/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0040	Calcium	62700	21	J	mg/kg	M
CAN096-0962-0040	Chromium	2.5	1		mg/kg	
CAN096-0962-0040	Cobalt	0.94	1		mg/kg	
CAN096-0962-0040	Copper	1.3	2.1		mg/kg	
CAN096-0962-0040	Iron	2010	10.5		mg/kg	
CAN096-0962-0040	Lead	1	2.6		mg/kg	
CAN096-0962-0040	Magnesium	4550	21		mg/kg	
CAN096-0962-0040	Manganese	27.1	1	J	mg/kg	M
CAN096-0962-0040	Mercury		0.1	U	mg/kg	
CAN096-0962-0040	Nickel	2	4.2		mg/kg	
CAN096-0962-0040	Potassium	617	525		mg/kg	
CAN096-0962-0040	Selenium		1	UJ	mg/kg	AM
CAN096-0962-0040	Silver		1	U	mg/kg	
CAN096-0962-0040	Sodium	90.2	525		mg/kg	
CAN096-0962-0040	Thallium		1	UJ	mg/kg	AC
CAN096-0962-0040	Vanadium	7	1		mg/kg	
CAN096-0962-0040	Zinc		4.4	U	mg/kg	L
CAN096-0962-0040	Aldrin		1.8	U	ug/kg	
CAN096-0962-0040	Aroclor 1016		35	U	ug/kg	
CAN096-0962-0040	Aroclor 1221		35	U	ug/kg	
CAN096-0962-0040	Aroclor 1232		35	U	ug/kg	
CAN096-0962-0040	Aroclor 1242		35	U	ug/kg	
CAN096-0962-0040	Aroclor 1248		35	U	ug/kg	
CAN096-0962-0040	Aroclor 1254		35	U	ug/kg	
CAN096-0962-0040	Aroclor 1260		35	U	ug/kg	
CAN096-0962-0040	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0040	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0040	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0040	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0040	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0040	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0040	4,4'-DDD		3.5	U	ug/kg	
CAN096-0962-0040	4,4'-DDE		3.5	U	ug/kg	
CAN096-0962-0040	4,4'-DDT		3.5	UJ	ug/kg	D
CAN096-0962-0040	Dieldrin		3.5	U	ug/kg	
CAN096-0962-0040	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0040	Endosulfan II		3.5	U	ug/kg	
CAN096-0962-0040	Endosulfan sulfate		3.5	U	ug/kg	
CAN096-0962-0040	Endrin		3.5	U	ug/kg	
CAN096-0962-0040	Endrin ketone		3.5	U	ug/kg	
CAN096-0962-0040	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0040	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0040	Methoxychlor		18	U	ug/kg	
CAN096-0962-0040	Toxaphene		180	U	ug/kg	
CAN096-0962-0040	Acetone	39	10	J	ug/kg	CD
CAN096-0962-0040	Benzene		5.2	U	ug/kg	
CAN096-0962-0040	Bromodichloromethane		5.2	U	ug/kg	
CAN096-0962-0040	Bromoform		5.2	UJ	ug/kg	C
CAN096-0962-0040	Bromomethane		10	UJ	ug/kg	C
CAN096-0962-0040	2-Butanone (MEK)		10	U	ug/kg	
CAN096-0962-0040	Carbon disulfide		5.2	U	ug/kg	
CAN096-0962-0040	Carbon tetrachloride		5.2	U	ug/kg	
CAN096-0962-0040	Chlorobenzene		5.2	U	ug/kg	
CAN096-0962-0040	Chloroethane		10	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0040	Chloroform		5.2	U	ug/kg	
CAN096-0962-0040	Chloromethane		10	UJ	ug/kg	C
CAN096-0962-0040	Dibromochloromethane		5.2	U	ug/kg	
CAN096-0962-0040	1,1-Dichloroethane		5.2	U	ug/kg	
CAN096-0962-0040	1,2-Dichloroethane		5.2	UJ	ug/kg	C
CAN096-0962-0040	1,1-Dichloroethene		5.2	U	ug/kg	
CAN096-0962-0040	1,2-Dichloroethene (total)		5.2	U	ug/kg	
CAN096-0962-0040	1,2-Dichloropropane		5.2	U	ug/kg	
CAN096-0962-0040	cis-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0040	trans-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0040	Ethylbenzene		5.2	U	ug/kg	
CAN096-0962-0040	2-Hexanone		10	U	ug/kg	
CAN096-0962-0040	Methylene chloride		5.2	U	ug/kg	
CAN096-0962-0040	4-Methyl-2-pentanone (MIBK)		10	U	ug/kg	
CAN096-0962-0040	Styrene		5.2	U	ug/kg	
CAN096-0962-0040	1,1,2,2-Tetrachloroethane		5.2	U	ug/kg	
CAN096-0962-0040	Tetrachloroethene		5.2	UJ	ug/kg	C
CAN096-0962-0040	Toluene	2.5	5.2	J	ug/kg	V
CAN096-0962-0040	1,1,1-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0040	1,1,2-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0040	Trichloroethene		5.2	U	ug/kg	
CAN096-0962-0040	Vinyl acetate		10	U	ug/kg	
CAN096-0962-0040	Vinyl chloride		10	U	ug/kg	
CAN096-0962-0040	Xylenes (total)		5.2	U	ug/kg	
CAN096-0962-0040	Phenol		350	U	ug/kg	
CAN096-0962-0040	bis(2-Chloroethyl) ether		350	U	ug/kg	
CAN096-0962-0040	2-Chlorophenol		350	U	ug/kg	
CAN096-0962-0040	1,3-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0040	1,4-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0040	Benzyl alcohol		350	U	ug/kg	
CAN096-0962-0040	1,2-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0040	2-Methylphenol		350	U	ug/kg	
CAN096-0962-0040	bis(2-Chloroisopropyl)ether		350	U	ug/kg	
CAN096-0962-0040	4-Methylphenol		350	U	ug/kg	
CAN096-0962-0040	N-Nitroso-di-n-propylamine		350	U	ug/kg	
CAN096-0962-0040	Hexachloroethane		350	U	ug/kg	
CAN096-0962-0040	Nitrobenzene		350	U	ug/kg	
CAN096-0962-0040	Isophorone		350	U	ug/kg	
CAN096-0962-0040	2-Nitrophenol		350	U	ug/kg	
CAN096-0962-0040	2,4-Dimethylphenol		350	UJ	ug/kg	C
CAN096-0962-0040	Benzoic acid		1700	U	ug/kg	
CAN096-0962-0040	bis(2-Chloroethoxy)methane		350	U	ug/kg	
CAN096-0962-0040	2,4-Dichlorophenol		350	U	ug/kg	
CAN096-0962-0040	1,2,4-Trichlorobenzene		350	U	ug/kg	
CAN096-0962-0040	Naphthalene		350	U	ug/kg	
CAN096-0962-0040	4-Chloroaniline		350	U	ug/kg	
CAN096-0962-0040	Hexachlorobutadiene		350	UJ	ug/kg	C
CAN096-0962-0040	4-Chloro-3-methylphenol		350	U	ug/kg	
CAN096-0962-0040	2-Methylnaphthalene		350	U	ug/kg	
CAN096-0962-0040	Hexachlorocyclopentadiene		350	U	ug/kg	
CAN096-0962-0040	2,4,6-Trichlorophenol		350	U	ug/kg	
CAN096-0962-0040	2,4,5-Trichlorophenol		1700	U	ug/kg	
CAN096-0962-0040	2-Chloronaphthalene		350	U	ug/kg	
CAN096-0962-0040	2-Nitroaniline		1700	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0040	Dimethyl phthalate		350	U	ug/kg	
CAN096-0962-0040	Acenaphthylene		350	U	ug/kg	
CAN096-0962-0040	3-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0040	Acenaphthene		350	U	ug/kg	
CAN096-0962-0040	2,4-Dinitrophenol		1700	U	ug/kg	
CAN096-0962-0040	4-Nitrophenol		1700	UJ	ug/kg	C
CAN096-0962-0040	Dibenzofuran		350	U	ug/kg	
CAN096-0962-0040	2,4-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0040	2,6-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0040	Diethyl phthalate		350	U	ug/kg	
CAN096-0962-0040	4-Chlorophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0040	Fluorene		350	U	ug/kg	
CAN096-0962-0040	4-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0040	4,6-Dinitro-2-methylphenol		1700	U	ug/kg	
CAN096-0962-0040	N-Nitrosodiphenylamine		350	U	ug/kg	
CAN096-0962-0040	4-Bromophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0040	Hexachlorobenzene		350	U	ug/kg	
CAN096-0962-0040	Pentachlorophenol		1700	U	ug/kg	
CAN096-0962-0040	Phenanthrene		350	U	ug/kg	
CAN096-0962-0040	Anthracene		350	U	ug/kg	
CAN096-0962-0040	Di-n-butyl phthalate		350	U	ug/kg	
CAN096-0962-0040	Fluoranthene		350	U	ug/kg	
CAN096-0962-0040	Pyrene		350	U	ug/kg	
CAN096-0962-0040	Butyl benzyl phthalate		350	U	ug/kg	
CAN096-0962-0040	3,3'-Dichlorobenzidine		690	U	ug/kg	
CAN096-0962-0040	Benzo(a)anthracene		350	U	ug/kg	
CAN096-0962-0040	bis(2-Ethylhexyl)phthalate		350	UJ	ug/kg	C
CAN096-0962-0040	Chrysene		350	U	ug/kg	
CAN096-0962-0040	Di-n-octyl phthalate		350	UJ	ug/kg	C
CAN096-0962-0040	Benzo(b)fluoranthene		350	U	ug/kg	
CAN096-0962-0040	Benzo(k)fluoranthene		350	U	ug/kg	
CAN096-0962-0040	Benzo(a)pyrene		350	U	ug/kg	
CAN096-0962-0040	Indeno(1,2,3-cd)pyrene		350	U	ug/kg	
CAN096-0962-0040	Dibenz(a,h)anthracene		350	U	ug/kg	
CAN096-0962-0040	Benzo(g,h,i)perylene		350	U	ug/kg	
CAN096-0962-0040	2,4-D		42	U	ug/kg	
CAN096-0962-0040	2,4-DB		100	U	ug/kg	
CAN096-0962-0040	2,4,5-T		10	U	ug/kg	
CAN096-0962-0040	2,4,5-TP (Silvex)		10	U	ug/kg	
CAN096-0962-0040	Dalapon		100	U	ug/kg	
CAN096-0962-0040	Dicamba		10	U	ug/kg	
CAN096-0962-0040	Dichlorprop		21	U	ug/kg	
CAN096-0962-0040	Dinoseb		21	U	ug/kg	
CAN096-0962-0040	MCPA		5200	U	ug/kg	
CAN096-0962-0040	MCPP		5200	U	ug/kg	
CAN096-0962-0040	Percent Moisture	4.8	0.1		percent	
CAN096-0962-0050	Aluminum	2600	10.6		mg/kg	
CAN096-0962-0050	Antimony		6.4	U	mg/kg	
CAN096-0962-0050	Arsenic	0.54	0.53		mg/kg	
CAN096-0962-0050	Barium	45.8	1.1	J	mg/kg	M
CAN096-0962-0050	Beryllium	0.24	0.21		mg/kg	
CAN096-0962-0050	Cadmium		0.53	U	mg/kg	
CAN096-0962-0050	Calcium	52700	21.2	J	mg/kg	M
CAN096-0962-0050	Chromium	7.1	1.1		mg/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0050	Cobalt	1.3	1.1		mg/kg	
CAN096-0962-0050	Copper	2	2.1		mg/kg	
CAN096-0962-0050	Iron	2300	10.6		mg/kg	
CAN096-0962-0050	Lead	1.1	2.7		mg/kg	
CAN096-0962-0050	Magnesium	4580	21.2		mg/kg	
CAN096-0962-0050	Manganese	39	1.1	J	mg/kg	M
CAN096-0962-0050	Mercury		0.11	U	mg/kg	
CAN096-0962-0050	Nickel	2.6	4.2		mg/kg	
CAN096-0962-0050	Potassium	577	531		mg/kg	
CAN096-0962-0050	Selenium		1.1	UJ	mg/kg	AM
CAN096-0962-0050	Silver		1.1	U	mg/kg	
CAN096-0962-0050	Sodium	135	531		mg/kg	
CAN096-0962-0050	Thallium		1.1	UJ	mg/kg	AC
CAN096-0962-0050	Vanadium	9.6	1.1		mg/kg	
CAN096-0962-0050	Zinc		4.6	U	mg/kg	L
CAN096-0962-0050	Aldrin		1.8	U	ug/kg	
CAN096-0962-0050	Aroclor 1016		35	U	ug/kg	
CAN096-0962-0050	Aroclor 1221		35	U	ug/kg	
CAN096-0962-0050	Aroclor 1232		35	U	ug/kg	
CAN096-0962-0050	Aroclor 1242		35	U	ug/kg	
CAN096-0962-0050	Aroclor 1248		35	U	ug/kg	
CAN096-0962-0050	Aroclor 1254		35	U	ug/kg	
CAN096-0962-0050	Aroclor 1260		35	U	ug/kg	
CAN096-0962-0050	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0050	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0050	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0050	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0050	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0050	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0050	4,4'-DDD		3.5	U	ug/kg	
CAN096-0962-0050	4,4'-DDE		3.5	U	ug/kg	
CAN096-0962-0050	4,4'-DDT		3.5	UJ	ug/kg	D
CAN096-0962-0050	Dieldrin		3.5	U	ug/kg	
CAN096-0962-0050	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0050	Endosulfan II		3.5	U	ug/kg	
CAN096-0962-0050	Endosulfan sulfate		3.5	U	ug/kg	
CAN096-0962-0050	Endrin		3.5	U	ug/kg	
CAN096-0962-0050	Endrin ketone		3.5	U	ug/kg	
CAN096-0962-0050	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0050	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0050	Methoxychlor		18	U	ug/kg	
CAN096-0962-0050	Toxaphene		180	U	ug/kg	
CAN096-0962-0050	1,2-Dichloroethane		5.3	UJ	ug/kg	C
CAN096-0962-0050	1,1-Dichloroethene		5.3	U	ug/kg	
CAN096-0962-0050	1,2-Dichloroethene (total)		5.3	U	ug/kg	
CAN096-0962-0050	1,2-Dichloropropane		5.3	U	ug/kg	
CAN096-0962-0050	cis-1,3-Dichloropropene		5.3	U	ug/kg	
CAN096-0962-0050	trans-1,3-Dichloropropene		5.3	U	ug/kg	
CAN096-0962-0050	Ethylbenzene		5.3	U	ug/kg	
CAN096-0962-0050	2-Hexanone		11	U	ug/kg	
CAN096-0962-0050	Methylene chloride		5.3	U	ug/kg	
CAN096-0962-0050	4-Methyl-2-pentanone (MIBK)		11	U	ug/kg	
CAN096-0962-0050	Styrene		5.3	U	ug/kg	
CAN096-0962-0050	1,1,2,2-Tetrachloroethane		5.3	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0050	Bromoform		5.3	UJ	ug/kg	C
CAN096-0962-0050	Bromomethane		11	UJ	ug/kg	C
CAN096-0962-0050	2-Butanone (MEK)		11	U	ug/kg	
CAN096-0962-0050	Carbon disulfide		5.3	U	ug/kg	
CAN096-0962-0050	Carbon tetrachloride		5.3	U	ug/kg	
CAN096-0962-0050	Chlorobenzene		5.3	U	ug/kg	
CAN096-0962-0050	Chloroethane		11	U	ug/kg	
CAN096-0962-0050	Chloroform		5.3	U	ug/kg	
CAN096-0962-0050	Chloromethane		11	UJ	ug/kg	C
CAN096-0962-0050	Dibromochloromethane		5.3	U	ug/kg	
CAN096-0962-0050	1,1-Dichloroethane		5.3	U	ug/kg	
CAN096-0962-0050	Acetone	26	11	J	ug/kg	DC
CAN096-0962-0050	Benzene		5.3	U	ug/kg	
CAN096-0962-0050	Bromodichloromethane		5.3	U	ug/kg	
CAN096-0962-0050	Tetrachloroethene		5.3	UJ	ug/kg	C
CAN096-0962-0050	Toluene		5.3	U	ug/kg	
CAN096-0962-0050	1,1,1-Trichloroethane		5.3	U	ug/kg	
CAN096-0962-0050	1,1,2-Trichloroethane		5.3	U	ug/kg	
CAN096-0962-0050	Trichloroethene		5.3	U	ug/kg	
CAN096-0962-0050	Vinyl acetate		11	U	ug/kg	
CAN096-0962-0050	Vinyl chloride		11	U	ug/kg	
CAN096-0962-0050	Xylenes (total)		5.3	U	ug/kg	
CAN096-0962-0050	Phenol		350	U	ug/kg	
CAN096-0962-0050	bis(2-Chloroethyl) ether		350	U	ug/kg	
CAN096-0962-0050	2-Chlorophenol		350	U	ug/kg	
CAN096-0962-0050	1,3-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0050	1,4-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0050	Benzyl alcohol		350	U	ug/kg	
CAN096-0962-0050	1,2-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0050	2-Methylphenol		350	U	ug/kg	
CAN096-0962-0050	bis(2-Chloroisopropyl)ether		350	U	ug/kg	
CAN096-0962-0050	4-Methylphenol		350	U	ug/kg	
CAN096-0962-0050	N-Nitroso-di-n-propylamine		350	U	ug/kg	
CAN096-0962-0050	Hexachloroethane		350	U	ug/kg	
CAN096-0962-0050	Nitrobenzene		350	U	ug/kg	
CAN096-0962-0050	Isophorone		350	U	ug/kg	
CAN096-0962-0050	2-Nitrophenol		350	U	ug/kg	
CAN096-0962-0050	2,4-Dimethylphenol		350	UJ	ug/kg	C
CAN096-0962-0050	Benzoic acid		1700	U	ug/kg	
CAN096-0962-0050	bis(2-Chloroethoxy)methane		350	U	ug/kg	
CAN096-0962-0050	2,4-Dichlorophenol		350	U	ug/kg	
CAN096-0962-0050	1,2,4-Trichlorobenzene		350	U	ug/kg	
CAN096-0962-0050	Naphthalene		350	U	ug/kg	
CAN096-0962-0050	4-Chloroaniline		350	U	ug/kg	
CAN096-0962-0050	Hexachlorobutadiene		350	UJ	ug/kg	C
CAN096-0962-0050	4-Chloro-3-methylphenol		350	U	ug/kg	
CAN096-0962-0050	2-Methylnaphthalene		350	U	ug/kg	
CAN096-0962-0050	Hexachlorocyclopentadiene		350	U	ug/kg	
CAN096-0962-0050	2,4,6-Trichlorophenol		350	U	ug/kg	
CAN096-0962-0050	2,4,5-Trichlorophenol		1700	U	ug/kg	
CAN096-0962-0050	2-Chloronaphthalene		350	U	ug/kg	
CAN096-0962-0050	2-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0050	Dimethyl phthalate		350	U	ug/kg	
CAN096-0962-0050	Acenaphthylene		350	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0050	3-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0050	Acenaphthene		350	U	ug/kg	
CAN096-0962-0050	2,4-Dinitrophenol		1700	U	ug/kg	
CAN096-0962-0050	4-Nitrophenol		1700	UJ	ug/kg	C
CAN096-0962-0050	Dibenzofuran		350	U	ug/kg	
CAN096-0962-0050	2,4-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0050	2,6-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0050	Diethyl phthalate		350	U	ug/kg	
CAN096-0962-0050	4-Chlorophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0050	Fluorene		350	U	ug/kg	
CAN096-0962-0050	4-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0050	4,6-Dinitro-2-methylphenol		1700	U	ug/kg	
CAN096-0962-0050	N-Nitrosodiphenylamine		350	U	ug/kg	
CAN096-0962-0050	4-Bromophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0050	Hexachlorobenzene		350	U	ug/kg	
CAN096-0962-0050	Pentachlorophenol		1700	U	ug/kg	
CAN096-0962-0050	Phenanthrene		350	U	ug/kg	
CAN096-0962-0050	Anthracene		350	U	ug/kg	
CAN096-0962-0050	Di-n-butyl phthalate		350	U	ug/kg	
CAN096-0962-0050	Fluoranthene		350	U	ug/kg	
CAN096-0962-0050	Pyrene		350	U	ug/kg	
CAN096-0962-0050	Butyl benzyl phthalate		350	U	ug/kg	
CAN096-0962-0050	3,3'-Dichlorobenzidine		700	U	ug/kg	
CAN096-0962-0050	Benzo(a)anthracene		350	U	ug/kg	
CAN096-0962-0050	bis(2-Ethylhexyl)phthalate		350	UJ	ug/kg	C
CAN096-0962-0050	Chrysene		350	U	ug/kg	
CAN096-0962-0050	Di-n-octyl phthalate		350	UJ	ug/kg	C
CAN096-0962-0050	Benzo(b)fluoranthene		350	U	ug/kg	
CAN096-0962-0050	Benzo(k)fluoranthene		350	U	ug/kg	
CAN096-0962-0050	Benzo(a)pyrene		350	U	ug/kg	
CAN096-0962-0050	Indeno(1,2,3-cd)pyrene		350	U	ug/kg	
CAN096-0962-0050	Dibenz(a,h)anthracene		350	U	ug/kg	
CAN096-0962-0050	Benzo(g,h,i)perylene		350	U	ug/kg	
CAN096-0962-0050	2,4-D		42	U	ug/kg	
CAN096-0962-0050	2,4-DB		110	U	ug/kg	
CAN096-0962-0050	2,4,5-T		11	U	ug/kg	
CAN096-0962-0050	2,4,5-TP (Silvex)		11	U	ug/kg	
CAN096-0962-0050	Dalapon		110	U	ug/kg	
CAN096-0962-0050	Dicamba		11	U	ug/kg	
CAN096-0962-0050	Dichlorprop		21	U	ug/kg	
CAN096-0962-0050	Dinoseb		21	U	ug/kg	
CAN096-0962-0050	MCPA		5300	U	ug/kg	
CAN096-0962-0050	MCPP		5300	U	ug/kg	
CAN096-0962-0050	Percent Moisture	5.8	0.1		percent	
CAN096-0962-0060	Aluminum	1320	10.4		mg/kg	
CAN096-0962-0060	Antimony		6.2	U	mg/kg	
CAN096-0962-0060	Arsenic	0.4	1		mg/kg	
CAN096-0962-0060	Barium	11.2	1	J	mg/kg	M
CAN096-0962-0060	Beryllium		0.21	U	mg/kg	
CAN096-0962-0060	Cadmium		0.52	U	mg/kg	
CAN096-0962-0060	Calcium	15600	20.7	J	mg/kg	M
CAN096-0962-0060	Chromium	2.3	1		mg/kg	
CAN096-0962-0060	Cobalt	0.78	1		mg/kg	
CAN096-0962-0060	Copper	1.3	2.1		mg/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0060	Iron	1990	10.4		mg/kg	
CAN096-0962-0060	Lead	0.79	0.52		mg/kg	
CAN096-0962-0060	Magnesium	1140	20.7		mg/kg	
CAN096-0962-0060	Manganese	24	1	J	mg/kg	M
CAN096-0962-0060	Mercury		0.1	U	mg/kg	
CAN096-0962-0060	Nickel	1.2	4.1		mg/kg	
CAN096-0962-0060	Potassium	288	518		mg/kg	
CAN096-0962-0060	Selenium		1	UJ	mg/kg	AM
CAN096-0962-0060	Silver		1	U	mg/kg	
CAN096-0962-0060	Sodium	68.4	518		mg/kg	
CAN096-0962-0060	Thallium		1	UJ	mg/kg	AC
CAN096-0962-0060	Vanadium	6	1		mg/kg	
CAN096-0962-0060	Zinc		3.5	U	mg/kg	L
CAN096-0962-0060	Aldrin		1.8	U	ug/kg	
CAN096-0962-0060	Aroclor 1016		34	U	ug/kg	
CAN096-0962-0060	Aroclor 1221		34	U	ug/kg	
CAN096-0962-0060	Aroclor 1232		34	U	ug/kg	
CAN096-0962-0060	Aroclor 1242		34	U	ug/kg	
CAN096-0962-0060	Aroclor 1248		34	U	ug/kg	
CAN096-0962-0060	Aroclor 1254		34	U	ug/kg	
CAN096-0962-0060	Aroclor 1260		34	U	ug/kg	
CAN096-0962-0060	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0060	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0060	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0060	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0060	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0060	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0060	4,4'-DDD		3.4	U	ug/kg	
CAN096-0962-0060	4,4'-DDE		3.4	U	ug/kg	
CAN096-0962-0060	4,4'-DDT		3.4	UJ	ug/kg	D
CAN096-0962-0060	Dieldrin		3.4	U	ug/kg	
CAN096-0962-0060	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0060	Endosulfan II		3.4	U	ug/kg	
CAN096-0962-0060	Endosulfan sulfate		3.4	U	ug/kg	
CAN096-0962-0060	Endrin		3.4	U	ug/kg	
CAN096-0962-0060	Endrin ketone		3.4	U	ug/kg	
CAN096-0962-0060	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0060	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0060	Methoxychlor		18	U	ug/kg	
CAN096-0962-0060	Toxaphene		180	U	ug/kg	
CAN096-0962-0060	Acetone	120	10	J	ug/kg	CD
CAN096-0962-0060	Benzene		5.2	U	ug/kg	
CAN096-0962-0060	Bromodichloromethane		5.2	U	ug/kg	
CAN096-0962-0060	Bromoform		5.2	UJ	ug/kg	C
CAN096-0962-0060	Bromomethane		10	UJ	ug/kg	C
CAN096-0962-0060	2-Butanone (MEK)		10	U	ug/kg	
CAN096-0962-0060	Carbon disulfide		5.2	U	ug/kg	
CAN096-0962-0060	Carbon tetrachloride		5.2	U	ug/kg	
CAN096-0962-0060	Chlorobenzene		5.2	U	ug/kg	
CAN096-0962-0060	Chloroethane		10	U	ug/kg	
CAN096-0962-0060	Chloroform		5.2	U	ug/kg	
CAN096-0962-0060	Chloromethane		10	UJ	ug/kg	C
CAN096-0962-0060	Dibromochloromethane		5.2	U	ug/kg	
CAN096-0962-0060	1,1-Dichloroethane		5.2	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0060	1,2-Dichloroethane		5.2	UJ	ug/kg	C
CAN096-0962-0060	1,1-Dichloroethene		5.2	U	ug/kg	
CAN096-0962-0060	1,2-Dichloroethene (total)		5.2	U	ug/kg	
CAN096-0962-0060	1,2-Dichloropropane		5.2	U	ug/kg	
CAN096-0962-0060	cis-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0060	trans-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0060	Ethylbenzene		5.2	U	ug/kg	
CAN096-0962-0060	2-Hexanone		10	U	ug/kg	
CAN096-0962-0060	Methylene chloride		5.2	U	ug/kg	
CAN096-0962-0060	4-Methyl-2-pentanone (MIBK)		10	U	ug/kg	
CAN096-0962-0060	Styrene		5.2	U	ug/kg	
CAN096-0962-0060	1,1,2,2-Tetrachloroethane		5.2	U	ug/kg	
CAN096-0962-0060	Tetrachloroethene		5.2	UJ	ug/kg	C
CAN096-0962-0060	Toluene	10	5.2		ug/kg	
CAN096-0962-0060	1,1,1-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0060	1,1,2-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0060	Trichloroethene		5.2	U	ug/kg	
CAN096-0962-0060	Vinyl acetate		10	U	ug/kg	
CAN096-0962-0060	Vinyl chloride		10	U	ug/kg	
CAN096-0962-0060	Xylenes (total)		5.2	U	ug/kg	
CAN096-0962-0060	Phenol		340	U	ug/kg	
CAN096-0962-0060	bis(2-Chloroethyl) ether		340	U	ug/kg	
CAN096-0962-0060	2-Chlorophenol		340	U	ug/kg	
CAN096-0962-0060	1,3-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0060	1,4-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0060	Benzyl alcohol		340	U	ug/kg	
CAN096-0962-0060	1,2-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0060	2-Methylphenol		340	U	ug/kg	
CAN096-0962-0060	bis(2-Chloroisopropyl)ether		340	U	ug/kg	
CAN096-0962-0060	4-Methylphenol		340	U	ug/kg	
CAN096-0962-0060	N-Nitroso-di-n-propylamine		340	U	ug/kg	
CAN096-0962-0060	Hexachloroethane		340	U	ug/kg	
CAN096-0962-0060	Nitrobenzene		340	U	ug/kg	
CAN096-0962-0060	Isophorone		340	U	ug/kg	
CAN096-0962-0060	2-Nitrophenol		340	U	ug/kg	
CAN096-0962-0060	2,4-Dimethylphenol		340	UJ	ug/kg	C
CAN096-0962-0060	Benzoic acid		1700	U	ug/kg	
CAN096-0962-0060	bis(2-Chloroethoxy)methane		340	U	ug/kg	
CAN096-0962-0060	2,4-Dichlorophenol		340	U	ug/kg	
CAN096-0962-0060	1,2,4-Trichlorobenzene		340	U	ug/kg	
CAN096-0962-0060	Naphthalene		340	U	ug/kg	
CAN096-0962-0060	4-Chloroaniline		340	U	ug/kg	
CAN096-0962-0060	Hexachlorobutadiene		340	UJ	ug/kg	C
CAN096-0962-0060	4-Chloro-3-methylphenol		340	U	ug/kg	
CAN096-0962-0060	2-Methylnaphthalene		340	U	ug/kg	
CAN096-0962-0060	Hexachlorocyclopentadiene		340	U	ug/kg	
CAN096-0962-0060	2,4,6-Trichlorophenol		340	U	ug/kg	
CAN096-0962-0060	2,4,5-Trichlorophenol		1700	U	ug/kg	
CAN096-0962-0060	2-Chloronaphthalene		340	U	ug/kg	
CAN096-0962-0060	2-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0060	Dimethyl phthalate		340	U	ug/kg	
CAN096-0962-0060	Acenaphthylene		340	U	ug/kg	
CAN096-0962-0060	3-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0060	Acenaphthene		340	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0060	2,4-Dinitrophenol		1700	U	ug/kg	
CAN096-0962-0060	4-Nitrophenol		1700	UJ	ug/kg	C
CAN096-0962-0060	Dibenzofuran		340	U	ug/kg	
CAN096-0962-0060	2,4-Dinitrotoluene		340	U	ug/kg	
CAN096-0962-0060	2,6-Dinitrotoluene		340	U	ug/kg	
CAN096-0962-0060	Diethyl phthalate		340	U	ug/kg	
CAN096-0962-0060	4-Chlorophenyl phenyl ether		340	U	ug/kg	
CAN096-0962-0060	Fluorene		340	U	ug/kg	
CAN096-0962-0060	4-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0060	4,6-Dinitro-2-methylphenol		1700	U	ug/kg	
CAN096-0962-0060	N-Nitrosodiphenylamine		340	U	ug/kg	
CAN096-0962-0060	4-Bromophenyl phenyl ether		340	U	ug/kg	
CAN096-0962-0060	Hexachlorobenzene		340	U	ug/kg	
CAN096-0962-0060	Pentachlorophenol		1700	U	ug/kg	
CAN096-0962-0060	Phenanthrene		340	U	ug/kg	
CAN096-0962-0060	Anthracene		340	U	ug/kg	
CAN096-0962-0060	Di-n-butyl phthalate		340	U	ug/kg	
CAN096-0962-0060	Fluoranthene		340	U	ug/kg	
CAN096-0962-0060	Pyrene		340	U	ug/kg	
CAN096-0962-0060	Butyl benzyl phthalate		340	U	ug/kg	
CAN096-0962-0060	3,3'-Dichlorobenzidine		680	U	ug/kg	
CAN096-0962-0060	Benzo(a)anthracene		340	U	ug/kg	
CAN096-0962-0060	bis(2-Ethylhexyl)phthalate		340	UJ	ug/kg	C
CAN096-0962-0060	Chrysene		340	U	ug/kg	
CAN096-0962-0060	Di-n-octyl phthalate		340	UJ	ug/kg	C
CAN096-0962-0060	Benzo(b)fluoranthene		340	U	ug/kg	
CAN096-0962-0060	Benzo(k)fluoranthene		340	U	ug/kg	
CAN096-0962-0060	Benzo(a)pyrene		340	U	ug/kg	
CAN096-0962-0060	Indeno(1,2,3-cd)pyrene		340	U	ug/kg	
CAN096-0962-0060	Dibenz(a,h)anthracene		340	U	ug/kg	
CAN096-0962-0060	Benzo(g,h,i)perylene		340	U	ug/kg	
CAN096-0962-0060	2,4-D		41	U	ug/kg	
CAN096-0962-0060	2,4-DB		100	U	ug/kg	
CAN096-0962-0060	2,4,5-T		10	U	ug/kg	
CAN096-0962-0060	2,4,5-TP (Silvex)		10	U	ug/kg	
CAN096-0962-0060	Dalapon		100	U	ug/kg	
CAN096-0962-0060	Dicamba		10	U	ug/kg	
CAN096-0962-0060	Dichlorprop		21	U	ug/kg	
CAN096-0962-0060	Dinoseb		21	U	ug/kg	
CAN096-0962-0060	MCPA		5200	U	ug/kg	
CAN096-0962-0060	MCPP		5200	U	ug/kg	
CAN096-0962-0060	Percent Moisture	3.5	0.1		percent	
CAN096-0962-0070	Aluminum	1570	10.5		mg/kg	
CAN096-0962-0070	Antimony		6.3	U	mg/kg	
CAN096-0962-0070	Arsenic	0.49	1		mg/kg	
CAN096-0962-0070	Barium	61.8	1	J	mg/kg	M
CAN096-0962-0070	Beryllium		0.21	U	mg/kg	
CAN096-0962-0070	Cadmium		0.52	U	mg/kg	
CAN096-0962-0070	Calcium	28300	20.9	J	mg/kg	M
CAN096-0962-0070	Chromium	4.4	1		mg/kg	
CAN096-0962-0070	Cobalt	1.1	1		mg/kg	
CAN096-0962-0070	Copper	1.4	2.1		mg/kg	
CAN096-0962-0070	Iron	2290	10.5		mg/kg	
CAN096-0962-0070	Lead	0.9	1		mg/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0070	Magnesium	1500	20.9		mg/kg	
CAN096-0962-0070	Manganese	30.2	1	J	mg/kg	M
CAN096-0962-0070	Mercury		0.1	U	mg/kg	
CAN096-0962-0070	Nickel	1.6	4.2		mg/kg	
CAN096-0962-0070	Potassium	351	523		mg/kg	
CAN096-0962-0070	Selenium		0.52	UJ	mg/kg	AM
CAN096-0962-0070	Silver	0.31	1		mg/kg	
CAN096-0962-0070	Sodium	140	523		mg/kg	
CAN096-0962-0070	Thallium		1	UJ	mg/kg	AC
CAN096-0962-0070	Vanadium	6.6	1		mg/kg	
CAN096-0962-0070	Zinc		4.2	U	mg/kg	L
CAN096-0962-0070	Aldrin		1.8	U	ug/kg	
CAN096-0962-0070	Aroclor 1016		35	U	ug/kg	
CAN096-0962-0070	Aroclor 1221		35	U	ug/kg	
CAN096-0962-0070	Aroclor 1232		35	U	ug/kg	
CAN096-0962-0070	Aroclor 1242		35	U	ug/kg	
CAN096-0962-0070	Aroclor 1248		35	U	ug/kg	
CAN096-0962-0070	Aroclor 1254		35	U	ug/kg	
CAN096-0962-0070	Aroclor 1260		35	U	ug/kg	
CAN096-0962-0070	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0070	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0070	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0070	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0070	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0070	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0070	4,4'-DDD		3.5	U	ug/kg	
CAN096-0962-0070	4,4'-DDE		3.5	U	ug/kg	
CAN096-0962-0070	4,4'-DDT		3.5	UJ	ug/kg	D
CAN096-0962-0070	Dieldrin		3.5	U	ug/kg	
CAN096-0962-0070	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0070	Endosulfan II		3.5	U	ug/kg	
CAN096-0962-0070	Endosulfan sulfate		3.5	U	ug/kg	
CAN096-0962-0070	Endrin		3.5	U	ug/kg	
CAN096-0962-0070	Endrin ketone		3.5	U	ug/kg	
CAN096-0962-0070	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0070	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0070	Methoxychlor		18	U	ug/kg	
CAN096-0962-0070	Toxaphene		180	U	ug/kg	
CAN096-0962-0070	Acetone	15	10	J	ug/kg	CD
CAN096-0962-0070	Benzene		5.2	U	ug/kg	
CAN096-0962-0070	Bromodichloromethane		5.2	U	ug/kg	
CAN096-0962-0070	Bromoform		5.2	UJ	ug/kg	C
CAN096-0962-0070	Bromomethane		10	UJ	ug/kg	C
CAN096-0962-0070	2-Butanone (MEK)		10	U	ug/kg	
CAN096-0962-0070	Carbon disulfide		5.2	U	ug/kg	
CAN096-0962-0070	Carbon tetrachloride		5.2	U	ug/kg	
CAN096-0962-0070	Chlorobenzene		5.2	U	ug/kg	
CAN096-0962-0070	Chloroethane		10	U	ug/kg	
CAN096-0962-0070	Chloroform		5.2	U	ug/kg	
CAN096-0962-0070	Chloromethane		10	UJ	ug/kg	C
CAN096-0962-0070	Dibromochloromethane		5.2	U	ug/kg	
CAN096-0962-0070	1,1-Dichloroethane		5.2	U	ug/kg	
CAN096-0962-0070	1,2-Dichloroethane		5.2	UJ	ug/kg	C
CAN096-0962-0070	1,1-Dichloroethene		5.2	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0070	1,2-Dichloroethene (total)		5.2	U	ug/kg	
CAN096-0962-0070	1,2-Dichloropropane		5.2	U	ug/kg	
CAN096-0962-0070	cis-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0070	trans-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0070	Ethylbenzene		5.2	U	ug/kg	
CAN096-0962-0070	2-Hexanone		10	U	ug/kg	
CAN096-0962-0070	Methylene chloride		5.2	U	ug/kg	
CAN096-0962-0070	4-Methyl-2-pentanone (MIBK)		10	U	ug/kg	
CAN096-0962-0070	Styrene		5.2	U	ug/kg	
CAN096-0962-0070	1,1,2,2-Tetrachloroethane		5.2	U	ug/kg	
CAN096-0962-0070	Tetrachloroethene		5.2	UJ	ug/kg	C
CAN096-0962-0070	Toluene	5.2	5.2		ug/kg	
CAN096-0962-0070	1,1,1-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0070	1,1,2-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0070	Trichloroethene		5.2	U	ug/kg	
CAN096-0962-0070	Vinyl acetate		10	U	ug/kg	
CAN096-0962-0070	Vinyl chloride		10	U	ug/kg	
CAN096-0962-0070	Xylenes (total)		5.2	U	ug/kg	
CAN096-0962-0070	Phenol		350	U	ug/kg	
CAN096-0962-0070	bis(2-Chloroethyl) ether		350	U	ug/kg	
CAN096-0962-0070	2-Chlorophenol		350	U	ug/kg	
CAN096-0962-0070	1,3-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0070	1,4-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0070	Benzyl alcohol		350	U	ug/kg	
CAN096-0962-0070	1,2-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0070	2-Methylphenol		350	U	ug/kg	
CAN096-0962-0070	bis(2-Chloroisopropyl)ether		350	U	ug/kg	
CAN096-0962-0070	4-Methylphenol		350	U	ug/kg	
CAN096-0962-0070	N-Nitroso-di-n-propylamine		350	U	ug/kg	
CAN096-0962-0070	Hexachloroethane		350	U	ug/kg	
CAN096-0962-0070	Nitrobenzene		350	U	ug/kg	
CAN096-0962-0070	Isophorone		350	U	ug/kg	
CAN096-0962-0070	2-Nitrophenol		350	U	ug/kg	
CAN096-0962-0070	2,4-Dimethylphenol		350	UJ	ug/kg	C
CAN096-0962-0070	Benzoic acid		1700	U	ug/kg	
CAN096-0962-0070	bis(2-Chloroethoxy)methane		350	U	ug/kg	
CAN096-0962-0070	2,4-Dichlorophenol		350	U	ug/kg	
CAN096-0962-0070	1,2,4-Trichlorobenzene		350	U	ug/kg	
CAN096-0962-0070	Naphthalene		350	U	ug/kg	
CAN096-0962-0070	4-Chloroaniline		350	U	ug/kg	
CAN096-0962-0070	Hexachlorobutadiene		350	UJ	ug/kg	C
CAN096-0962-0070	4-Chloro-3-methylphenol		350	U	ug/kg	
CAN096-0962-0070	2-Methylnaphthalene		350	U	ug/kg	
CAN096-0962-0070	Hexachlorocyclopentadiene		350	U	ug/kg	
CAN096-0962-0070	2,4,6-Trichlorophenol		350	U	ug/kg	
CAN096-0962-0070	2,4,5-Trichlorophenol		1700	U	ug/kg	
CAN096-0962-0070	2-Chloronaphthalene		350	U	ug/kg	
CAN096-0962-0070	2-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0070	Dimethyl phthalate		350	U	ug/kg	
CAN096-0962-0070	Acenaphthylene		350	U	ug/kg	
CAN096-0962-0070	3-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0070	Acenaphthene		350	U	ug/kg	
CAN096-0962-0070	2,4-Dinitrophenol		1700	U	ug/kg	
CAN096-0962-0070	4-Nitrophenol		1700	UJ	ug/kg	C

