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

FEB 2 2 2012

Colonel David C. Piech
Commander
110 E Sextant Avenue Suite 1098
Cannon AFB NM 88103

MAR 2012

Ms. Lane Andress
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Bldg 1
Santa Fe NM 87505-6063

Dear Ms. Andress

Attached is the Additional Investigation Report associated with the *Phase II Supplemental Assessment at Area of Concern A (SS-19), Cannon AFB, New Mexico, January 2012.* If you have any questions regarding this submittal, please contact Mr. Ronald Lancaster, Chief, Asset Management Flight at (575) 784-1146 or Mr. Matthew Higginbotham, Restoration Program Manager at (575) 784-1092.

Sincerely

DAVID C. PIECH, Colonel, USAF

Attachment:
Investigation Report

cc:
Environmental Protection Agency, Region VI, Ms. Wendy Jacques w/o Attachment

PHASE II SUPPLEMENTAL ASSESSMENT AT AREA OF CONCERN A (SS-19)

CANNON AIR FORCE BASE
NEW MEXICO

November 2012

Prepared for:

Air Force Special Operations Command

27th Special Operations Wing

Under contract to:

Air Force Civil Engineer Center

URS
12120 Shamrock Plaza, Suite 300
Omaha, Nebraska 68154

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AOC	Area of Concern
bgs	below ground surface
BISON	Biota Information System of New Mexico
BRA	Baseline Risk Assessment
CAC	corrective action complete
COC	chain-of-custody
DAF	dilution attenuation factor
DoD ELAP	Department of Defense Environmental Laboratory Accreditation Program
DQO	Data Quality Objective
EMAX	EMAX Laboratories, Inc.
ERA	Ecological Risk Assessment
ERP	Environmental Restoration Program
ESL	ecological screening level
eV	electron volt
FS	Feasibility Study
GEM	golf course management
GPS	global positioning system
HWB	Hazardous Waste Bureau
HQ	hazard quotient
IDW	investigation-derived waste
INRMP	Integrated Natural Resources Management Plan
J	estimated value
LANL	Los Alamos National Laboratory
mg/kg	milligrams per kilogram
MOGAS	motor gasoline
MS/MSD	matrix spike/matrix spike duplicate

NAD83	North American Datum of 1983
NFA	No Further Action
NMACP	New Mexico Avian Conservation Partners
NMED	New Mexico Environment Department
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QAPP	Quality Assurance Project Plan
QC	quality control
Radian	Radian Corporation
SCFS	sample collection field sheet
SOP	standard operating procedure
SSL	soil screening level
SVOC	semivolatile organic compound
TRV	toxicity reference values
URS	URS Group, Inc.
URSGWC	URS Greiner Woodward-Clyde
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTL	upper tolerance limit
VOC	volatile organic compound
W-C	Woodward-Clyde
WPA	work plan addendum

This document presents results of the Phase II Supplemental Assessment at Area of Concern (AOC) A (SS-19) at Cannon Air Force Base (AFB) near Clovis, New Mexico. This assessment was completed in order to obtain additional data to more accurately characterize surface soil in the drainage swale along Kermit Evans Avenue at AOC A (SS-19).

1.1 AUTHORITY

URS Group, Inc. (URS) has been contracted by the Air Force Civil Engineer Center (AFCEC) under Contract Number FA8903-08-D-8783, Task Order 0170 to complete a Phase II Supplemental Assessment at AOC A (SS-19). This Phase II Supplemental Assessment is being addressed under the Environmental Restoration Program (ERP) for Cannon AFB.

1.2 PURPOSE AND SCOPE

The purpose of this supplemental assessment is to obtain the information necessary to determine the presence or absence of lead contamination in surface soil that may pose an unacceptable risk to human health or the environment at AOC A (SS-19).

This report describes the field activities completed for the supplemental assessment at AOC A (SS-19), presents the results obtained from laboratory analysis, provides a screening-level risk evaluation, and provides a summary and recommendations for the site. The sections of this report are organized as follows:

- **Section 1** provides an introduction, background information, information from previous investigations, and data quality objectives (DQOs) for the project.
- **Section 2** describes field sampling procedures used to complete the field activities.
- **Section 3** describes the chemical results, nature and extent of contamination, and screening-level risk evaluation.
- **Section 4** consists of a summary and recommendations for the site.
- **Section 5** provides a list of the references used to produce this report.