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0070	Dibenzofuran		350	U	ug/kg	
CAN096-0962-0070	2,4-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0070	2,6-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0070	Diethyl phthalate		350	U	ug/kg	
CAN096-0962-0070	4-Chlorophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0070	Fluorene		350	U	ug/kg	
CAN096-0962-0070	4-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0070	4,6-Dinitro-2-methylphenol		1700	U	ug/kg	
CAN096-0962-0070	N-Nitrosodiphenylamine		350	U	ug/kg	
CAN096-0962-0070	4-Bromophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0070	Hexachlorobenzene		350	U	ug/kg	
CAN096-0962-0070	Pentachlorophenol		1700	U	ug/kg	
CAN096-0962-0070	Phenanthrene		350	U	ug/kg	
CAN096-0962-0070	Anthracene		350	U	ug/kg	
CAN096-0962-0070	Di-n-butyl phthalate		350	U	ug/kg	
CAN096-0962-0070	Fluoranthene		350	U	ug/kg	
CAN096-0962-0070	Pyrene		350	U	ug/kg	
CAN096-0962-0070	Butyl benzyl phthalate		350	U	ug/kg	
CAN096-0962-0070	3,3'-Dichlorobenzidine		690	U	ug/kg	
CAN096-0962-0070	Benzo(a)anthracene		350	U	ug/kg	
CAN096-0962-0070	bis(2-Ethylhexyl)phthalate		350	UJ	ug/kg	C
CAN096-0962-0070	Chrysene		350	U	ug/kg	
CAN096-0962-0070	Di-n-octyl phthalate		350	UJ	ug/kg	C
CAN096-0962-0070	Benzo(b)fluoranthene		350	U	ug/kg	
CAN096-0962-0070	Benzo(k)fluoranthene		350	U	ug/kg	
CAN096-0962-0070	Benzo(a)pyrene		50	U	ug/kg	
CAN096-0962-0070	Indeno(1,2,3-cd)pyrene		50	U	ug/kg	
CAN096-0962-0070	Dibenz(a,h)anthracene		350	U	ug/kg	
CAN096-0962-0070	Benzo(g,h,i)perylene		350	U	ug/kg	
CAN096-0962-0070	2,4-D		42	U	ug/kg	
CAN096-0962-0070	2,4-DB		100	U	ug/kg	
CAN096-0962-0070	2,4,5-T		10	U	ug/kg	
CAN096-0962-0070	2,4,5-TP (Silvex)		10	U	ug/kg	
CAN096-0962-0070	Dalapon		100	U	ug/kg	
CAN096-0962-0070	Dicamba		10	U	ug/kg	
CAN096-0962-0070	Dichlorprop		21	U	ug/kg	
CAN096-0962-0070	Dinoseb		21	U	ug/kg	
CAN096-0962-0070	MCPA		5200	U	ug/kg	
CAN096-0962-0070	MCPP		5200	U	ug/kg	
CAN096-0962-0070	Percent Moisture	4.4	0.1		percent	
CAN096-0962-0080	Aluminum	1460	10.4		mg/kg	
CAN096-0962-0080	Antimony		6.3	U	mg/kg	
CAN096-0962-0080	Arsenic	0.67	0.52		mg/kg	
CAN096-0962-0080	Barium	17.8	1	J	mg/kg	M
CAN096-0962-0080	Beryllium		0.21	U	mg/kg	
CAN096-0962-0080	Cadmium		0.52	U	mg/kg	
CAN096-0962-0080	Calcium	12600	20.9	J	mg/kg	M
CAN096-0962-0080	Chromium	2.6	1		mg/kg	
CAN096-0962-0080	Cobalt	1.4	1		mg/kg	
CAN096-0962-0080	Copper	1.9	2.1		mg/kg	
CAN096-0962-0080	Iron	2730	10.4		mg/kg	
CAN096-0962-0080	Lead	1.7	1		mg/kg	
CAN096-0962-0080	Magnesium	1200	20.9		mg/kg	
CAN096-0962-0080	Manganese	43	1	J	mg/kg	M

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0080	Mercury		0.1	U	mg/kg	
CAN096-0962-0080	Nickel	1.7	4.2		mg/kg	
CAN096-0962-0080	Potassium	365	522		mg/kg	
CAN096-0962-0080	Selenium		0.52	UJ	mg/kg	AM
CAN096-0962-0080	Silver		1	U	mg/kg	
CAN096-0962-0080	Sodium	136	522		mg/kg	
CAN096-0962-0080	Thallium		0.52	UJ	mg/kg	AC
CAN096-0962-0080	Vanadium	7.8	1		mg/kg	
CAN096-0962-0080	Zinc		5.3	U	mg/kg	L
CAN096-0962-0080	Aldrin		1.8	U	ug/kg	
CAN096-0962-0080	Aroclor 1016		34	U	ug/kg	
CAN096-0962-0080	Aroclor 1221		34	U	ug/kg	
CAN096-0962-0080	Aroclor 1232		34	U	ug/kg	
CAN096-0962-0080	Aroclor 1242		34	U	ug/kg	
CAN096-0962-0080	Aroclor 1248		34	U	ug/kg	
CAN096-0962-0080	Aroclor 1254		34	U	ug/kg	
CAN096-0962-0080	Aroclor 1260		34	U	ug/kg	
CAN096-0962-0080	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0080	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0080	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0080	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0080	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0080	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0080	4,4'-DDD		3.4	U	ug/kg	
CAN096-0962-0080	4,4'-DDE		3.4	U	ug/kg	
CAN096-0962-0080	4,4'-DDT		3.4	UJ	ug/kg	D
CAN096-0962-0080	Dieldrin		3.4	U	ug/kg	
CAN096-0962-0080	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0080	Endosulfan II		3.4	U	ug/kg	
CAN096-0962-0080	Endosulfan sulfate		3.4	U	ug/kg	
CAN096-0962-0080	Endrin		3.4	U	ug/kg	
CAN096-0962-0080	Endrin ketone		3.4	U	ug/kg	
CAN096-0962-0080	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0080	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0080	Methoxychlor		18	U	ug/kg	
CAN096-0962-0080	Toxaphene		180	U	ug/kg	
CAN096-0962-0080	Chloroform		5.2	U	ug/kg	
CAN096-0962-0080	Chloromethane		10	UJ	ug/kg	C
CAN096-0962-0080	Dibromochloromethane		5.2	U	ug/kg	
CAN096-0962-0080	1,1-Dichloroethane		5.2	U	ug/kg	
CAN096-0962-0080	1,2-Dichloroethane		5.2	UJ	ug/kg	C
CAN096-0962-0080	1,1-Dichloroethene		5.2	U	ug/kg	
CAN096-0962-0080	1,2-Dichloroethene (total)		5.2	U	ug/kg	
CAN096-0962-0080	1,2-Dichloropropane		5.2	U	ug/kg	
CAN096-0962-0080	cis-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0080	Acetone		10	UJ	ug/kg	CD
CAN096-0962-0080	Benzene		5.2	U	ug/kg	
CAN096-0962-0080	Bromodichloromethane		5.2	U	ug/kg	
CAN096-0962-0080	Bromoform		5.2	UJ	ug/kg	C
CAN096-0962-0080	Bromomethane		10	UJ	ug/kg	C
CAN096-0962-0080	2-Butanone (MEK)		10	U	ug/kg	
CAN096-0962-0080	Carbon disulfide		5.2	U	ug/kg	
CAN096-0962-0080	Carbon tetrachloride		5.2	U	ug/kg	
CAN096-0962-0080	Chlorobenzene		5.2	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0080	Chloroethane		10	U	ug/kg	
CAN096-0962-0080	trans-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0080	Ethylbenzene		5.2	U	ug/kg	
CAN096-0962-0080	2-Hexanone		10	U	ug/kg	
CAN096-0962-0080	Methylene chloride		5.2	U	ug/kg	
CAN096-0962-0080	4-Methyl-2-pentanone (MIBK)		10	U	ug/kg	
CAN096-0962-0080	Styrene		5.2	U	ug/kg	
CAN096-0962-0080	1,1,2,2-Tetrachloro[illegible]ane		5.2	U	ug/kg	
CAN096-0962-0080	Tetrachloroethene		5.2	UJ	ug/kg	C
CAN096-0962-0080	Toluene	4.2	5.2	J	ug/kg	V
CAN096-0962-0080	1,1,1-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0080	1,1,2-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0080	Trichloroethene		5.2	U	ug/kg	
CAN096-0962-0080	Vinyl acetate		10	U	ug/kg	
CAN096-0962-0080	Vinyl chloride		10	U	ug/kg	
CAN096-0962-0080	Xylenes (total)		5.2	U	ug/kg	
CAN096-0962-0080	Phenol		340	U	ug/kg	
CAN096-0962-0080	bis(2-Chloroethyl) ether		340	U	ug/kg	
CAN096-0962-0080	2-Chlorophenol		340	U	ug/kg	
CAN096-0962-0080	1,3-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0080	1,4-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0080	Benzyl alcohol		340	U	ug/kg	
CAN096-0962-0080	1,2-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0080	2-Methylphenol		340	U	ug/kg	
CAN096-0962-0080	bis(2-Chloroisopropyl)ether		340	U	ug/kg	
CAN096-0962-0080	4-Methylphenol		340	U	ug/kg	
CAN096-0962-0080	N-Nitroso-di-n-propylamine		340	U	ug/kg	
CAN096-0962-0080	Hexachloroethane		340	U	ug/kg	
CAN096-0962-0080	Nitrobenzene		340	U	ug/kg	
CAN096-0962-0080	Isophorone		340	U	ug/kg	
CAN096-0962-0080	2-Nitrophenol		340	U	ug/kg	
CAN096-0962-0080	2,4-Dimethylphenol		340	UJ	ug/kg	C
CAN096-0962-0080	Benzoic acid		1700	U	ug/kg	
CAN096-0962-0080	bis(2-Chloroethoxy)methane		340	U	ug/kg	
CAN096-0962-0080	2,4-Dichlorophenol		340	U	ug/kg	
CAN096-0962-0080	1,2,4-Trichlorobenzene		340	U	ug/kg	
CAN096-0962-0080	Naphthalene		340	U	ug/kg	
CAN096-0962-0080	4-Chloroaniline		340	U	ug/kg	
CAN096-0962-0080	Hexachlorobutadiene		340	UJ	ug/kg	C
CAN096-0962-0080	4-Chloro-3-methylphenol		340	U	ug/kg	
CAN096-0962-0080	2-Methylnaphthalene		340	U	ug/kg	
CAN096-0962-0080	Hexachlorocyclopentadiene		340	U	ug/kg	
CAN096-0962-0080	2,4,6-Trichlorophenol		340	U	ug/kg	
CAN096-0962-0080	2,4,5-Trichlorophenol		1700	U	ug/kg	
CAN096-0962-0080	2-Chloronaphthalene		340	U	ug/kg	
CAN096-0962-0080	2-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0080	Dimethyl phthalate		340	U	ug/kg	
CAN096-0962-0080	Acenaphthylene		340	U	ug/kg	
CAN096-0962-0080	3-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0080	Acenaphthene		340	U	ug/kg	
CAN096-0962-0080	2,4-Dinitrophenol		1700	U	ug/kg	
CAN096-0962-0080	4-Nitrophenol		1700	UJ	ug/kg	C
CAN096-0962-0080	Dibenzofuran		340	U	ug/kg	
CAN096-0962-0080	2,4-Dinitrotoluene		340	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0080	2,6-Dinitrotoluene		340	U	ug/kg	
CAN096-0962-0080	Diethyl phthalate		340	U	ug/kg	
CAN096-0962-0080	4-Chlorophenyl phenyl ether		340	U	ug/kg	
CAN096-0962-0080	Fluorene		340	U	ug/kg	
CAN096-0962-0080	4-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0080	4,6-Dinitro-2-methylphenol		1700	U	ug/kg	
CAN096-0962-0080	N-Nitrosodiphenylamine		340	U	ug/kg	
CAN096-0962-0080	4-Bromophenyl phenyl ether		340	U	ug/kg	
CAN096-0962-0080	Hexachlorobenzene		340	U	ug/kg	
CAN096-0962-0080	Pentachlorophenol		1700	U	ug/kg	
CAN096-0962-0080	Phenanthrene		340	U	ug/kg	
CAN096-0962-0080	Anthracene		340	U	ug/kg	
CAN096-0962-0080	Di-n-butyl phthalate		340	U	ug/kg	
CAN096-0962-0080	Fluoranthene		340	U	ug/kg	
CAN096-0962-0080	Pyrene		340	U	ug/kg	
CAN096-0962-0080	Butyl benzyl phthalate		340	U	ug/kg	
CAN096-0962-0080	3,3'-Dichlorobenzidine		690	U	ug/kg	
CAN096-0962-0080	Benzo(a)anthracene		340	U	ug/kg	
CAN096-0962-0080	bis(2-Ethylhexyl)phthalate		340	UJ	ug/kg	C
CAN096-0962-0080	Chrysene		340	U	ug/kg	
CAN096-0962-0080	Di-n-octyl phthalate		340	UJ	ug/kg	C
CAN096-0962-0080	Benzo(b)fluoranthene		340	U	ug/kg	
CAN096-0962-0080	Benzo(k)fluoranthene		340	U	ug/kg	
CAN096-0962-0080	Benzo(a)pyrene		340	U	ug/kg	
CAN096-0962-0080	Indeno(1,2,3-cd)pyrene		340	U	ug/kg	
CAN096-0962-0080	Dibenz(a,h)anthracene		340	U	ug/kg	
CAN096-0962-0080	Benzo(g,h,i)perylene		340	U	ug/kg	
CAN096-0962-0080	2,4-D		42	U	ug/kg	
CAN096-0962-0080	2,4-DB		100	U	ug/kg	
CAN096-0962-0080	2,4,5-T		10	U	ug/kg	
CAN096-0962-0080	2,4,5-TP (Silvex)		10	U	ug/kg	
CAN096-0962-0080	Dalapon		100	U	ug/kg	
CAN096-0962-0080	Dicamba		10	U	ug/kg	
CAN096-0962-0080	Dichlorprop		21	U	ug/kg	
CAN096-0962-0080	Dinoseb		21	U	ug/kg	
CAN096-0962-0080	MCPA		5200	U	ug/kg	
CAN096-0962-0080	MCPP		5200	U	ug/kg	
CAN096-0962-0080	Percent Moisture	4.2	0.1		percent	
CAN096-0962-0090	Aluminum	1210	10.3		mg/kg	
CAN096-0962-0090	Antimony		6.2	U	mg/kg	
CAN096-0962-0090	Arsenic	0.86	0.52		mg/kg	
CAN096-0962-0090	Barium	18.5	1	J	mg/kg	M
CAN096-0962-0090	Beryllium		0.21	U	mg/kg	
CAN096-0962-0090	Cadmium		0.52	U	mg/kg	
CAN096-0962-0090	Calcium	12100	20.6	J	mg/kg	M
CAN096-0962-0090	Chromium	2.4	1		mg/kg	
CAN096-0962-0090	Cobalt	1.1	1		mg/kg	
CAN096-0962-0090	Copper	1.8	2.1		mg/kg	
CAN096-0962-0090	Iron	2440	10.3		mg/kg	
CAN096-0962-0090	Lead	1.9	0.52		mg/kg	
CAN096-0962-0090	Magnesium	1000	20.6		mg/kg	
CAN096-0962-0090	Manganese	39	1	J	mg/kg	M
CAN096-0962-0090	Mercury		0.1	U	mg/kg	
CAN096-0962-0090	Nickel	1.7	4.1		mg/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0090	Potassium	333	515		mg/kg	
CAN096-0962-0090	Selenium		0.52	UJ	mg/kg	AM
CAN096-0962-0090	Silver		1	U	mg/kg	
CAN096-0962-0090	Sodium	135	515		mg/kg	
CAN096-0962-0090	Thallium		0.52	UJ	mg/kg	AC
CAN096-0962-0090	Vanadium	7.1	1		mg/kg	
CAN096-0962-0090	Zinc		6.4	U	mg/kg	L
CAN096-0962-0090	Aldrin		1.8	U	ug/kg	
CAN096-0962-0090	Aroclor 1016		34	U	ug/kg	
CAN096-0962-0090	Aroclor 1221		34	U	ug/kg	
CAN096-0962-0090	Aroclor 1232		34	U	ug/kg	
CAN096-0962-0090	Aroclor 1242		34	U	ug/kg	
CAN096-0962-0090	Aroclor 1248		34	U	ug/kg	
CAN096-0962-0090	Aroclor 1254		34	U	ug/kg	
CAN096-0962-0090	Aroclor 1260		34	U	ug/kg	
CAN096-0962-0090	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0090	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0090	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0090	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0090	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0090	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0090	4,4'-DDD		3.4	U	ug/kg	
CAN096-0962-0090	4,4'-DDE		3.4	U	ug/kg	
CAN096-0962-0090	4,4'-DDT		3.4	UJ	ug/kg	D
CAN096-0962-0090	Dieldrin		3.4	U	ug/kg	
CAN096-0962-0090	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0090	Endosulfan II		3.4	U	ug/kg	
CAN096-0962-0090	Endosulfan sulfate		3.4	U	ug/kg	
CAN096-0962-0090	Endrin		3.4	U	ug/kg	
CAN096-0962-0090	Endrin ketone		3.4	U	ug/kg	
CAN096-0962-0090	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0090	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0090	Methoxychlor		18	U	ug/kg	
CAN096-0962-0090	Toxaphene		180	U	ug/kg	
CAN096-0962-0090	Acetone		10	UJ	ug/kg	CD
CAN096-0962-0090	Benzene		5.2	U	ug/kg	
CAN096-0962-0090	Bromodichloromethane		5.2	U	ug/kg	
CAN096-0962-0090	Bromoform		5.2	UJ	ug/kg	C
CAN096-0962-0090	Bromomethane		10	UJ	ug/kg	C
CAN096-0962-0090	2-Butanone (MEK)		10	U	ug/kg	
CAN096-0962-0090	Carbon disulfide		5.2	U	ug/kg	
CAN096-0962-0090	Carbon tetrachloride		5.2	U	ug/kg	
CAN096-0962-0090	Chlorobenzene		5.2	U	ug/kg	
CAN096-0962-0090	Chloroethane		10	U	ug/kg	
CAN096-0962-0090	Chloroform		5.2	U	ug/kg	
CAN096-0962-0090	Chloromethane		10	UJ	ug/kg	C
CAN096-0962-0090	Dibromochloromethane		5.2	U	ug/kg	
CAN096-0962-0090	1,1-Dichloroethane		5.2	U	ug/kg	
CAN096-0962-0090	1,2-Dichloroethane		5.2	UJ	ug/kg	C
CAN096-0962-0090	1,1-Dichloroethene		5.2	U	ug/kg	
CAN096-0962-0090	1,2-Dichloroethene (total)		5.2	U	ug/kg	
CAN096-0962-0090	1,2-Dichloropropane		5.2	U	ug/kg	
CAN096-0962-0090	cis-1,3-Dichloropropene		5.2	U	ug/kg	
CAN096-0962-0090	trans-1,3-Dichloropropene		5.2	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0090	Ethylbenzene		5.2	U	ug/kg	
CAN096-0962-0090	2-Hexanone		10	U	ug/kg	
CAN096-0962-0090	Methylene chloride		5.2	U	ug/kg	
CAN096-0962-0090	4-Methyl-2-pentanone (MIBK)		10	U	ug/kg	
CAN096-0962-0090	Styrene		5.2	U	ug/kg	
CAN096-0962-0090	1,1,2,2-Tetrachloroethane		5.2	U	ug/kg	
CAN096-0962-0090	Tetrachloroethene		5.2	UJ	ug/kg	C
CAN096-0962-0090	Toluene	1.9	5.2	J	ug/kg	V
CAN096-0962-0090	1,1,1-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0090	1,1,2-Trichloroethane		5.2	U	ug/kg	
CAN096-0962-0090	Trichloroethene		5.2	U	ug/kg	
CAN096-0962-0090	Vinyl acetate		10	U	ug/kg	
CAN096-0962-0090	Vinyl chloride		10	U	ug/kg	
CAN096-0962-0090	Xylenes (total)		5.2	U	ug/kg	
CAN096-0962-0090	Phenol		340	U	ug/kg	
CAN096-0962-0090	bis(2-Chloroethyl) ether		340	U	ug/kg	
CAN096-0962-0090	2-Chlorophenol		340	U	ug/kg	
CAN096-0962-0090	1,3-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0090	1,4-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0090	Benzyl alcohol		340	U	ug/kg	
CAN096-0962-0090	1,2-Dichlorobenzene		340	U	ug/kg	
CAN096-0962-0090	2-Methylphenol		340	U	ug/kg	
CAN096-0962-0090	bis(2-Chloroisopropyl)ether		340	U	ug/kg	
CAN096-0962-0090	4-Methylphenol		340	U	ug/kg	
CAN096-0962-0090	N-Nitroso-di-n-propylamine		340	U	ug/kg	
CAN096-0962-0090	Hexachloroethane		340	U	ug/kg	
CAN096-0962-0090	Nitrobenzene		340	U	ug/kg	
CAN096-0962-0090	Isophorone		340	U	ug/kg	
CAN096-0962-0090	2-Nitrophenol		340	U	ug/kg	
CAN096-0962-0090	2,4-Dimethylphenol		340	UJ	ug/kg	C
CAN096-0962-0090	Benzoic acid		1600	U	ug/kg	
CAN096-0962-0090	bis(2-Chloroethoxy)methane		340	U	ug/kg	
CAN096-0962-0090	2,4-Dichlorophenol		340	U	ug/kg	
CAN096-0962-0090	1,2,4-Trichlorobenzene		340	U	ug/kg	
CAN096-0962-0090	Naphthalene		340	U	ug/kg	
CAN096-0962-0090	4-Chloroaniline		340	U	ug/kg	
CAN096-0962-0090	Hexachlorobutadiene		340	UJ	ug/kg	C
CAN096-0962-0090	4-Chloro-3-methylphenol		340	U	ug/kg	
CAN096-0962-0090	2-Methylnaphthalene		340	U	ug/kg	
CAN096-0962-0090	Hexachlorocyclopentadiene		340	U	ug/kg	
CAN096-0962-0090	2,4,6-Trichlorophenol		340	U	ug/kg	
CAN096-0962-0090	2,4,5-Trichlorophenol		1600	U	ug/kg	
CAN096-0962-0090	2-Chloronaphthalene		340	U	ug/kg	
CAN096-0962-0090	2-Nitroaniline		1600	U	ug/kg	
CAN096-0962-0090	Dimethyl phthalate		340	U	ug/kg	
CAN096-0962-0090	Acenaphthylene		340	U	ug/kg	
CAN096-0962-0090	3-Nitroaniline		1600	U	ug/kg	
CAN096-0962-0090	Acenaphthene		340	U	ug/kg	
CAN096-0962-0090	2,4-Dinitrophenol		1600	U	ug/kg	
CAN096-0962-0090	4-Nitrophenol		1600	UJ	ug/kg	C
CAN096-0962-0090	Dibenzofuran		340	U	ug/kg	
CAN096-0962-0090	2,4-Dinitrotoluene		340	U	ug/kg	
CAN096-0962-0090	2,6-Dinitrotoluene		340	U	ug/kg	
CAN096-0962-0090	Diethyl phthalate		340	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0090	4-Chlorophenyl phenyl ether		340	U	ug/kg	
CAN096-0962-0090	Fluorene		340	U	ug/kg	
CAN096-0962-0090	4-Nitroaniline		1600	U	ug/kg	
CAN096-0962-0090	4,6-Dinitro-2-methylphenol		1600	U	ug/kg	
CAN096-0962-0090	N-Nitrosodiphenylamine		340	U	ug/kg	
CAN096-0962-0090	4-Bromophenyl phenyl ether		340	U	ug/kg	
CAN096-0962-0090	Hexachlorobenzene		340	U	ug/kg	
CAN096-0962-0090	Pentachlorophenol		1600	U	ug/kg	
CAN096-0962-0090	Phenanthrene		340	U	ug/kg	
CAN096-0962-0090	Anthracene		340	U	ug/kg	
CAN096-0962-0090	Di-n-butyl phthalate		340	U	ug/kg	
CAN096-0962-0090	Fluoranthene		340	U	ug/kg	
CAN096-0962-0090	Pyrene		340	U	ug/kg	
CAN096-0962-0090	Butyl benzyl phthalate		340	U	ug/kg	
CAN096-0962-0090	3,3'-Dichlorobenzidine		680	U	ug/kg	
CAN096-0962-0090	Benzo(a)anthracene		340	U	ug/kg	
CAN096-0962-0090	bis(2-Ethylhexyl)phthalate		340	UJ	ug/kg	C
CAN096-0962-0090	Chrysene		340	U	ug/kg	
CAN096-0962-0090	Di-n-octyl phthalate		340	UJ	ug/kg	C
CAN096-0962-0090	Benzo(b)fluoranthene		340	U	ug/kg	
CAN096-0962-0090	Benzo(k)fluoranthene		340	U	ug/kg	
CAN096-0962-0090	Benzo(a)pyrene		340	U	ug/kg	
CAN096-0962-0090	Indeno(1,2,3-cd)pyrene		340	U	ug/kg	
CAN096-0962-0090	Dibenz(a,h)anthracene		340	U	ug/kg	
CAN096-0962-0090	Benzo(g,h,i)perylene		340	U	ug/kg	
CAN096-0962-0090	2,4-D		41	U	ug/kg	
CAN096-0962-0090	2,4-DB		100	U	ug/kg	
CAN096-0962-0090	2,4,5-T		10	U	ug/kg	
CAN096-0962-0090	2,4,5-TP (Silvex)		10	U	ug/kg	
CAN096-0962-0090	Dalapon		100	U	ug/kg	
CAN096-0962-0090	Dicamba		10	U	ug/kg	
CAN096-0962-0090	Dichlorprop		21	U	ug/kg	
CAN096-0962-0090	Dinoseb		21	U	ug/kg	
CAN096-0962-0090	MCPA		5200	U	ug/kg	
CAN096-0962-0090	MCPP		5200	U	ug/kg	
CAN096-0962-0090	Percent Moisture	3	0.1		percent	
CAN096-0962-0100	Aluminum	1510	10.5		mg/kg	
CAN096-0962-0100	Antimony		6.3	U	mg/kg	
CAN096-0962-0100	Arsenic	0.85	0.53		mg/kg	
CAN096-0962-0100	Barium	32.6	1.1	J	mg/kg	M
CAN096-0962-0100	Beryllium		0.21	U	mg/kg	
CAN096-0962-0100	Cadmium		0.53	U	mg/kg	
CAN096-0962-0100	Calcium	17400	21	J	mg/kg	M
CAN096-0962-0100	Chromium	5.8	1.1		mg/kg	
CAN096-0962-0100	Cobalt	1.4	1.1		mg/kg	
CAN096-0962-0100	Copper	1.8	2.1		mg/kg	
CAN096-0962-0100	Iron	2930	10.5		mg/kg	
CAN096-0962-0100	Lead	1.7	1.1		mg/kg	
CAN096-0962-0100	Magnesium	1180	21		mg/kg	
CAN096-0962-0100	Manganese	57.3	1.1	J	mg/kg	M
CAN096-0962-0100	Mercury		0.11	U	mg/kg	
CAN096-0962-0100	Nickel	2.3	4.2		mg/kg	
CAN096-0962-0100	Potassium	413	526		mg/kg	
CAN096-0962-0100	Selenium		0.53	UJ	mg/kg	AM