The appendices contain the following information:

- **Appendix A** contains the Base Civil Engineering Work Clearance Request (AF Form 103 – Modified for Cannon AFB).
- **Appendix B** contains the sample collection field sheets (SCFSs).
- **Appendix C** contains the fieldwork photographic log.
- **Appendix D** contains the analytical data, laboratory results, field duplicate results, data reviews, qualified data table, and chain of custody (COC).

- **Appendix E** contains the New Mexico Environment Department (NMED) soil screening levels (SSLs).
- **Appendix F** contains the Los Alamos National Laboratory (LANL) ecological screening levels (ESLs).
- **Appendix G** contains the Scoping Site Assessment and Ecological Exclusion Criteria Checklists, a table, and related figures.
- **Appendix H** contains the Final Supplemental Assessment of AOCs A, B, and C.
- **Appendix I** contains the Site Risk and Site Hazard Index calculations.
- **Appendix J** contains NMED's Refined Ecological Risk Assessment (ERA) for AOC A (SS-19).

1.3 FACILITY/SITE DESCRIPTION AND BACKGROUND

This section provides a site description, background information and a summary of the results of previous investigations at AOC A (SS-19).

1.3.1 Cannon AFB Facility Description

The Cannon AFB facility description was provided previously in the Supplemental Assessment of Areas of Concern A, B, and C Work Plan (URS 2005a) and the Supplemental Assessment of Areas of Concern A, B, and C Final Report (URS 2005b). An installation location map of Cannon AFB is provided as **Figure 1-1**.

1.3.2 AOC A (SS-19) Site Description and Background

AOC A (SS-19) is located southeast of Building 444 in the north-central region of Cannon AFB, as shown on the Site Location Plan (**Figure 1-2**). The site dimensions and its immediate vicinity, with previous soil sample locations, are shown on **Figure 1-3**. The site is relatively flat and much of it is asphalt-paved with a small drainage swale running to the southeast through a grassy area in the southern portion of the site. AOC A (SS-19) is the site of two motor gasoline (MOGAS) spills from overturned fuel trucks. Both spills occurred in the early 1960s at the present location of Kermit Evans Avenue (formerly Argentia Avenue), across from the refueling area of Facility No. 379, southeast of Building 444. The total quantity of MOGAS spilled is estimated to be 2,000 to 3,000 gallons. No attempts were made to recover the fuel or to excavate and replace contaminated soils. The fire department reportedly washed down the area after the two spills occurred (CH2M Hill 1983).

1.3.3 AOC A (SS-19) Previous Investigation Results

In 1984, two soil borings were drilled to 60 feet below ground surface (bgs) and sampled as part of a Phase II, Stage 1 investigation conducted by Radian Corporation (Radian) at AOC A (SS-19) (Radian 1986). Three soil samples from each boring were analyzed for oil and grease, lead, and purgeable aromatics. Lead, and one purgeable organic compound (1,2-dichloroethene, detected at a concentration of 2.37E+02 micrograms per kilogram [µg/kg] in a duplicate [19A-1A] but not in the associated sample), were present in relatively low concentrations (i.e., all concentrations are below the current NMED residential SSLs). No oil and grease was detected in any of the samples (Radian 1986). Following a No Further Action (NFA) proposal (URSGWC 2000), AOC A (SS-19) was listed as a site that did not yet qualify for NFA approval based on the previous investigation results (NMED 2004). Results of the December 1984 investigation at AOC A (SS-19) are provided in **Table 1-1** (summary of samples collected), **Table 1-2** (summary of the analytical results), and **Table 1-3** (analytical data screening results).