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0100	Silver	0.38	1.1		mg/kg	
CAN096-0962-0100	Sodium	148	526		mg/kg	
CAN096-0962-0100	Thallium		0.53	UJ	mg/kg	AC
CAN096-0962-0100	Vanadium	8.2	1.1		mg/kg	
CAN096-0962-0100	Zinc		5.4	U	mg/kg	L
CAN096-0962-0100	Aldrin		1.8	U	ug/kg	
CAN096-0962-0100	Aroclor 1016		35	U	ug/kg	
CAN096-0962-0100	Aroclor 1221		35	U	ug/kg	
CAN096-0962-0100	Aroclor 1232		35	U	ug/kg	
CAN096-0962-0100	Aroclor 1242		35	U	ug/kg	
CAN096-0962-0100	Aroclor 1248		35	U	ug/kg	
CAN096-0962-0100	Aroclor 1254		35	U	ug/kg	
CAN096-0962-0100	Aroclor 1260		35	U	ug/kg	
CAN096-0962-0100	alpha-BHC		1.8	U	ug/kg	
CAN096-0962-0100	beta-BHC		1.8	U	ug/kg	
CAN096-0962-0100	delta-BHC		1.8	U	ug/kg	
CAN096-0962-0100	gamma-BHC (Lindane)		1.8	U	ug/kg	
CAN096-0962-0100	alpha-Chlordane		1.8	U	ug/kg	
CAN096-0962-0100	gamma-Chlordane		1.8	U	ug/kg	
CAN096-0962-0100	4,4'-DDD		3.5	U	ug/kg	
CAN096-0962-0100	4,4'-DDE		3.5	U	ug/kg	
CAN096-0962-0100	4,4'-DDT		3.5	UJ	ug/kg	D
CAN096-0962-0100	Dieldrin		3.5	U	ug/kg	
CAN096-0962-0100	Endosulfan I		1.8	U	ug/kg	
CAN096-0962-0100	Endosulfan II		3.5	U	ug/kg	
CAN096-0962-0100	Endosulfan sulfate		3.5	U	ug/kg	
CAN096-0962-0100	Endrin		3.5	U	ug/kg	
CAN096-0962-0100	Endrin ketone		3.5	U	ug/kg	
CAN096-0962-0100	Heptachlor		1.8	U	ug/kg	
CAN096-0962-0100	Heptachlor epoxide		1.8	U	ug/kg	
CAN096-0962-0100	Methoxychlor		18	U	ug/kg	
CAN096-0962-0100	Toxaphene		180	U	ug/kg	
CAN096-0962-0100	Acetone		11	UJ	ug/kg	CD
CAN096-0962-0100	Benzene		5.3	U	ug/kg	
CAN096-0962-0100	Bromodichloromethane		5.3	U	ug/kg	
CAN096-0962-0100	Bromoform		5.3	UJ	ug/kg	C
CAN096-0962-0100	Bromomethane		11	UJ	ug/kg	C
CAN096-0962-0100	2-Butanone (MEK)		11	U	ug/kg	
CAN096-0962-0100	Carbon disulfide		5.3	U	ug/kg	
CAN096-0962-0100	Carbon tetrachloride		5.3	U	ug/kg	
CAN096-0962-0100	Chlorobenzene		5.3	U	ug/kg	
CAN096-0962-0100	Chloroethane		11	U	ug/kg	
CAN096-0962-0100	Chloroform		5.3	U	ug/kg	
CAN096-0962-0100	Chloromethane		11	UJ	ug/kg	C
CAN096-0962-0100	Dibromochloromethane		5.3	U	ug/kg	
CAN096-0962-0100	1,1-Dichloroethane		5.3	U	ug/kg	
CAN096-0962-0100	1,2-Dichloroethane		5.3	UJ	ug/kg	C
CAN096-0962-0100	1,1-Dichloroethene		5.3	U	ug/kg	
CAN096-0962-0100	1,2-Dichloroethene (total)		5.3	U	ug/kg	
CAN096-0962-0100	1,2-Dichloropropane		5.3	U	ug/kg	
CAN096-0962-0100	cis-1,3-Dichloropropene		5.3	U	ug/kg	
CAN096-0962-0100	trans-1,3-Dichloropropene		5.3	U	ug/kg	
CAN096-0962-0100	Ethylbenzene		5.3	U	ug/kg	
CAN096-0962-0100	2-Hexanone		11	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0100	Methylene chloride		5.3	U	ug/kg	
CAN096-0962-0100	4-Methyl-2-pentanone (MIBK)		11	U	ug/kg	
CAN096-0962-0100	Styrene		5.3	U	ug/kg	
CAN096-0962-0100	1,1,2,2-Tetrachloroethane		5.3	U	ug/kg	
CAN096-0962-0100	Tetrachloroethene		5.3	UJ	ug/kg	C
CAN096-0962-0100	Toluene	3.4	5.3	J	ug/kg	V
CAN096-0962-0100	1,1,1-Trichloroethane		5.3	U	ug/kg	
CAN096-0962-0100	1,1,2-Trichloroethane		5.3	U	ug/kg	
CAN096-0962-0100	Trichloroethene		5.3	U	ug/kg	
CAN096-0962-0100	Vinyl acetate		11	U	ug/kg	
CAN096-0962-0100	Vinyl chloride		11	U	ug/kg	
CAN096-0962-0100	Xylenes (total)		5.3	U	ug/kg	
CAN096-0962-0100	Phenol		350	U	ug/kg	
CAN096-0962-0100	bis(2-Chloroethyl) ether		350	U	ug/kg	
CAN096-0962-0100	2-Chlorophenol		350	U	ug/kg	
CAN096-0962-0100	1,3-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0100	1,4-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0100	Benzyl alcohol		350	U	ug/kg	
CAN096-0962-0100	1,2-Dichlorobenzene		350	U	ug/kg	
CAN096-0962-0100	2-Methylphenol		350	U	ug/kg	
CAN096-0962-0100	bis(2-Chloroisopropyl)ether		350	U	ug/kg	
CAN096-0962-0100	4-Methylphenol		350	U	ug/kg	
CAN096-0962-0100	N-Nitroso-di-n-propylamine		350	U	ug/kg	
CAN096-0962-0100	Hexachloroethane		350	U	ug/kg	
CAN096-0962-0100	Nitrobenzene		350	U	ug/kg	
CAN096-0962-0100	Isophorone		350	U	ug/kg	
CAN096-0962-0100	2-Nitrophenol		350	U	ug/kg	
CAN096-0962-0100	2,4-Dimethylphenol		350	UJ	ug/kg	C
CAN096-0962-0100	Benzoic acid		1700	U	ug/kg	
CAN096-0962-0100	bis(2-Chloroethoxy)methane		350	U	ug/kg	
CAN096-0962-0100	2,4-Dichlorophenol		350	U	ug/kg	
CAN096-0962-0100	1,2,4-Trichlorobenzene		350	U	ug/kg	
CAN096-0962-0100	Naphthalene		350	U	ug/kg	
CAN096-0962-0100	4-Chloroaniline		350	U	ug/kg	
CAN096-0962-0100	Hexachlorobutadiene		350	UJ	ug/kg	C
CAN096-0962-0100	4-Chloro-3-methylphenol		350	U	ug/kg	
CAN096-0962-0100	2-Methylnaphthalene		350	U	ug/kg	
CAN096-0962-0100	Hexachlorocyclopentadiene		350	U	ug/kg	
CAN096-0962-0100	2,4,6-Trichlorophenol		350	U	ug/kg	
CAN096-0962-0100	2,4,5-Trichlorophenol		1700	U	ug/kg	
CAN096-0962-0100	2-Chloronaphthalene		350	U	ug/kg	
CAN096-0962-0100	2-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0100	Dimethyl phthalate		350	U	ug/kg	
CAN096-0962-0100	Acenaphthylene		350	U	ug/kg	
CAN096-0962-0100	3-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0100	Acenaphthene		350	U	ug/kg	
CAN096-0962-0100	2,4-Dinitrophenol		1700	U	ug/kg	
CAN096-0962-0100	4-Nitrophenol		1700	UJ	ug/kg	C
CAN096-0962-0100	Dibenzofuran		350	U	ug/kg	
CAN096-0962-0100	2,4-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0100	2,6-Dinitrotoluene		350	U	ug/kg	
CAN096-0962-0100	Diethyl phthalate		350	U	ug/kg	
CAN096-0962-0100	4-Chlorophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0100	Fluorene		350	U	ug/kg	

Field ID	Chemical	Result	Reporting Limit	Qualifier	Units	Comments
CAN096-0962-0100	4-Nitroaniline		1700	U	ug/kg	
CAN096-0962-0100	4,6-Dinitro-2-methylphenol		1700	U	ug/kg	
CAN096-0962-0100	N-Nitrosodiphenylamine		350	U	ug/kg	
CAN096-0962-0100	4-Bromophenyl phenyl ether		350	U	ug/kg	
CAN096-0962-0100	Hexachlorobenzene		350	U	ug/kg	
CAN096-0962-0100	Pentachlorophenol		1700	U	ug/kg	
CAN096-0962-0100	Phenanthrene		350	U	ug/kg	
CAN096-0962-0100	Anthracene		350	U	ug/kg	
CAN096-0962-0100	Di-n-butyl phthalate		350	U	ug/kg	
CAN096-0962-0100	Fluoranthene		350	U	ug/kg	
CAN096-0962-0100	Pyrene		350	U	ug/kg	
CAN096-0962-0100	Butyl benzyl phthalate		350	U	ug/kg	
CAN096-0962-0100	3,3'-Dichlorobenzidine		690	U	ug/kg	
CAN096-0962-0100	Benzo(a)anthracene		350	U	ug/kg	
CAN096-0962-0100	bis(2-Ethylhexyl)phthalate		350	UJ	ug/kg	C
CAN096-0962-0100	Chrysene		350	U	ug/kg	
CAN096-0962-0100	Di-n-octyl phthalate		350	UJ	ug/kg	C
CAN096-0962-0100	Benzo(b)fluoranthene		350	U	ug/kg	
CAN096-0962-0100	Benzo(k)fluoranthene		350	U	ug/kg	
CAN096-0962-0100	Benzo(a)pyrene		350	U	ug/kg	
CAN096-0962-0100	Indeno(1,2,3-cd)pyrene		350	U	ug/kg	
CAN096-0962-0100	Dibenz(a,h)anthracene		350	U	ug/kg	
CAN096-0962-0100	Benzo(g,h,i)perylene		350	U	ug/kg	
CAN096-0962-0100	2,4-D		42	U	ug/kg	
CAN096-0962-0100	2,4-DB		110	U	ug/kg	
CAN096-0962-0100	2,4,5-T		11	U	ug/kg	
CAN096-0962-0100	2,4,5-TP (Silvex)		11	U	ug/kg	
CAN096-0962-0100	Dalapon		110	U	ug/kg	
CAN096-0962-0100	Dicamba		11	U	ug/kg	
CAN096-0962-0100	Dichlorprop		21	U	ug/kg	
CAN096-0962-0100	Dinoseb		21	U	ug/kg	
CAN096-0962-0100	MCPA		5300	U	ug/kg	
CAN096-0962-0100	MCPP		5300	U	ug/kg	
CAN096-0962-0100	Percent Moisture	4.9	0.1		percent	

APPENDIX E
19 SWMU BOUNDARY SURVEY

TECHNICAL MEMORANDUM

To: Thomas Theile
U.S. Army Corps of Engineers
Omaha District

From: Tom Acre
Woodward-Clyde

Office: Denver

Date: January 7, 1995

Subject: 19 SWMU Boundary Monument Surveying
Cannon Air Force Base, Clovis, New Mexico
Project No. C3M11L (T1003)

This Technical Memorandum provides a summary of the surveying and boundary monument placement activities conducted for 19 Appendix I Solid Waste Management Units (SWMUs) at 15 sites at Cannon Air Force Base (Cannon AFB), New Mexico. The surveying and boundary monument placement occurred from November 7 through November 19, 1993. The field activities at these SWMUs consisted of: (1) preliminarily staking boundary corners (or traverse points) at each SWMU by Woodward-Clyde; (2) subsequent review and approval by Cannon AFB personnel; (3) establishing permanent boundary corners through the installation of Type G permanent monuments at all SWMU boundaries; and (4) surveying of boundary monument locations by a New Mexico registered surveyor. Additional activities for this project task included the compilation of a boundary survey and plat for each SWMU, and compilation of a graphical index of all SWMUs on three plat maps. The surveying was performed to support a Class III permit modification to Cannon AFB's RCRA Part B permit for the 19 Appendix I SWMUs.

SWMU boundary corners (or traverse points) were established at the corners for installation of permanent monuments (and along the borders if the SWMU boundary length was greater

than 1000 feet) for 19 SWMUs at 15 sites. The permanent monument locations were reviewed and approved by on-site Cannon AFB personnel (Dr. Janice Stowell and Mr. John Eckoff). The Sanitary Sewer Line (SWMU No.98) and Wastewater Treatment Effluent (SWMU No. 102) boundary survey consisted of permanent boundary markers at traverse points instead of boundary corners since these two SWMUs are linear features. A total of 86 boundary monuments were installed at 15 sites, with a minimum of 4 at each SWMU location (with the exceptions noted above). The locations of the SWMU permanent boundary monuments were based on SWMU boundaries identified during the RCRA Facility Assessment, and information obtained during the previous IRP Remedial and RCRA Facility investigations conducted at each SWMU. The SWMUs for which boundary corners (or traverse points) were established and platting were completed are listed in Table 1. The SWMU permanent boundary monument locations for the 15 SWMU sites are shown on Figures 1 through 14, and plat maps 10069 through 10071.

Horizontal survey information for each boundary survey point for the 19 SWMUs (15 sites) include northing and easting coordinates referenced to the Base Comprehensive Plan and state plane coordinates. Reporting of the northing and easting coordinates was reported to the nearest hundredth of a foot (±0.01 ft) (Table 1). In addition, the survey locations are marked on the site maps (Figures 1 through 14). Lydick Engineers and Surveyors, Clovis, New Mexico surveyed each permanent boundary monument installed during the surveying task. Boundary monuments consisted of Type G monuments (with 3-foot long, 5/8-inch rebar) which were driven into the ground using a sledge hammer at the SWMU boundaries.

Survey plats (three originals) indicating the location and dimensions of each of the 19 SWMUs with respect to permanently surveyed benchmarks were prepared on mylar, showing the plat drawn in ink on an Omaha District plan sheet. One of the originals will be filed with the Curry County zoning activity or the authority with jurisdiction over local land use. The other originals will be furnished to Cannon AFB and U.S. EPA Region VI.