In February 2005, four soil borings, as shown on **Figure 1-3**, were drilled to depths of 9.8, 23.2, 23.4, and 24.5 feet bgs in the vicinity of the spill site using hollow-stem augers. Soil samples were collected using split spoon samplers at approximately 5-foot intervals beginning at about 1 foot bgs. Since field screening and observations did not indicate possible contamination, the two deepest samples from each boring were submitted for analysis (i.e., a total of eight samples). Eleven volatile organic compounds (VOCs) were detected in the eight samples collected at AOC A (SS-19) in February 2005. Ten of the 11 compounds were present only in concentrations below or just slightly above the reporting limits. The exception, toluene, was present at a maximum concentration of 4.70E-02 milligrams per kilogram (mg/kg), which is well below the NMED residential screening level of 5.57E+03 mg/kg (NMED 2012). Despite being present in concentrations near the reporting limits, seven of the eight chloroform concentrations identified in samples from AOC A (SS-19) exceeded the generic NMED SSL for the migration to groundwater pathway. Based on this, a site-specific dilution attenuation factor (DAF) for AOC A (SS-19) was calculated using NMED guidelines (NMED 2005). The site-specific DAF and SSL for the migration to groundwater pathway were calculated to be 30.2 and 1.25E-02 mg/kg, respectively (URS 2005b). The NMED-approved, site-specific chloroform DAF and SSL calculations for contaminant migration to groundwater are provided in Section 5.4.3 on page 5-3 of the Final Supplemental Assessment of AOCs A, B, and C (see **Appendix H**). This site-specific SSL was above the maximum concentration identified at AOC A (1.20E-02 mg/kg). No semivolatile organic compounds (SVOCs) were detected in any of the eight samples collected at AOC A (SS-19). Lead was detected in all eight samples collected at AOC A (SS-19) in February 2005. The maximum lead concentration (5.90E+00 mg/kg) was well below the NMED residential screening level for lead (4.00E+02 mg/kg) (NMED 2012) and below the background Upper Tolerance Limit (UTL) for lead in subsurface soil (8.70E+00 mg/kg) (W-C 1997). Based on these results and on previous sampling results, where all concentrations were below current NMED residential SSLs, no further risk screening was recommended for AOC A (SS-19) (URS 2005b). Results of the February 2005 investigation at AOC A (SS-19) are provided in **Tables 1-**

1, **1-2**, and **1-3**. The complete set of analytical results is included in Appendix C of the Supplemental Assessment of Areas of Concern, A, B, and C Final Report (URS 2005b).

In July 2008, AOC A (SS-19) was proposed for corrective action complete (CAC) without controls; however, NMED responded, via a letter dated September 14, 2009, that the site could not yet be considered for CAC status (NMED 2009). The letter stated that lead results from surface soil samples collected by Radian in 1984 (shown in red on **Figure 1-3**) were used by NMED in an ecological risk screen. These soil samples were collected from inside the drainage ditch alongside Kermit Evans Avenue. The letter also stated that, because Cannon AFB does not have ecological risk screening values for the facility, NMED used ESLs in the LANL ECORISK Database (Version 2.3, October 2008) for its ecological risk screen. This risk screen indicated the maximum detected lead concentration (3.50E+01 mg/kg at 19B) in a surface soil sample exceeded the risk-based ESLs (range of 1.40E+01 to 2.10E+01 mg/kg). Based on these results and the absence of surface soil samples collected for the 2005 investigation, NMED indicated that additional surface soil sampling in the drainage swale was required to determine if potential lead contamination is present in surface soil.

1.4 DATA QUALITY OBJECTIVES

The DQO evaluation process is designed to provide soil data of sufficient quality and quantity to evaluate whether a release has occurred that could pose a risk to human health or the environment and to evaluate the need for further evaluation, such as collection of additional data, completion of a Baseline Risk Assessment (BRA), or completion of a Feasibility Study (FS). The DQO process for AOC A (SS-19) has been provided previously in the Supplemental Assessment of Areas of Concern A, B, and C Work Plan (URS 2005a) and is summarized in the Phase II Supplemental Assessment Work Plan Addendum (WPA) (URS 2011).

TABLE 1-1
SUMMARY OF PREVIOUS SAMPLES COLLECTED FOR CHEMICAL ANALYSIS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