TABLE 1

SURVEY DATA FOR BOUNDARY MONUMENTS
19 SOLID WASTE MANAGMENT UNITS (15 SITES)
CANNON AIR FORCE BASE, CLOVIS, NEW MEXICO

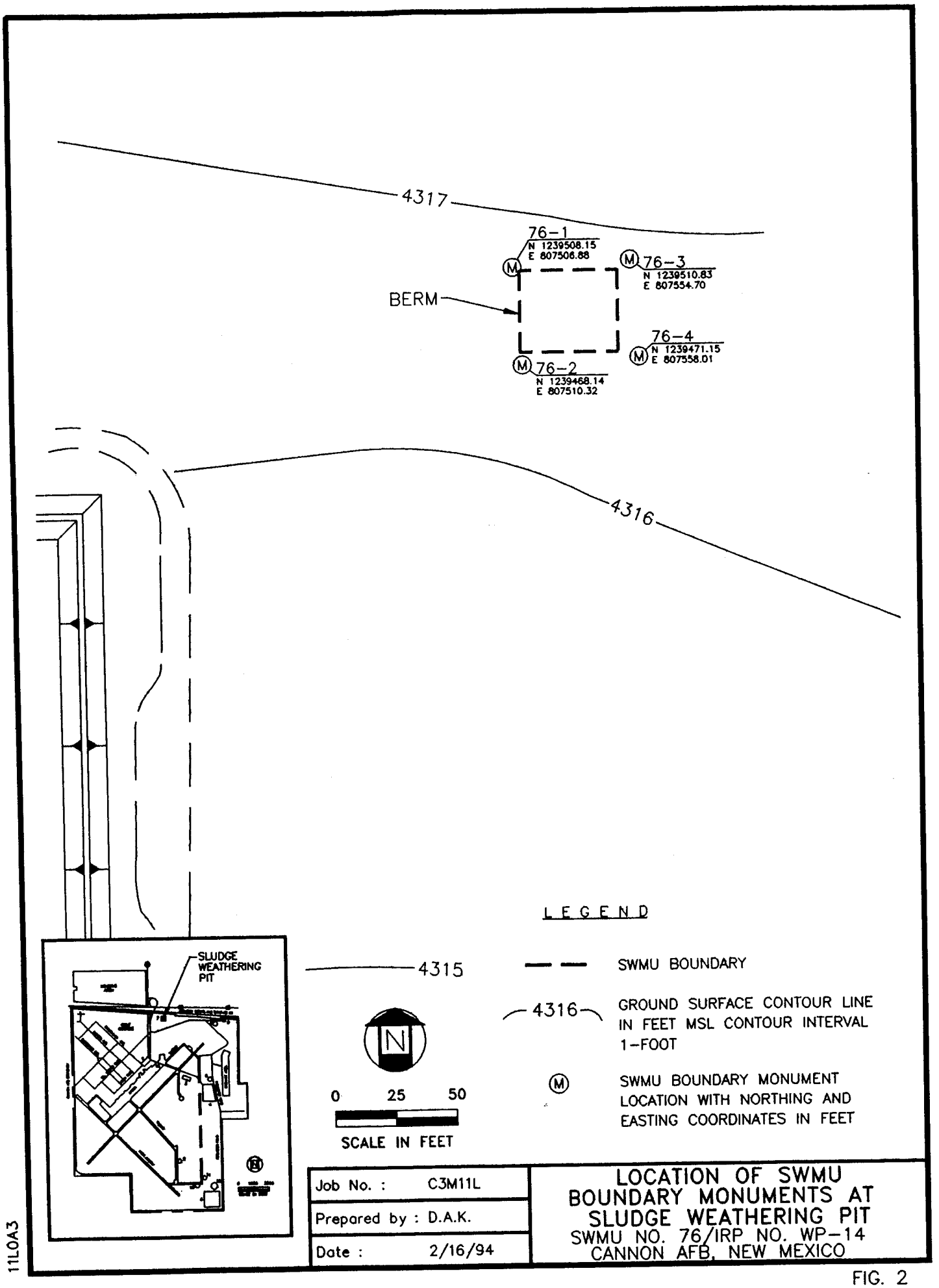
SWMU NUMBER	SWMU NAME	IRP Designation	Approximate Width (feet)	Approximate Length (feet)	Number of Monuments	Monument Number	Survey Northing (feet)	Survey Easting (feet)
34	AGE Drainage Ditch	SD-15	20	1,200	8	34-2	1,236,590.51	806,226.18
						34-3	1,236,280.86	805,976.43
						34-4	1,236,006.77	805,690.01
						34-5	1,235,993.31	805,702.50
						34-6	1,236,263.25	805,993.12
						34-7	1,236,567.53	806,251.93
						34-8	1,236,954.85	806,356.02
						34-9	1,236,968.61	806,333.12
76	Sludge Weathering Pit	WP-14	40	50	4	76-1	1,239,508.15	807,506.88
						76-2	1,239,468.14	807,510.32
						76-3	1,239,510.83	807,554.70
						76-4	1,239,471.15	807,558.01
78	Fire Department Training Area No. 1	FT-6	100	100	4	78-1	1,239,348.40	810,902.01
						78-2	1,239,356.15	811,001.51
						78-3	1,239,249.19	810,905.52
						78-4	1,239,256.01	811,004.86
81	Solvent Disposal Site	DP-16	100	100	4	81-1	1,239,428.30	811,249.56
						81-2	1,239,431.18	811,349.67
						81-3	1,239,531.22	811,340.70
						81-4	1,239,528.93	811,241.05
82	Landfill No. 2	LF-2	500	1,500	8	82-1	1,238,015.28	812,036.96
						82-2	1,237,990.30	812,537.77
						82-3	1,238,489.35	812,536.65
						82-4	1,238,513.91	812,031.74
						82-5	1,238,990.04	812,533.17
						82-6	1,239,484.86	812,501.53
						82-7	1,239,509.65	812,034.21
						82-8	1,239,013.23	812,024.87
86-90	Engine Test Cell	SD-11	140	500	4	86-1	1,229,536.93	808,752.25
						86-2	1,229,542.72	808,290.24
						86-3	1,229,402.42	808,257.66
						86-4	1,229,397.07	808,751.46
95	NE Stormwater Drainage Area	SD-20	50	1,850	6	95-1	1,235,360.60	808,704.96
						95-2	1,235,314.09	808,685.89
						95-3	1,235,082.13	809,080.76
						95-4	1,233,853.98	809,426.95
						95-5	1,233,857.93	809,553.04
						95-6	1,235,155.33	809,153.55
96	Old Entomology Rinse Area	SD-17	200	200	4	96-1	1,235,210.88	810,580.63
						96-2	1,235,016.44	810,628.21
						96-3	1,235,010.54	810,429.57
						96-4	1,235,203.85	810,376.42

TABLE 1

(Concluded)

SWMU NUMBER	SWMU NAME	IRP Designation	Approximate Width (feet)	Approximate Length (feet)	Number of Monuments	Monument Number	Survey Northing (feet)	Survey Easting (feet)
98	Sanitary Sewer Line		10	10,000	12	98-1	1,236,234.57	808,091.57
						98-2	1,236,407.07	807,383.90
						98-3	1,236,043.70	808,859.95
						98-4	1,235,933.50	809,316.14
						98-5	1,235,838.24	809,710.19
						98-6	1,235,220.76	810,471.58
						98-7	1,238,218.69	806,120.64
						98-8	1,237,344.78	806,126.00
						98-9	1,236,828.18	806,230.16
						98-10	1,235,997.76	805,401.10
						98-11	1,235,353.72	804,780.14
						98-12	1,234,743.62	804,193.64
101	Wastewater Treatment Lagoons		1,150	2,000	6	101-1	1,234,977.33	809,942.80
						101-2	1,233,875.56	809,943.82
						101-3	1,233,074.22	809,947.19
						101-4	1,233,320.59	810,974.60
						101-5	1,234,081.98	810,792.55
						101-6	1,234,968.09	810,578.63
102	Wastewater Treatment Effluent		10	1,400	4	102-1	1,233,545.74	811,754.43
						102-2	1,233,517.43	811,082.24
						102-3	1,234,124.29	810,815.25
						102-4	1,233,488.59	810,965.95
104	Landfill No. 4	LF-4	540	700	4	104-1	1,234,912.40	812,443.77
						104-2	1,234,938.32	812,941.05
						104-3	1,234,266.09	812,982.01
						140-4	1,234,235.28	812,450.38
105	Landfill No. 3	LF-3	300	2,000	10	105-1	1,232,407.71	812,276.32
						105-2	1,232,417.20	813,266.55
						105-3	1,232,702.68	813,259.27
						105-4	1,232,721.89	812,256.19
						105-5	1,232,713.61	811,762.97
						105-6	1,232,912.59	811,762.38
						105-7	1,232,914.61	811,516.15
						105-8	1,232,714.37	811,513.17
						105-9	1,232,677.79	811,264.97
						105-10	1,232,400.63	811,270.27
106	Fire Department Training Area No. 2	FT-7	110	335	4	106-1	1,227,702.50	809,310.95
						106-2	1,227,592.73	809,311.88
						106-3	1,227,596.63	809,648.89
						106-4	1,227,706.57	809,645.55
107	Fire Department Training Area No. 3	FT-8	140	200	4	107-1	1,228,203.49	809,939.83
						107-2	1,228,213.99	810,078.32
						107-3	1,228,401.60	810,076.98
						107-4	1,228,403.63	809,938.12

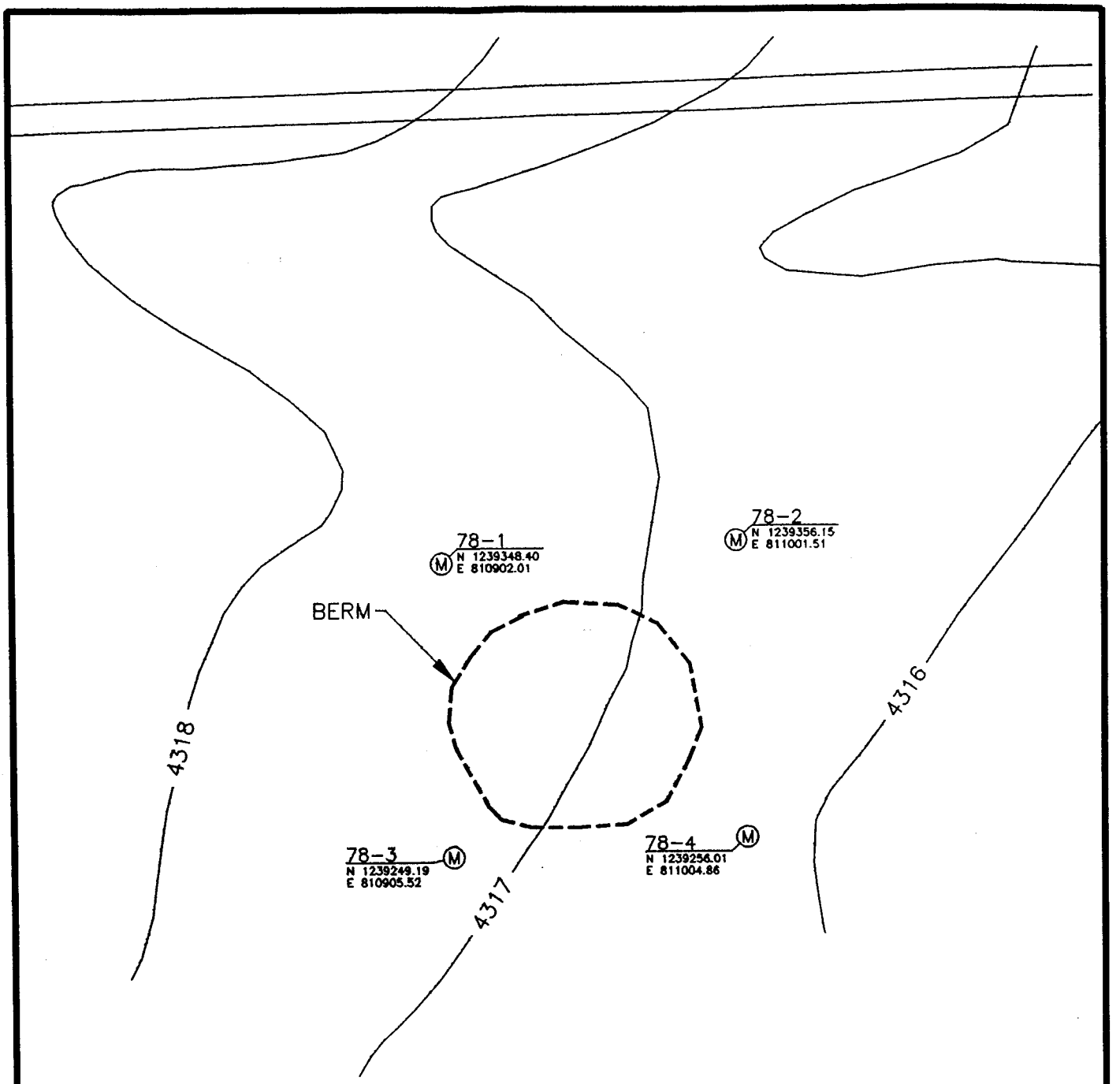
SWMU Solid Waste Management Unit
IRP Installation Restoration Program

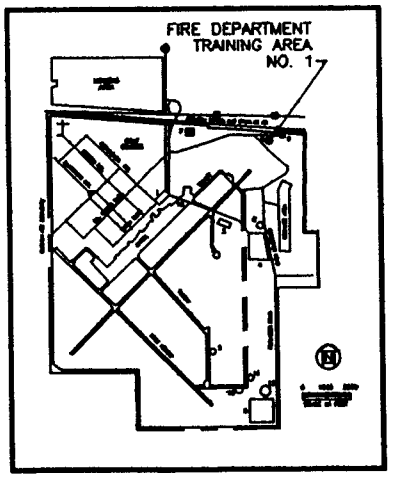


Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT SLUDGE WEATHERING PIT SWMU NO. 76/IRP NO. WP-14 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

11L0A3

FIG. 2





LEGEND

SWMU BOUNDARY

4316 GROUND SURFACE CONTOUR LINE IN FEET MSL
CONTOUR INTERVAL = 1 FOOT

(M) SWMU BOUNDARY MONUMENT LOCATION WITH NORTHING AND EASTING COORDINATES IN FEET

N

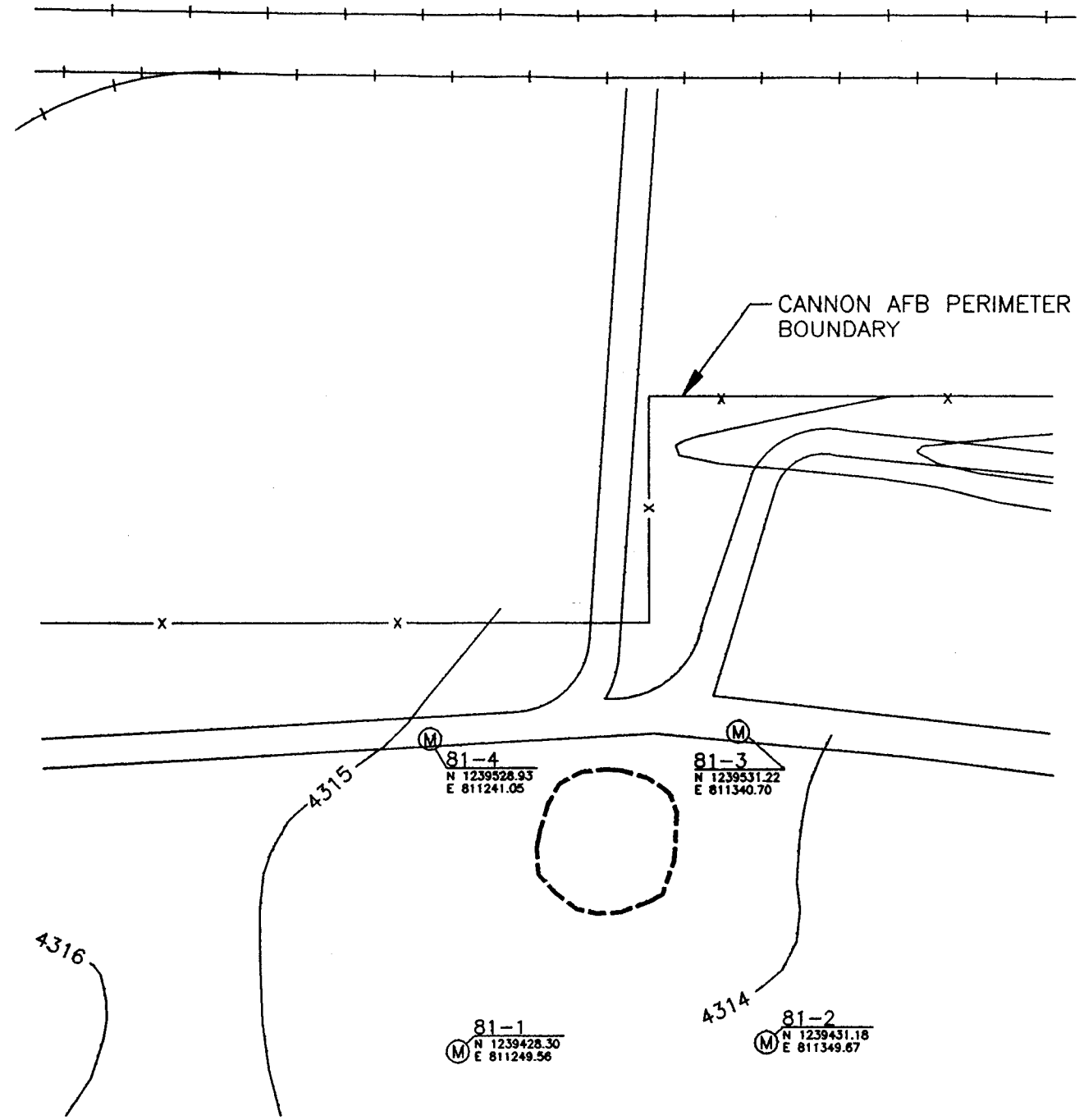
0 25 50

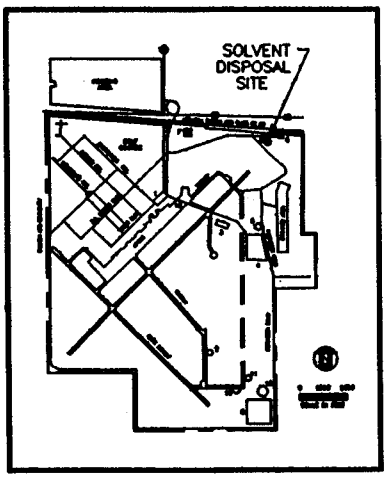
SCALE IN FEET

Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT FIRE DEPARTMENT TRAINING AREA NO. 1
Prepared by : D.A.K.	SWMU NO. 78/IRP FT-6
Date : 2/14/94	CANNON AFB, NEW MEXICO

11L0A4

FIG. 3





LEGEND

- - - - - APPROXIMATE SWMU BOUNDARY

—4316— GROUND SURFACE CONTOUR LINE IN FEET MSL
CONTOUR INTERVAL = 1 FOOT

(M) SWMU BOUNDARY MONUMENT LOCATION WITH NORTHING AND EASTING COORDINATES IN FEET

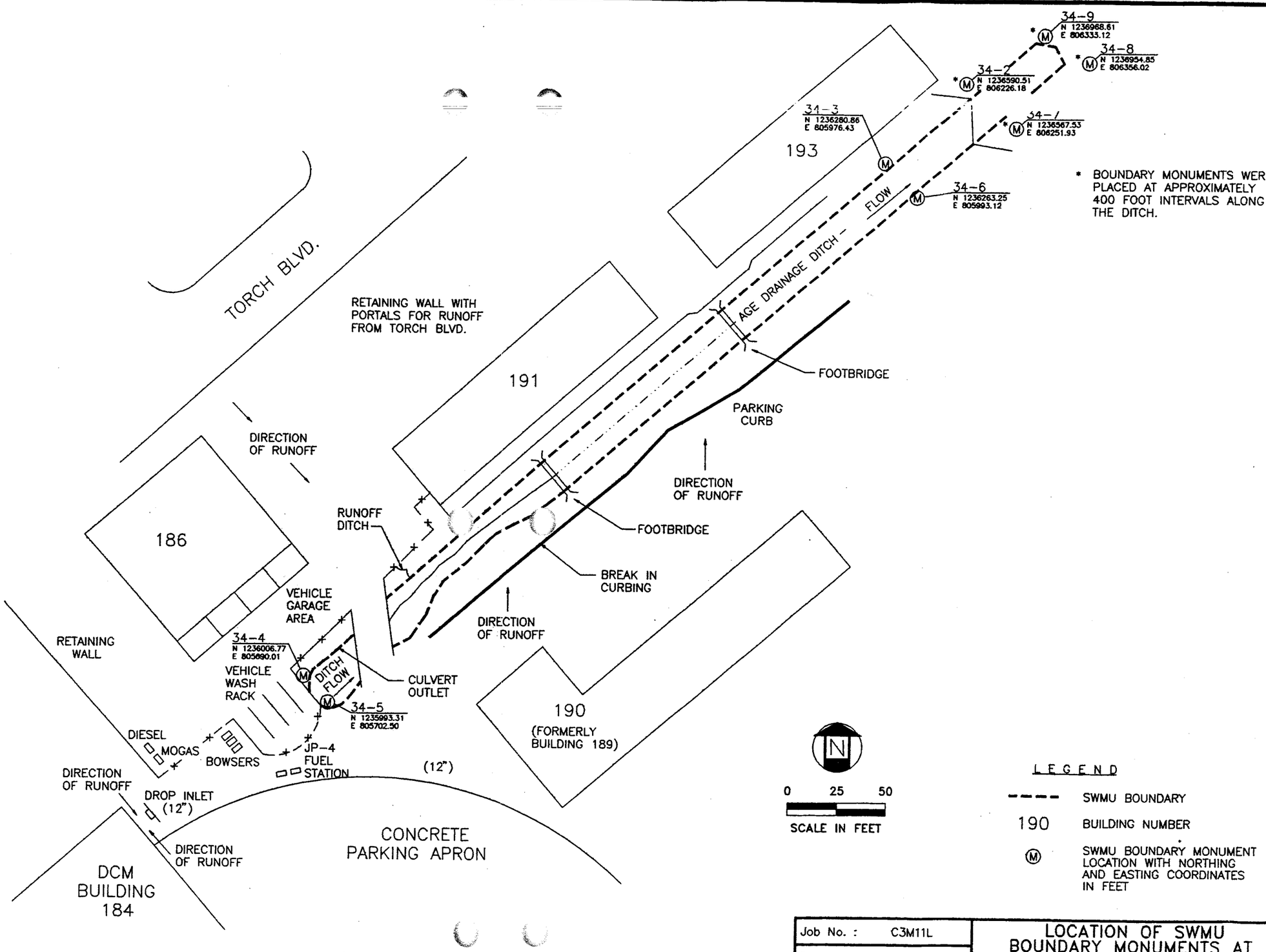
N

0 25 50
SCALE IN FEET

Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT SOLVENT DISPOSAL SITE SWMU NO. 81/IRP NO. DP-16 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