Sample Location	Sample Identification	Depth Interval (feet bgs)	Sample Date	Matrix	TCL SVOCs (8270C)	TCL VOCs (8260B)	Lead (6010B or 239.2)[1]	Oil and Grease (413.2)	Purgeable Organic Compounds (8010/8020)	Note(s)
19A	19A-1	3.0-4.0	12/18/1984	soil			X	X	X	Field Duplicate (19A-1A)
	19A-2	8.0-9.0	12/18/1984	soil			X	X	X	
	19A-3	45.0-47.0	12/18/1984	soil			X	X	X	
19B	19B-1	0.0-1.0	12/19/1984	soil			X	X	X	
	19B-2	9.0-10.0	12/19/1984	soil			X	X	X	
	19B-3	57.5-59.5	12/19/1984	soil			X	X	X	
CAA-SB01	CAA-SB01-005	3.0-5.0	2/16/2005	soil	X	X	X			
	CAA-SB01-010	8.0-9.6	2/16/2005	soil	X	X	X			
CAA-SB02	CAA-SB02-020	18.0-20.0	2/17/2005	soil	X	X	X			Field Duplicate (CAA-SB02-220)
	CAA-SB02-023	23.0-23.4	2/17/2005	soil	X	X	X			
CAA-SB03	CAA-SB03-015	13.0-14.7	2/17/2005	soil	X	X	X			
	CAA-SB03-019	18.0-18.4	2/17/2005	soil	X	X	X			
CAA-SB04	CAA-SB04-020	18.0-20.0	2/17/2005	soil	X	X	X			MS/MSD, Field Duplicate (CAA-SB04-120)
	CAA-SB04-025	23-24.5	2/17/2005	soil	X	X	X			
				Totals	**8**	**8**	**14**	**6**	**6**	

Notes:

[1]Method 239.2 was used for sample locations 19A and 19B.

AFB = Air Force Base

AOC = Area of Concern

bgs = below ground surface

MS/MSD = matrix spike/matrix spike duplicate

TCL = target compound list

SB = soil boring

SVOC = semivolatile organic compound

VOC = volatile organic compound

TABLE 1-2
SUMMARY OF PREVIOUS ANALYTICAL DATA
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			19A-1			19A-2			19A-3			19B-1		
DATE COLLECTED			December 18, 1984			December 18, 1984			December 18, 1984			December 19, 1984		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)														
Benzene	9.00E-04 J	3 / 8	NA			NA			NA			NA		
Bromomethane	2.20E-03 J	1 / 8	NA			NA			NA			NA		
Chloroform	1.20E-02	7 / 8	NA			NA			NA			NA		
Cyclohexane	3.50E-03 J	7 / 8	NA			NA			NA			NA		
Dibromochloromethane	6.00E-03	7 / 8	NA			NA			NA			NA		
Ethylbenzene	1.10E-03 J	3 / 8	NA			NA			NA			NA		
m,p-Xylene (sum of isomers)	3.90E-03 J	6 / 8	NA			NA			NA			NA		
Methylcyclohexane	1.30E-02 J	7 / 8	NA			NA			NA			NA		
Methyl Acetate	8.80E-03 J	5 / 8	NA			NA			NA			NA		
o-Xylene (1,2-Dimethylbenzene)	7.00E-04 J	3 / 8	NA			NA			NA			NA		
Toluene	4.70E-02	8 / 8	NA			NA			NA			NA		
PURGEABLE ORGANIC COMPOUNDS (mg/kg)														
All purgeable organic carbons reported nondetect		0 / 6	ND	1.00E-03	U	ND	1.00E-03	U	ND	1.00E-03	U	ND	1.00E-03	U
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)														
All SVOCs reported nondetect	ND	0 / 8	NA			NA			NA			NA		
OIL AND GREASE (mg/kg)														
All oil and grease reported nondetect	ND	0 / 6	ND	unk	U	ND	unk	U	ND	unk	U	ND	unk	U
METALS (mg/kg)														
Lead	3.50E+01	14 / 14	1.50E+00	unk		2.30E+00	unk		1.10E+00	unk		3.50E+01	unk	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

AFB = Air Force Base
AOC = Area of Concern
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
Qual = qualifier
RL = reporting limit
SVOC = semivolatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown

TABLE 1-2
SUMMARY OF PREVIOUS ANALYTICAL DATA
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			19B-2			19B-3			CAA-SB01-005			CAA-SB01-010		
DATE COLLECTED			December 19, 1984			December 19, 1984			February 16, 2005			February 16, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)														
Benzene	9.00E-04 J	3 / 8	NA			NA			ND	5.90E-03	U	ND	5.60E-03	U
Bromomethane	2.20E-03 J	1 / 8	NA			NA			ND	1.20E-02	U	ND	1.10E-02	U
Chloroform	1.20E-02	7 / 8	NA			NA			9.20E-03	5.90E-03		ND	5.60E-03	U
Cyclohexane	3.50E-03 J	7 / 8	NA			NA			2.30E-03	5.90E-03	J	ND	5.60E-03	U
Dibromochloromethane	6.00E-03	7 / 8	NA			NA			2.60E-03	5.90E-03	J	ND	5.60E-03	U
Ethylbenzene	1.10E-03 J	3 / 8	NA			NA			ND	5.90E-03	U	ND	5.60E-03	U
m,p-Xylene (sum of isomers)	3.90E-03 J	6 / 8	NA			NA			1.20E-03	5.90E-03	J	ND	5.60E-03	U
Methylcyclohexane	1.30E-02 J	7 / 8	NA			NA			6.00E-03	2.40E-02	J	ND	2.30E-02	U
Methyl Acetate	8.80E-03 J	5 / 8	NA			NA			ND	1.20E-02	U	2.70E-03	1.10E-02	J
o-Xylene (1,2-Dimethylbenzene)	7.00E-04 J	3 / 8	NA			NA			ND	5.90E-03	U	ND	5.60E-03	U
Toluene	4.70E-02	8 / 8	NA			NA			1.90E-02	5.90E-03		1.50E-03	5.60E-03	J
PURGEABLE ORGANIC COMPOUNDS (mg/kg)														
All purgeable organic carbons reported nondetect		0 / 6	ND	1.00E-03	U	ND	1.00E-03	U	NA			NA		
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)														
All SVOCs reported nondetect	ND	0 / 8	NA			NA			ND			ND		
OIL AND GREASE (mg/kg)														
All oil and grease reported nondetect	ND	0 / 6	ND	unk	U	ND	unk	U	NA			NA		
METALS (mg/kg)														
Lead	3.50E+01	14 / 14	9.50E-01	unk		9.90E-01	unk		5.40E-01	6.00E-01	J	7.10E-01	6.00E-01	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

AFB = Air Force Base
AOC = Area of Concern
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
Qual = qualifier
RL = reporting limit
SVOC = semivolatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown

TABLE 1-2
SUMMARY OF PREVIOUS ANALYTICAL DATA
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			CAA-SB02-020			CAA-SB02-023			CAA-SB03-015			CAA-SB03-019		
DATE COLLECTED			February 17, 2005			February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)														
Benzene	9.00E-04 J	3 / 8	ND	5.90E-03	U	ND	5.90E-03	U	8.00E-04	5.50E-03	J	9.00E-04	5.70E-03	J
Bromomethane	2.20E-03 J	1 / 8	2.20E-03	1.20E-02	J	ND	1.20E-02	UJ	ND	1.10E-02	U	ND	1.10E-02	U
Chloroform	1.20E-02	7 / 8	9.80E-03	5.90E-03		1.20E-02	5.90E-03		1.20E-02	5.50E-03		1.10E-02	5.70E-03	
Cyclohexane	3.50E-03 J	7 / 8	2.40E-03	5.90E-03	J	3.20E-03	5.90E-03	J	3.10E-03	5.50E-03	J	3.00E-03	5.70E-03	J
Dibromochloromethane	6.00E-03	7 / 8	3.10E-03	5.90E-03	J	5.80E-03	5.90E-03	J	6.00E-03	5.50E-03		4.70E-03	5.70E-03	J
Ethylbenzene	1.10E-03 J	3 / 8	ND	5.90E-03	U	ND	5.90E-03	U	1.00E-03	5.50E-03	J	9.00E-04	5.70E-03	J
m,p-Xylene (sum of isomers)	3.90E-03 J	6 / 8	1.80E-03	5.90E-03	J	3.30E-03	5.90E-03	J	ND	5.50E-03	U	3.00E-03	5.70E-03	J
Methylcyclohexane	1.30E-02 J	7 / 8	6.80E-03	2.40E-02	J	1.10E-02	2.40E-02	J	1.20E-02	2.20E-02	J	9.30E-03	2.30E-02	J
Methyl Acetate	8.80E-03 J	5 / 8	1.80E-03	1.20E-02	J	ND	1.20E-02	U	4.90E-03	1.10E-02	J	8.80E-03	1.10E-02	J
o-Xylene (1,2-Dimethylbenzene)	7.00E-04 J	3 / 8	ND	5.90E-03	U	ND	5.90E-03	U	7.00E-04	5.50E-03	J	7.00E-04	5.70E-03	J
Toluene	4.70E-02	8 / 8	2.50E-02	5.90E-03		4.60E-02	5.90E-03		4.40E-02	5.50E-03		3.70E-02	5.70E-03	
PURGEABLE ORGANIC COMPOUNDS (mg/kg)														
All purgeable organic carbons reported nondetect		0 / 6	NA			NA			NA			NA		
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)														
All SVOCs reported nondetect	ND	0 / 8	ND			ND			ND			ND		
OIL AND GREASE (mg/kg)														
All oil and grease reported nondetect	ND	0 / 6	NA			NA			NA			NA		
METALS (mg/kg)														
Lead	3.50E+01	14 / 14	3.20E+00	6.00E-01		1.40E+00	6.00E-01		5.90E+00	6.00E-01		1.70E+00	6.00E-01	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