11L0A5

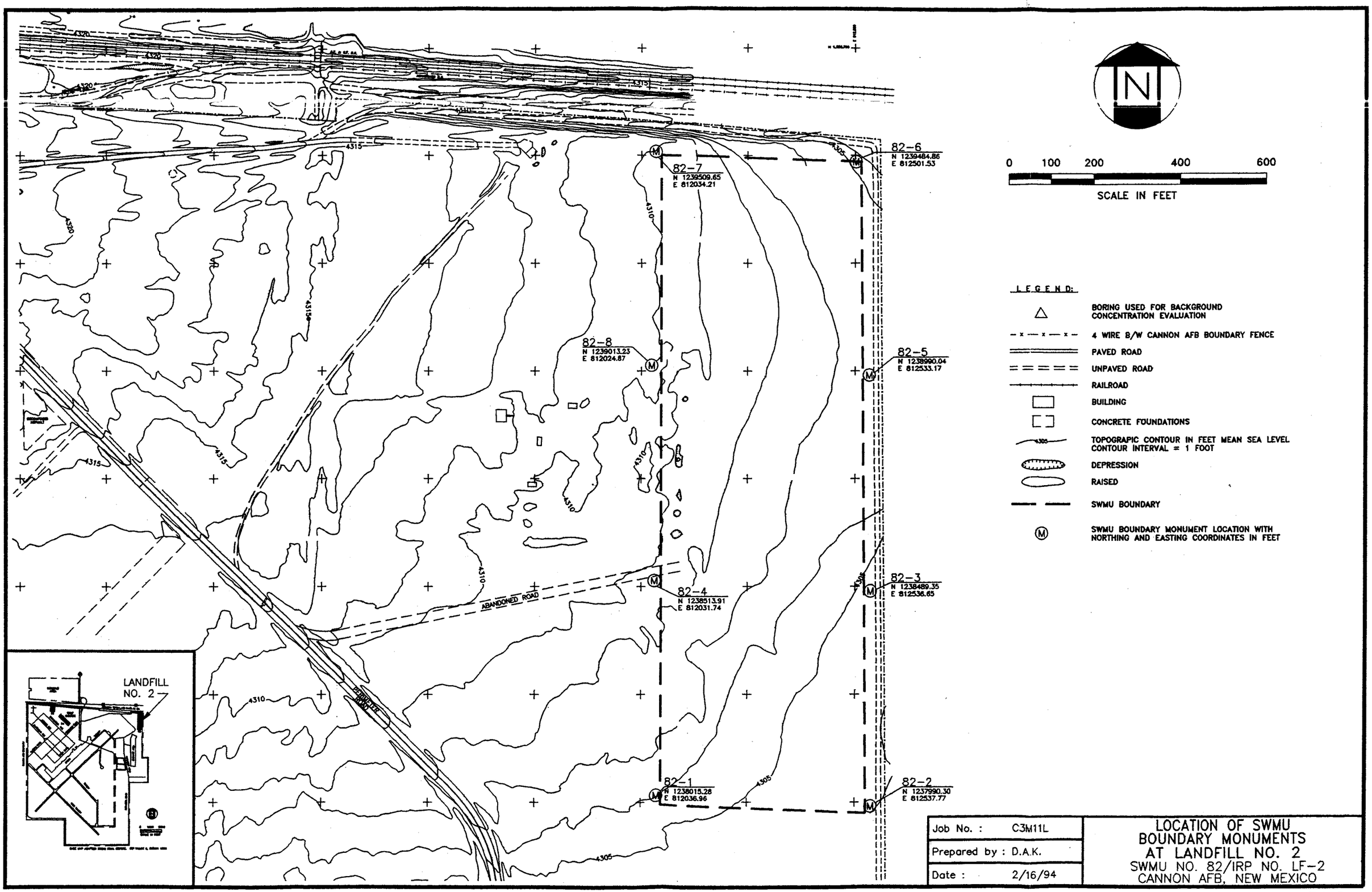
FIG. 4



Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT AGE DRAINAGE DITCH SWMU NO. 34/IRP NO. SD-15 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

11L0A15

FIG. 1

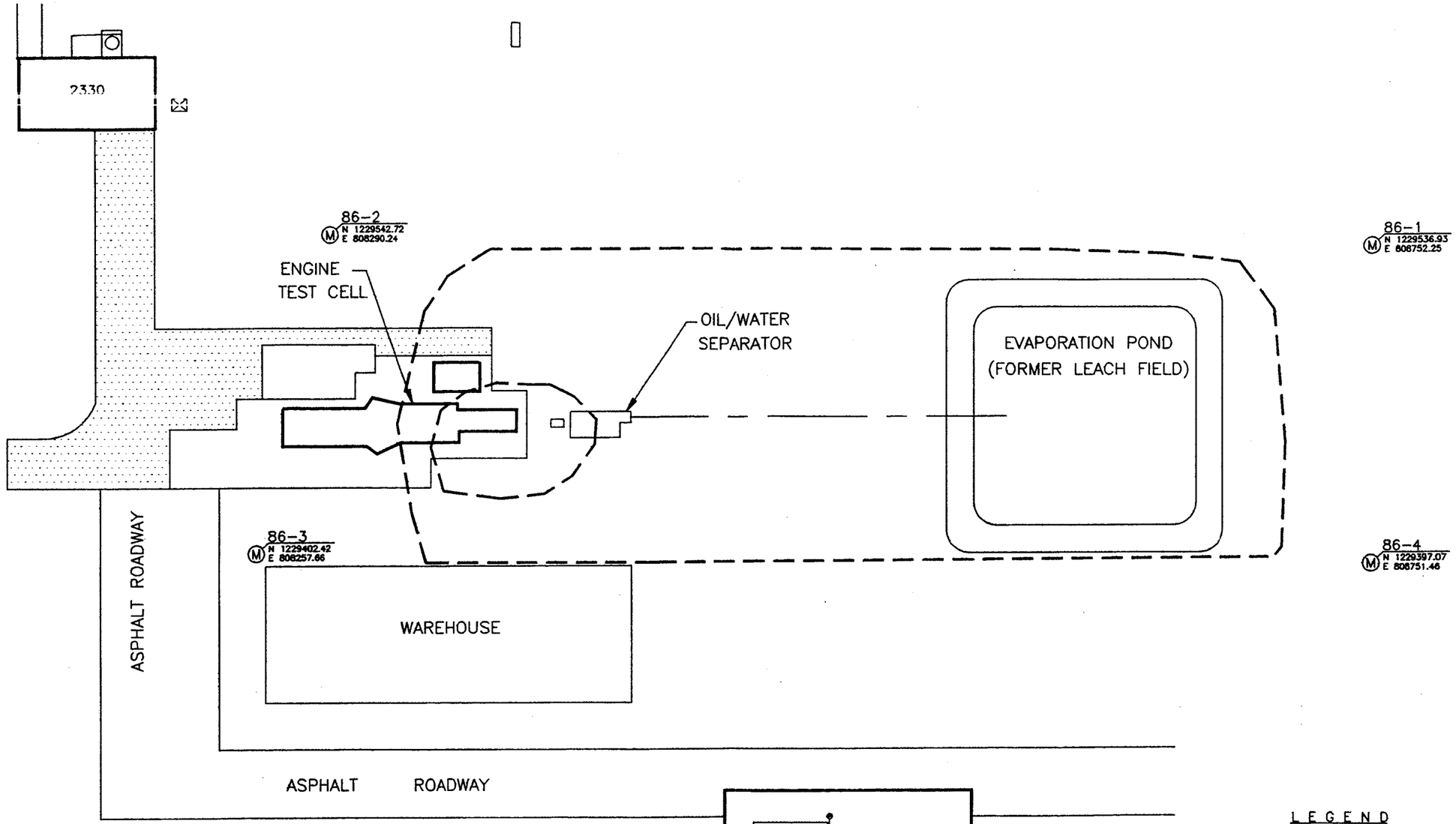


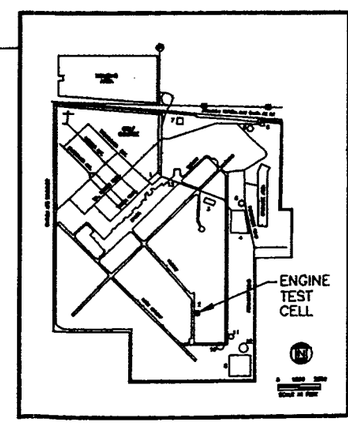
Job No. :	C3M11L
Prepared by :	D.A.K.
Date :	2/16/94

LOCATION OF SWMU BOUNDARY MONUMENTS AT LANDFILL NO. 2
SWMU NO. 82/IRP NO. LF-2
CANNON AFB, NEW MEXICO

11L0016

FIG. 5





N

0 25 50

SCALE IN FEET

LEGEND

— — SWMU BOUNDARY

2330 BUILDING NUMBER

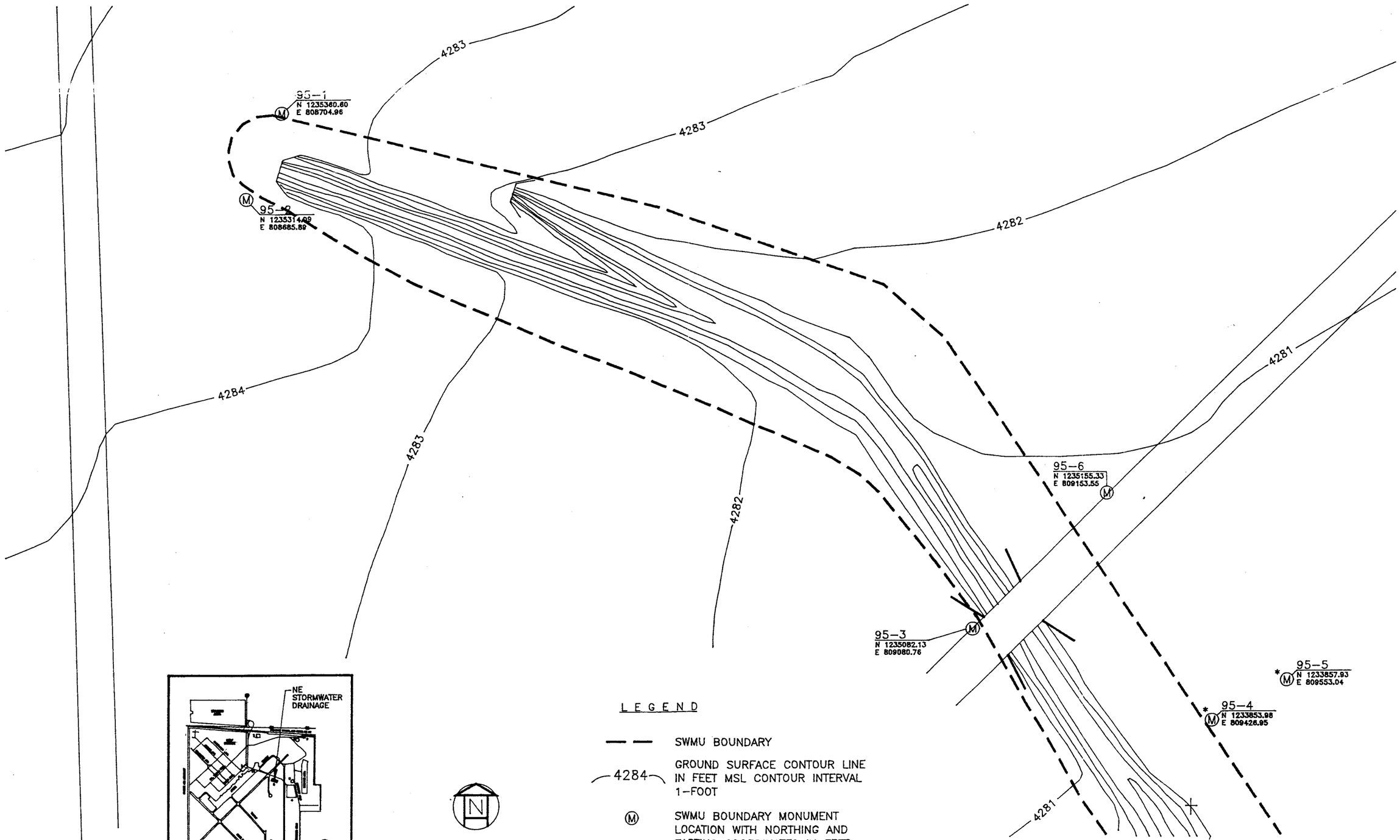
Ⓜ SWMU BOUNDARY MONUMENT LOCATION WITH NORTHING AND EASTING COORDINATES IN FEET

Job No. :	C3M11L
Prepared by :	D.A.K.
Date :	2/16/94

LOCATION OF SWMU BOUNDARY MONUMENTS AT ENGINE TEST CELL AREA
SWMU NOS. 86-90/IRP NO. SD-11
CANNON AFB, NEW MEXICO

FIG. 6

11L0A14



LEGEND

— — SWMU BOUNDARY

4284 GROUND SURFACE CONTOUR LINE IN FEET MSL CONTOUR INTERVAL 1-FOOT

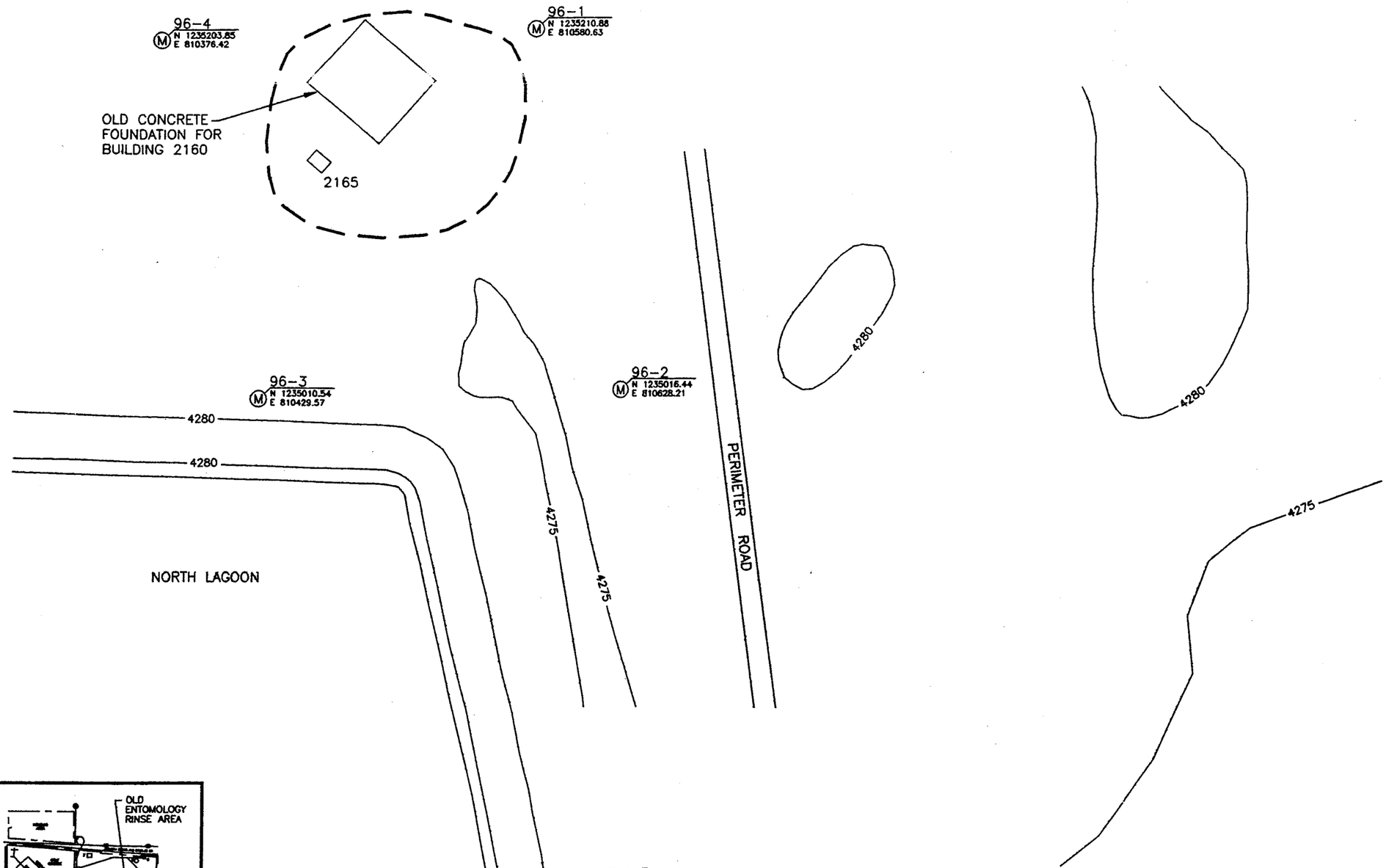
Ⓜ SWMU BOUNDARY MONUMENT LOCATION WITH NORTHING AND EASTING COORDINATES IN FEET

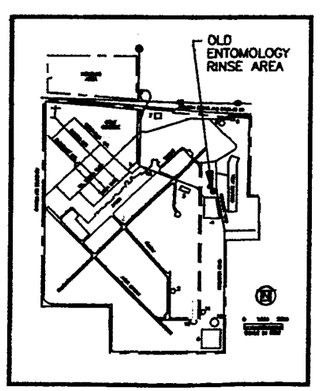
* TWO SWMU BOUNDARY MONUMENTS WERE PLACED AT THE SOUTHERN MOST EDGE OF THE DRAINAGE.

Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT NE STORMWATER DRAINAGE AREA SWMU NO. 95/IRP NO. SD-20 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

11L0A13

FIG. 7





N

0 30 60

SCALE IN FEET

LEGEND

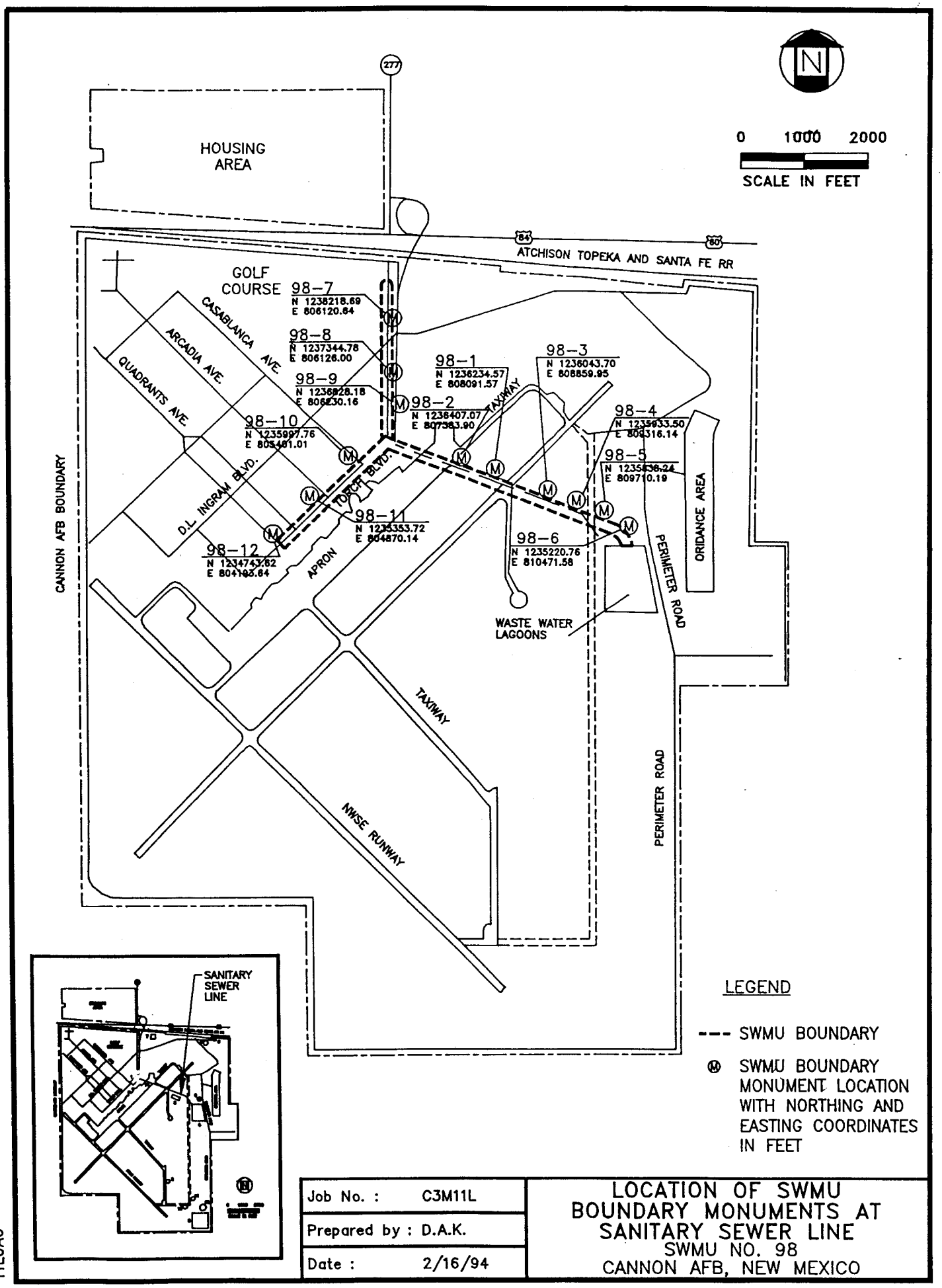
— — —	SWMU BOUNDARY
—4280—	GROUND SURFACE CONTOUR LINE IN FEET MSL CONTOUR INTERVAL = 5 FEET
2165	BUILDING NUMBER
Ⓜ	SWMU BOUNDARY MONUMENT LOCATION WITH NORTHING AND EASTING COORDINATES IN FEET

Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT OLD ENTOMOLOGY RINSE AREA SWMU NO. 96/IRP NO. SD-17 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

FIG. 8

E

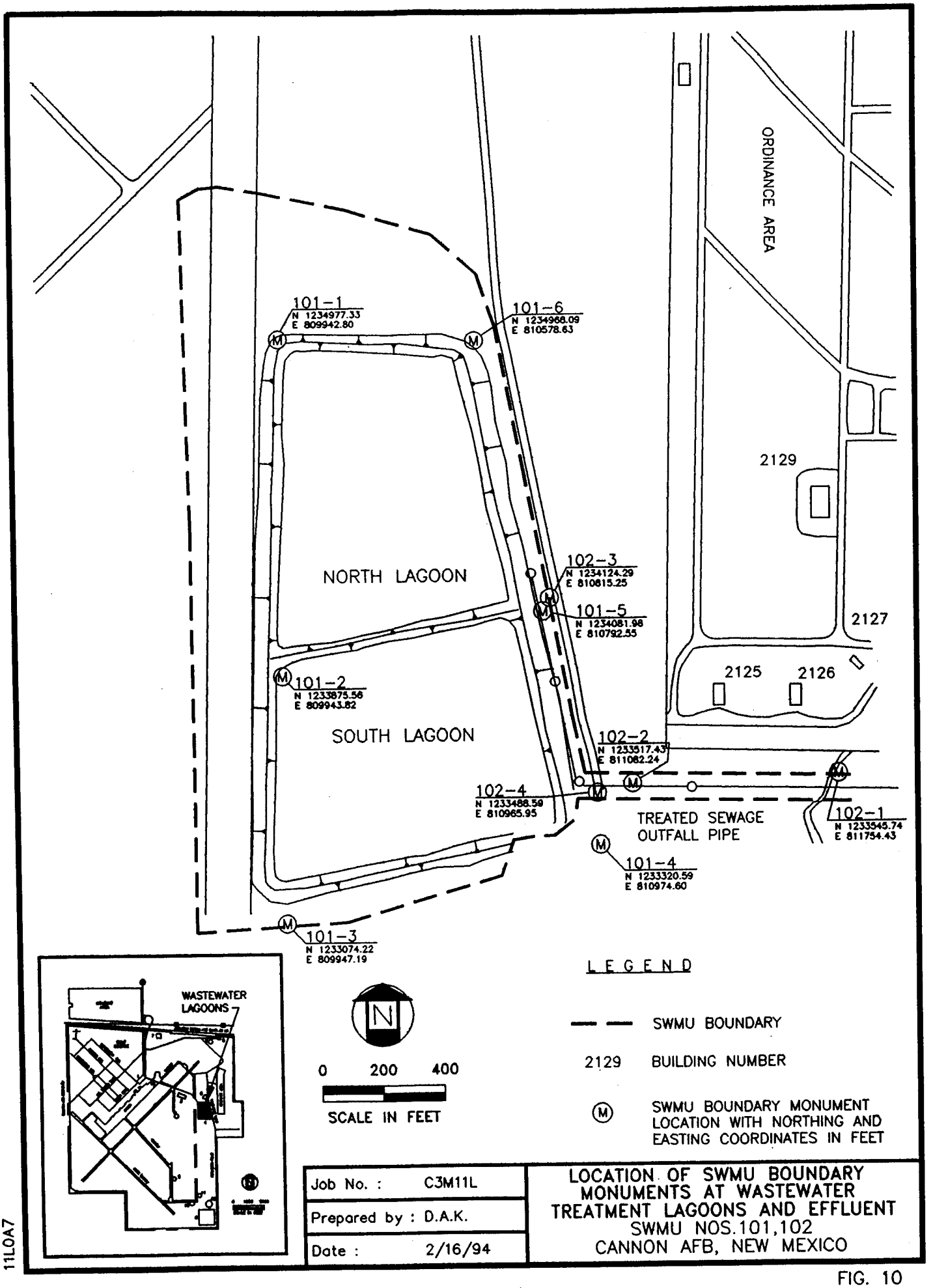
C1140A12



Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT SANITARY SEWER LINE SWMU NO. 98 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

11L0A6

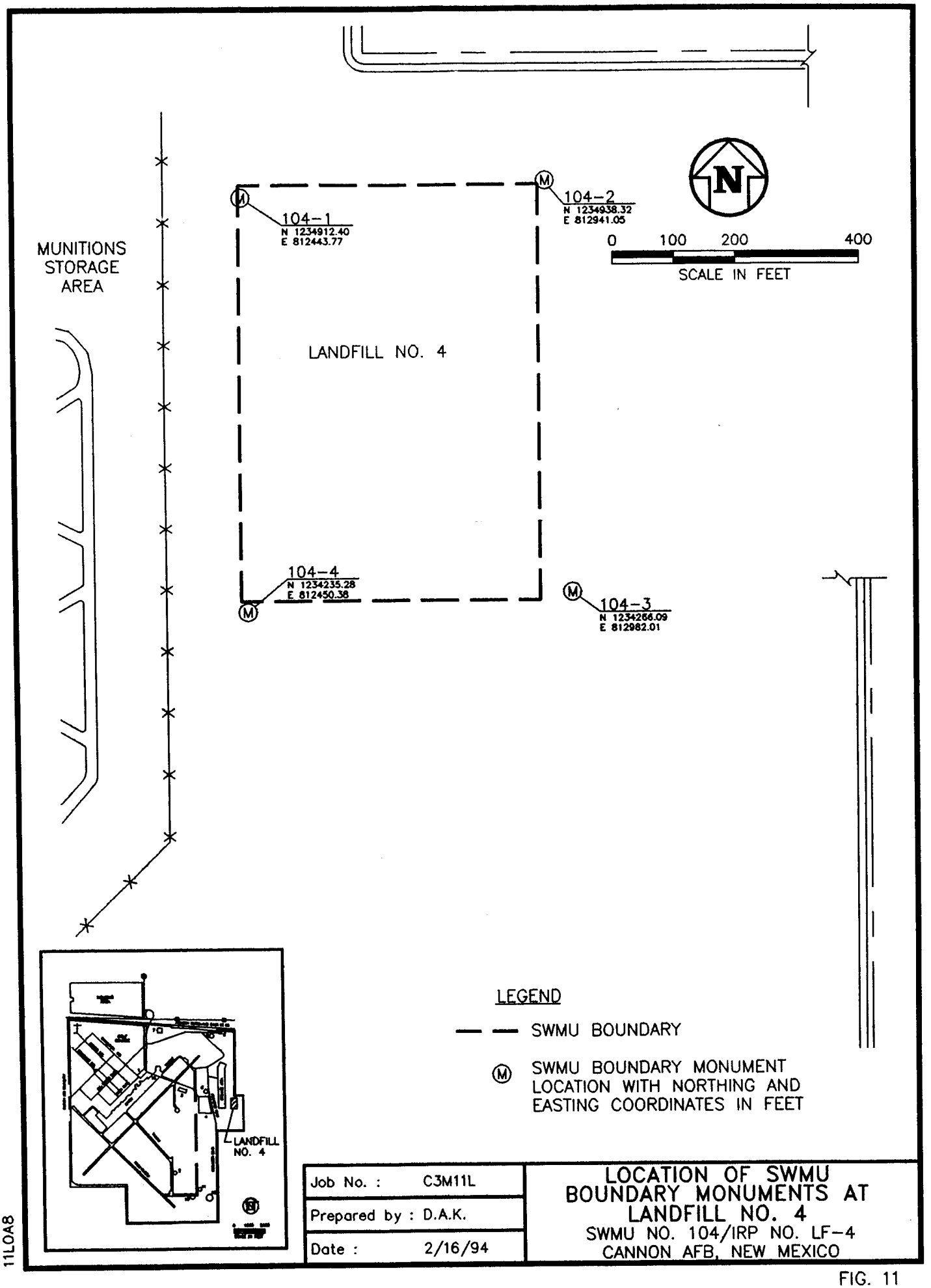
FIG. 9



Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT WASTEWATER TREATMENT LAGOONS AND EFFLUENT SWMU NOS.101,102 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

11L0A7

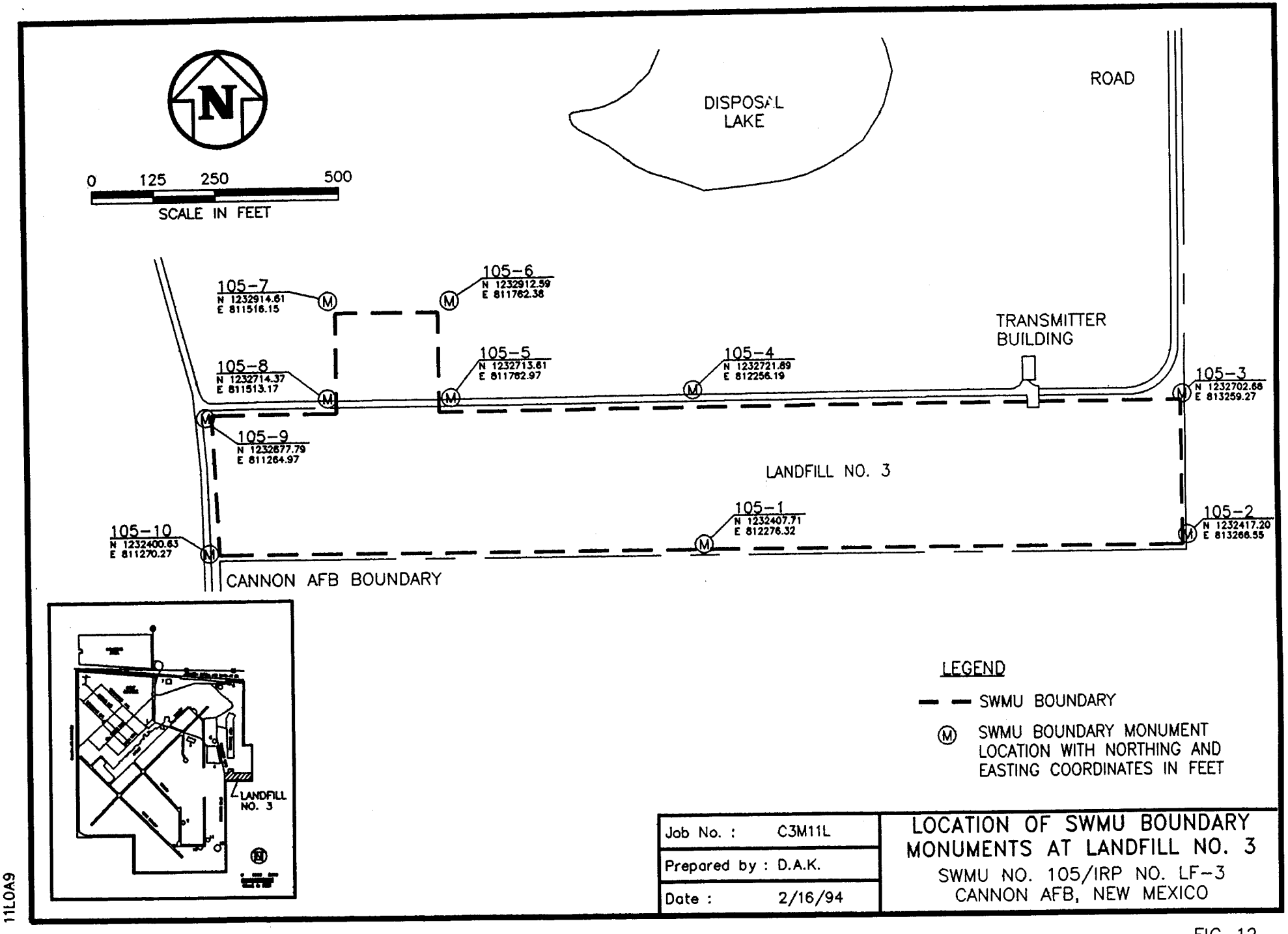
FIG. 10



Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT LANDFILL NO. 4
Prepared by : D.A.K.	SWMU NO. 104/IRP NO. LF-4
Date : 2/16/94	CANNON AFB, NEW MEXICO

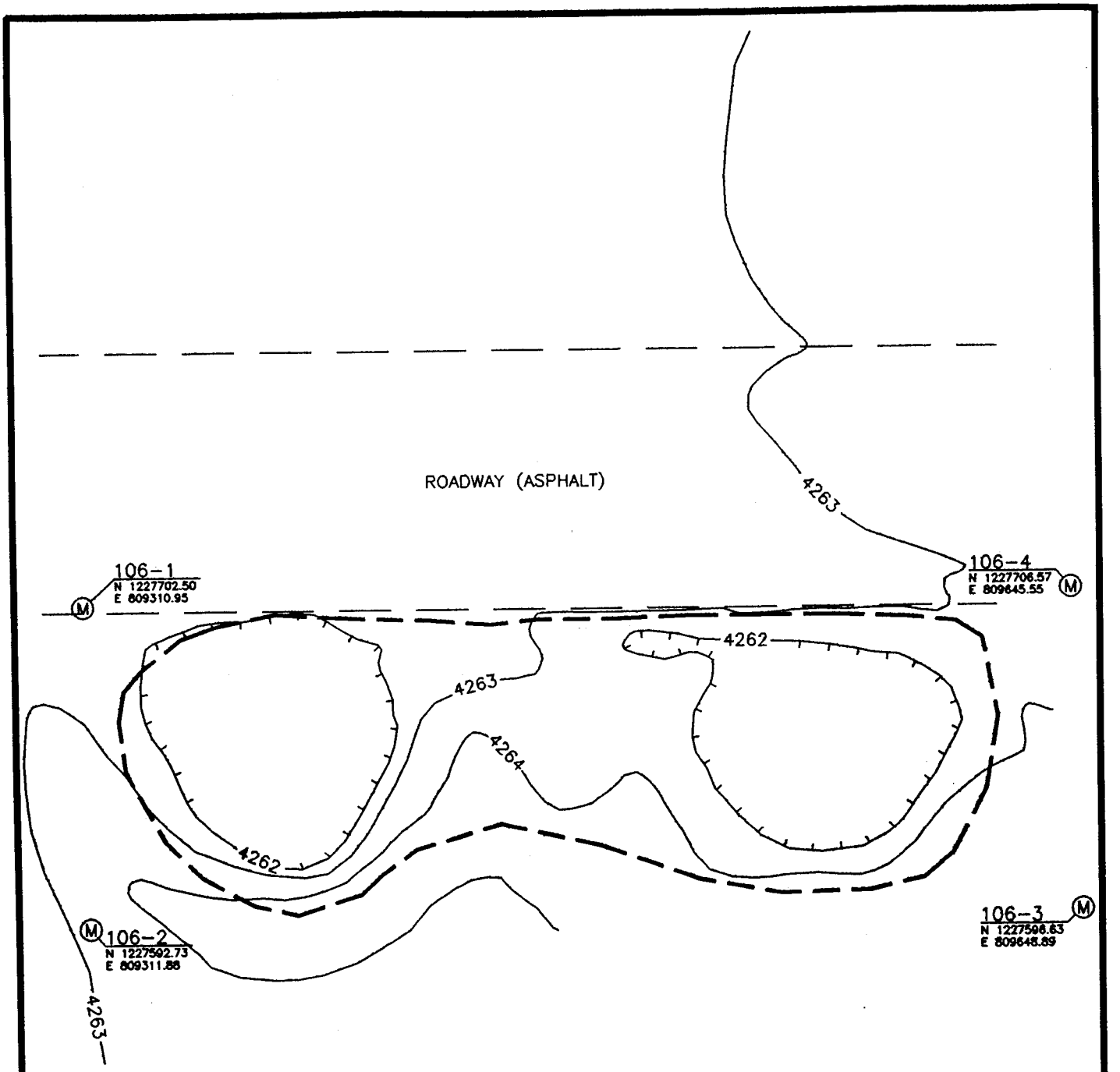
11LOA8

FIG. 11



11L0A9

FIG. 12



LEGEND

SWMU BOUNDARY

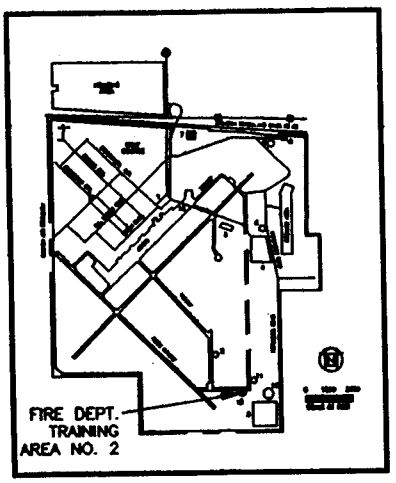
4263 GROUND SURFACE CONTOUR LINE IN FEET MSL
CONTOUR INTERVAL = 1 FOOT

M SWMU BOUNDARY MONUMENT LOCATION WITH NORTHING AND EASTING COORDINATES IN FEET

N

0 25 50

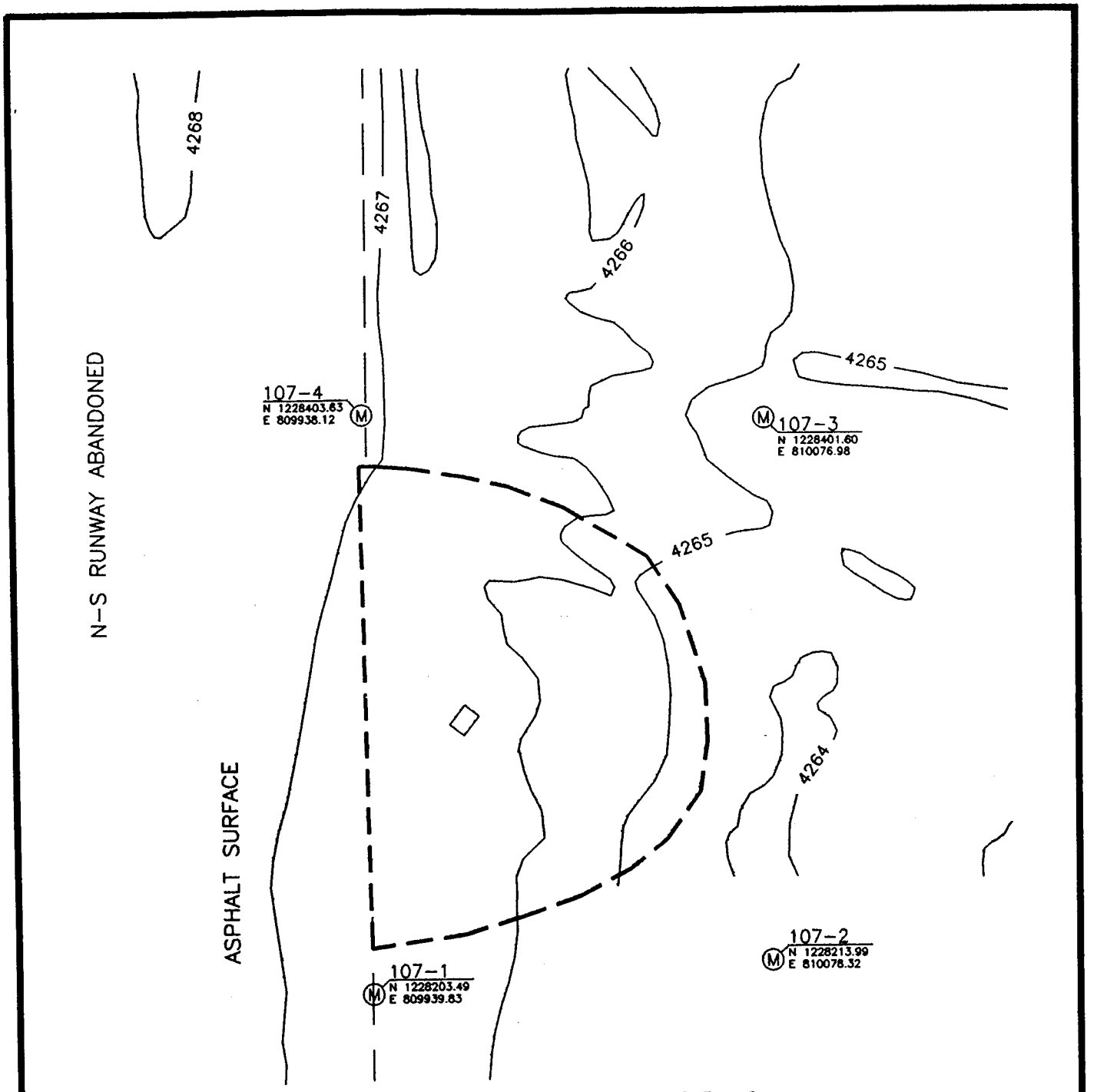
SCALE IN FEET

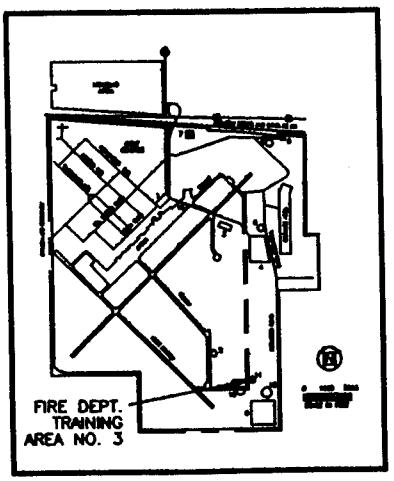


Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT FIRE DEPARTMENT TRAINING AREA NO. 2 SWMU NO. 106/IRP NO. FT-7 CANNON AFB, NEW MEXICO
Prepared by : D.A.K.	
Date : 2/16/94	

11LOA10

FIG. 13





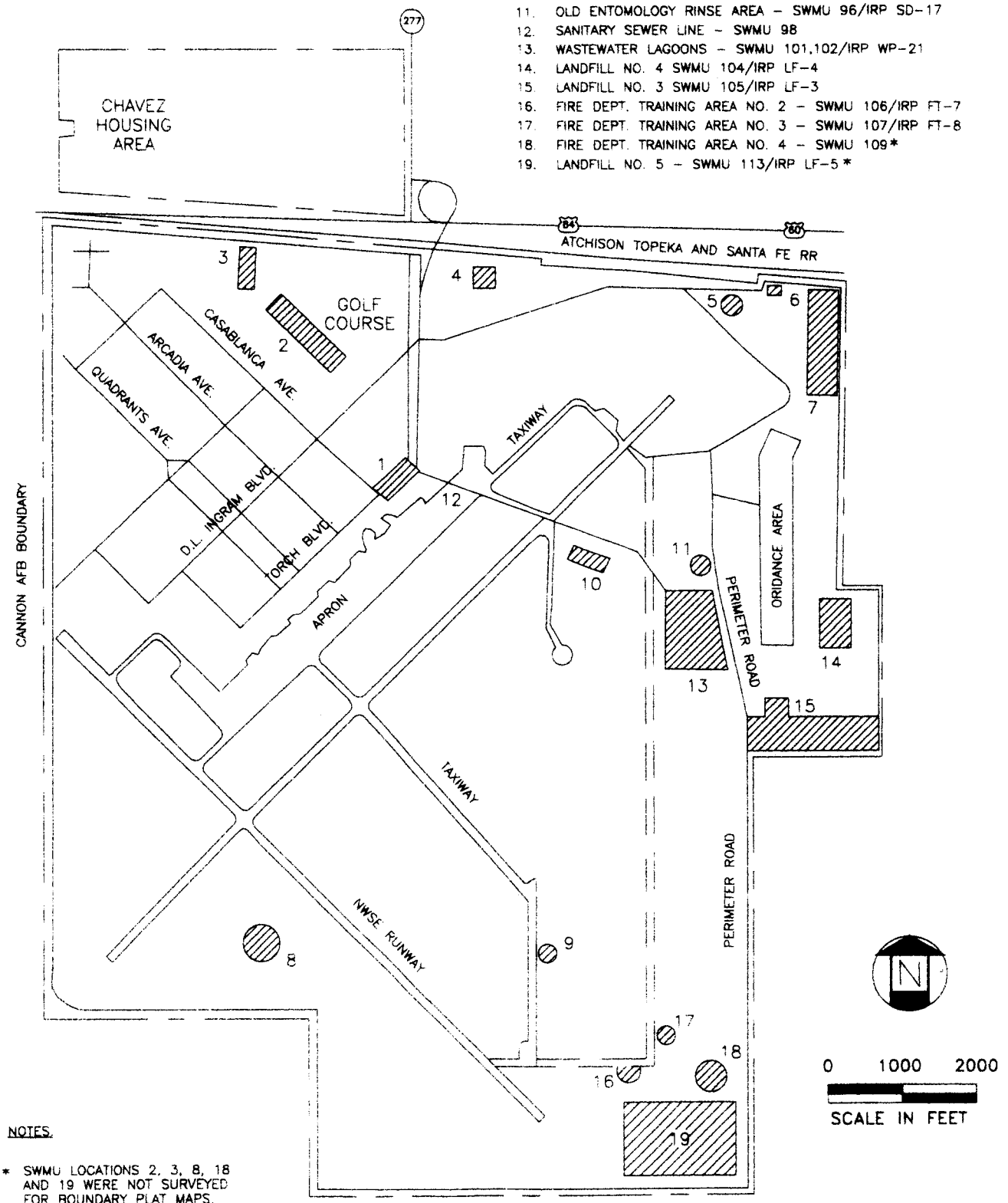
Job No. : C3M11L	LOCATION OF SWMU BOUNDARY MONUMENTS AT FIRE DEPARTMENT TRAINING AREA NO. 3
Prepared by : D.A.K.	SWMU NO. 107/IRP NO. FT-8
Date : 2/16/94	CANNON AFB, NEW MEXICO

11LOA11

FIG. 14

EXPLANATION

1. AGE DRAINAGE DITCH - SWMU 34/IRP SD-15
2. LANDFILL NO. 1 - SWMU 74/IRP LF-1*
3. SANITARY SEWAGE LIFT STATION OVERFLOW PIT SWMU 75/IRP SD-13*
4. SLUDGE WEATHERING PIT - SWMU 76/IRP WP-14
5. FIRE DEPT. TRAINING AREA NO. 1 SWMU 78/IRP FT-6
6. SOLVENT DISPOSAL SITE - SWMU 81/IRP DP-16
7. LANDFILL NO. 2 - SWMU 82/IRP LF-2
8. STORMWATER COLLECTION POINT SWMU 85/IRP SD-12*
9. ENGINE TEST CELL AREA - SWMU 86-90/IRP SD-11
10. NE STORMWATER DRAINAGE AREA - SWMU 95/IRP SD-20
11. OLD ENTOMOLOGY RINSE AREA - SWMU 96/IRP SD-17
12. SANITARY SEWER LINE - SWMU 98
13. WASTEWATER LAGOONS - SWMU 101,102/IRP WP-21
14. LANDFILL NO. 4 SWMU 104/IRP LF-4
15. LANDFILL NO. 3 SWMU 105/IRP LF-3
16. FIRE DEPT. TRAINING AREA NO. 2 - SWMU 106/IRP FT-7
17. FIRE DEPT. TRAINING AREA NO. 3 - SWMU 107/IRP FT-8
18. FIRE DEPT. TRAINING AREA NO. 4 - SWMU 109*
19. LANDFILL NO. 5 - SWMU 113/IRP LF-5*



NOTES.

* SWMU LOCATIONS 2, 3, 8, 18 AND 19 WERE NOT SURVEYED FOR BOUNDARY PLAT MAPS.

SWMU LOCATIONS 3 AND 8 ARE APPROXIMATELY LOCATED FROM CANNON AFB, BASE COMPREHENSIVE PLAN, TAB C-1E, SHEET 1, 18 MARCH 1991.

SOURCE: WCC, 1992

Job No. : C3M11L	APPENDIX I SOLID WASTE MANAGEMENT UNIT (SWMU) LOCATION MAP CANNON AFB, NEW MEXICO
Prepared by : J.T.A.	
Date : 1/3/95	

C3M11L0A

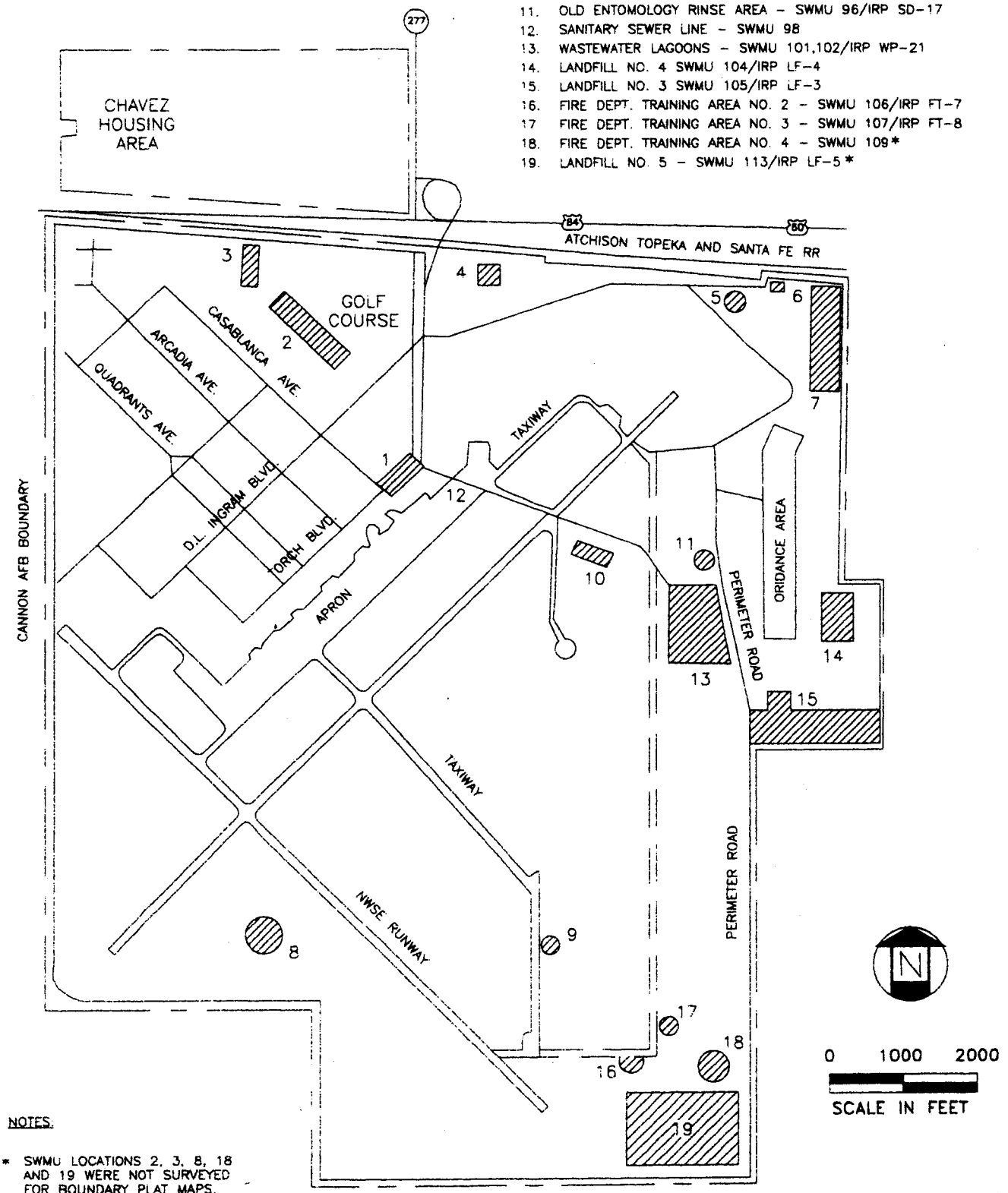
SWMU NUMBER	SWMU NAME	IRP Designation	Approximate Width (feet)	Approximate Length (feet)	Number of Monuments	Monument Number	Survey Northing (feet)	Survey Easting (feet)	PLAT Sheet Number
98	Sanitary Sewer Line		10	10,000	12	98-1	1,236,234.57	808,091.57	1
						98-2	1,236,407.07	807,383.90	
						98-3	1,236,043.70	808,859.95	
						98-4	1,235,933.50	809,316.14	
						98-5	1,235,838.24	809,710.19	
						98-6	1,235,220.76	810,471.58	
						98-7	1,238,218.69	806,120.64	
						98-8	1,237,344.78	806,126.00	
						98-9	1,236,628.18	806,230.16	
						98-10	1,235,997.76	805,401.10	
						98-11	1,235,353.72	804,780.14	
						98-12	1,234,743.62	804,193.64	
101	Wastewater Treatment Lagoons		1,150	2,000	6	101-1	1,234,977.33	809,942.80	3
						101-2	1,233,875.56	809,943.82	
						101-3	1,233,074.22	809,947.19	
						101-4	1,233,320.59	810,974.60	
						101-5	1,234,081.98	810,792.55	
						101-6	1,234,968.09	810,578.63	
102	Wastewater Treatment Effluent		10	1,400	4	102-1	1,233,545.74	811,754.43	2
						102-2	1,233,517.43	811,082.24	
						102-3	1,234,124.29	810,815.25	
						102-4	1,233,488.59	810,965.95	
104	Landfill No. 4	LF-4	540	700	4	104-1	1,234,912.40	812,443.77	2
						104-2	1,234,938.32	812,941.05	
						104-3	1,234,266.09	812,982.01	
						104-4	1,234,235.28	812,450.38	
105	Landfill No. 3	LF-3	300	2,000	10	105-1	1,232,407.71	812,276.32	3
						105-2	1,232,417.20	813,286.55	
						105-3	1,232,702.68	813,259.27	
						105-4	1,232,721.89	812,256.19	
						105-5	1,232,713.61	811,762.97	
						105-6	1,232,912.59	811,762.38	
						105-7	1,232,914.61	811,516.15	
						105-8	1,232,714.37	811,513.17	
						105-9	1,232,677.79	811,264.97	
						105-10	1,232,400.63	811,270.27	
106	Fire Department Training Area No. 2	FT-7	110	335	4	106-1	1,227,702.50	809,310.95	2
						106-2	1,227,592.73	809,311.88	
						106-3	1,227,596.63	809,648.89	
						106-4	1,227,706.57	809,645.55	
107	Fire Department Training Area No. 3	FT-8	140	200	4	107-1	1,228,203.49	809,939.83	2
						107-2	1,228,213.99	810,078.32	
						107-3	1,228,401.60	810,076.98	
						107-4	1,228,403.63	809,938.12	

SWMU Solid Waste Management Unit
IRP Installation Restoration Program

SWMU NUMBER	SWMU NAME	IRP Designation	Approximate Width (feet)	Approximate Length (feet)	Number of Monuments	Monument Number	Survey Northing (feet)	Survey Easting (feet)	PLAT Sheet Number
34	AGE Drainage Ditch	SD-15	20	1,200	8	34-2	1,236,590.51	806,226.18	2
						34-3	1,236,280.86	805,976.43	
						34-4	1,236,006.77	805,690.01	
						34-5	1,235,993.31	805,702.50	
						34-6	1,236,263.25	805,993.12	
						34-7	1,236,567.53	806,251.93	
						34-8	1,236,954.85	806,356.02	
						34-9	1,236,968.61	806,333.12	
76	Sludge Weathering Pit	WP-14	40	50	4	76-1	1,239,508.15	807,506.88	2
						76-2	1,239,468.14	807,510.32	
						76-3	1,239,510.83	807,554.70	
						76-4	1,239,471.15	807,558.01	
78	Fire Department Training Area No. 1	FT-6	100	100	4	78-1	1,239,348.40	810,902.01	2
						78-2	1,239,356.15	811,001.51	
						78-3	1,239,249.19	810,905.52	
						78-4	1,239,256.01	811,004.86	
81	Solvent Disposal Site	DP-16	100	100	4	81-1	1,239,428.30	811,249.56	2
						81-2	1,239,431.18	811,349.67	
						81-3	1,239,531.22	811,340.70	
						81-4	1,239,528.93	811,241.05	
82	Landfill No. 2	LF-2	500	1,500	8	82-1	1,238,015.28	812,036.96	2
						82-2	1,237,990.30	812,537.77	
						82-3	1,238,489.35	812,536.65	
						82-4	1,238,513.91	812,031.74	
						82-5	1,238,990.04	812,533.17	
						82-6	1,239,484.86	812,501.53	
						82-7	1,239,509.65	812,034.21	
						82-8	1,239,013.23	812,024.87	
86-90	Engine Test Cell	SD-11	140	500	4	86-1	1,229,536.93	808,752.25	2
						86-2	1,229,542.72	808,290.24	
						86-3	1,229,402.42	808,257.66	
						86-4	1,229,397.07	808,751.46	
95	NE Stormwater Drainage Area	SD-20	50	1850	6	95-1	1,235,360.60	808,704.96	3
						95-2	1,235,314.09	808,685.89	
						95-3	1,235,082.13	809,080.76	
						95-4	1,233,853.98	809,426.95	
						95-5	1,233,857.93	809,553.04	
						95-6	1,235,155.33	809,153.55	
96	Old Entomology Rinse Area	SD-17	200	200	4	96-1	1,235,210.88	810,580.63	3
						96-2	1,235,016.44	810,628.21	
						96-3	1,235,010.54	810,429.57	
						96-4	1,235,203.85	810,376.42	

EXPLANATION

1. AGE DRAINAGE DITCH - SWMU 34/IRP SD-15
2. LANDFILL NO. 1 - SWMU 74/IRP LF-1*
3. SANITARY SEWAGE LIFT STATION OVERFLOW PIT SWMU 75/IRP SD-13*
4. SLUDGE WEATHERING PIT - SWMU 76/IRP WP-14
5. FIRE DEPT. TRAINING AREA NO. 1 SWMU 78/IRP FT-6
6. SOLVENT DISPOSAL SITE - SWMU 81/IRP DP-16
7. LANDFILL NO. 2 - SWMU 82/IRP LF-2
8. STORMWATER COLLECTION POINT SWMU 85/IRP SD-12*
9. ENGINE TEST CELL AREA - SWMU 86-90/IRP SD-11
10. NE STORMWATER DRAINAGE AREA - SWMU 95/IRP SD-20
11. OLD ENTOMOLOGY RINSE AREA - SWMU 96/IRP SD-17
12. SANITARY SEWER LINE - SWMU 98
13. WASTEWATER LAGOONS - SWMU 101,102/IRP WP-21
14. LANDFILL NO. 4 SWMU 104/IRP LF-4
15. LANDFILL NO. 3 SWMU 105/IRP LF-3
16. FIRE DEPT. TRAINING AREA NO. 2 - SWMU 106/IRP FT-7
17. FIRE DEPT. TRAINING AREA NO. 3 - SWMU 107/IRP FT-8
18. FIRE DEPT. TRAINING AREA NO. 4 - SWMU 109*
19. LANDFILL NO. 5 - SWMU 113/IRP LF-5*



NOTES:

* SWMU LOCATIONS 2, 3, 8, 18 AND 19 WERE NOT SURVEYED FOR BOUNDARY PLAT MAPS.

SWMU LOCATIONS 3 AND 8 ARE APPROXIMATELY LOCATED FROM CANNON AFB, BASE COMPREHENSIVE PLAN, TAB C-1E, SHEET 1, 18 MARCH 1991.

SOURCE: WCC, 1992

Job No. : C3M11L	APPENDIX I SOLID WASTE MANAGEMENT UNIT (SWMU) LOCATION MAP CANNON AFB, NEW MEXICO
Prepared by : J.T.A.	
Date : 1/3/95	

C3M11UA

SWMU NUMBER	SWMU NAME	IRP Designation	Approximate Width (feet)	Approximate Length (feet)	Number of Monuments	Monument Number	Survey Northing (feet)	Survey Easting (feet)	PLAT Sheet Number
98	Sanitary Sewer Line		10	10,000	12	98-1	1,236,234.57	808,091.57	1
						98-2	1,236,407.07	807,383.90	
						98-3	1,236,043.70	808,859.95	
						98-4	1,235,933.50	809,316.14	
						98-5	1,235,838.24	809,710.19	
						98-6	1,235,220.76	810,471.58	
						98-7	1,238,218.69	806,120.64	
						98-8	1,237,344.78	806,126.00	
						98-9	1,236,828.18	806,230.16	
						98-10	1,235,997.76	805,401.10	
						98-11	1,235,353.72	804,780.14	
						98-12	1,234,743.62	804,193.64	
101	Wastewater Treatment Lagoons		1,150	2,000	6	101-1	1,234,977.33	809,942.80	3
						101-2	1,233,875.56	809,943.82	
						101-3	1,233,074.22	809,947.19	
						101-4	1,233,320.59	810,974.60	
						101-5	1,234,081.98	810,792.55	
						101-6	1,234,968.09	810,578.63	
102	Wastewater Treatment Effluent		10	1,400	4	102-1	1,233,545.74	811,754.43	2
						102-2	1,233,517.43	811,082.24	
						102-3	1,234,124.29	810,815.25	
						102-4	1,233,488.59	810,965.95	
104	Landfill No. 4	LF-4	540	700	4	104-1	1,234,912.40	812,443.77	2
						104-2	1,234,938.32	812,941.05	
						104-3	1,234,266.09	812,982.01	
						104-4	1,234,235.28	812,450.38	
105	Landfill No. 3	LF-3	300	2,000	10	105-1	1,232,407.71	812,276.32	3
						105-2	1,232,417.20	813,266.55	
						105-3	1,232,702.68	813,259.27	
						105-4	1,232,721.89	812,256.19	
						105-5	1,232,713.61	811,762.97	
						105-6	1,232,912.59	811,762.38	
						105-7	1,232,914.61	811,516.15	
						105-8	1,232,714.37	811,513.17	
						105-9	1,232,677.79	811,264.97	
						105-10	1,232,400.63	811,270.27	
106	Fire Department Training Area No. 2	FT-7	110	335	4	106-1	1,227,702.50	809,310.95	2
						106-2	1,227,592.73	809,311.88	
						106-3	1,227,596.63	809,648.89	
						106-4	1,227,706.57	809,645.55	
107	Fire Department Training Area No. 3	FT-8	140	200	4	107-1	1,228,203.49	809,939.83	2
						107-2	1,228,213.99	810,078.32	
						107-3	1,228,401.60	810,076.98	
						107-4	1,228,403.63	809,938.12	

SWMU Solid Waste Management Unit
IRP Installation Restoration Program

SWMU NUMBER	SWMU NAME	IRP Designation	Approximate Width (feet)	Approximate Length (feet)	Number of Monuments	Monument Number	Survey Northing (feet)	Survey Easting (feet)	PLAT Sheet Number
34	AGE Drainage Ditch	SD-15	20	1,200	8	34-2	1,236,590.51	806,226.18	2
						34-3	1,236,280.86	805,976.43	
						34-4	1,236,006.77	805,690.01	
						34-5	1,235,993.31	805,702.50	
						34-6	1,236,263.25	805,993.12	
						34-7	1,236,567.53	806,251.93	
						34-8	1,236,954.85	806,356.02	
						34-9	1,236,968.61	806,333.12	
76	Sludge Weathering Pit	WP-14	40	50	4	76-1	1,239,508.15	807,506.88	2
						76-2	1,239,468.14	807,510.32	
						76-3	1,239,510.83	807,554.70	
						76-4	1,239,471.15	807,558.01	
78	Fire Department Training Area No. 1	FT-6	100	100	4	78-1	1,239,348.40	810,902.01	2
						78-2	1,239,356.15	811,001.51	
						78-3	1,239,249.19	810,905.52	
						78-4	1,239,256.01	811,004.86	
81	Solvent Disposal Site	DP-16	100	100	4	81-1	1,239,428.30	811,249.56	2
						81-2	1,239,431.18	811,349.67	
						81-3	1,239,531.22	811,340.70	
						81-4	1,239,528.93	811,241.05	
82	Landfill No. 2	LF-2	500	1,500	8	82-1	1,238,015.28	812,036.96	2
						82-2	1,237,990.30	812,537.77	
						82-3	1,238,489.35	812,536.65	
						82-4	1,238,513.91	812,031.74	
						82-5	1,238,990.04	812,533.17	
						82-6	1,239,484.86	812,501.53	
						82-7	1,239,509.65	812,034.21	
						82-8	1,239,013.23	812,024.87	
86-90	Engine Test Cell	SD-11	140	500	4	86-1	1,229,536.93	808,752.25	2
						86-2	1,229,542.72	808,290.24	
						86-3	1,229,402.42	808,257.86	
						86-4	1,229,397.07	808,751.46	
95	NE Stormwater Drainage Area	SD-20	50	1850	6	95-1	1,235,360.60	808,704.96	3
						95-2	1,235,314.09	808,685.89	
						95-3	1,235,082.13	809,080.76	
						95-4	1,233,853.98	809,426.95	
						95-5	1,233,857.93	809,553.04	
						95-6	1,235,155.33	809,153.55	
96	Old Entomology Rinse Area	SD-17	200	200	4	96-1	1,235,210.88	810,580.63	3
						96-2	1,235,016.44	810,628.21	
						96-3	1,235,010.54	810,429.57	
						96-4	1,235,203.85	810,376.42	