AFB = Air Force Base
AOC = Area of Concern
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
Qual = qualifier
RL = reporting limit
SVOC = semivolatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown

TABLE 1-2
SUMMARY OF PREVIOUS ANALYTICAL DATA
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			CAA-SB04-020			CAA-SB04-025		
DATE COLLECTED			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzene	9.00E-04 J	3 / 8	ND	5.80E-03	U	8.00E-04	5.60E-03	J
Bromomethane	2.20E-03 J	1 / 8	ND	1.20E-02	U	ND	1.10E-02	U
Chloroform	1.20E-02	7 / 8	1.00E-02	5.80E-03		1.20E-02	5.60E-03	
Cyclohexane	3.50E-03 J	7 / 8	2.90E-03	5.80E-03	J	3.50E-03	5.60E-03	J
Dibromochloromethane	6.00E-03	7 / 8	3.30E-03	5.80E-03	J	5.40E-03	5.60E-03	J
Ethylbenzene	1.10E-03 J	3 / 8	ND	5.80E-03	U	1.10E-03	5.60E-03	J
m,p-Xylene (sum of isomers)	3.90E-03 J	6 / 8	2.30E-03	5.80E-03	J	3.90E-03	5.60E-03	J
Methylcyclohexane	1.30E-02 J	7 / 8	9.10E-03	2.30E-02	J	1.30E-02	2.20E-02	J
Methyl Acetate	8.80E-03 J	5 / 8	5.20E-03	1.20E-02	J	ND	1.10E-02	U
o-Xylene (1,2-Dimethylbenzene)	7.00E-04 J	3 / 8	ND	5.80E-03	U	7.00E-04	5.60E-03	J
Toluene	4.70E-02	8 / 8	3.00E-02	5.80E-03		4.70E-02	5.60E-03	
PURGEABLE ORGANIC COMPOUNDS (mg/kg)								
All purgeable organic carbons reported nondetect		0 / 6	NA			NA		
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
All SVOCs reported nondetect	ND	0 / 8	ND			ND		
OIL AND GREASE (mg/kg)								
All oil and grease reported nondetect	ND	0 / 6	NA			NA		
METALS (mg/kg)								
Lead	3.50E+01	14 / 14	1.40E+00	6.00E-01		4.40E+00	6.00E-01	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

AFB = Air Force Base
AOC = Area of Concern
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
Qual = qualifier
RL = reporting limit
SVOC = semivolatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown

TABLE 1-3
SUMMARY OF PREVIOUS ANALYTICAL DATA SCREENING RESULTS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		19A-1			19A-2			19A-3		
DATE COLLECTED			Residential	Site-specific Migration to GW	December 18, 1984			December 18, 1984			December 18, 1984		
	Maximum	Frequency	Soil	(DAF 30.2)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)													
Benzene	9.00E-04 J	3 / 8	3.32E+00	3.05E-02	NA			NA			NA		
Bromomethane	2.20E-03 J	1 / 8	2.73E+00	5.69E-02	NA			NA			NA		
Chloroform	1.20E-02	7 / 8	1.21E+00	1.25E-02	NA			NA			NA		
Cyclohexane	3.50E-03 J	7 / 8	NE	NE	NA			NA			NA		
Dibromochloromethane	6.00E-03	7 / 8	4.42E+00	3.50E-02	NA			NA			NA		
Ethylbenzene	1.10E-03 J	3 / 8	1.28E+02	3.07E+01	NA			NA			NA		
Methylcyclohexane	3.90E-03 J	7 / 8	7.89E+00	8.89E+02	NA			NA			NA		
Methyl Acetate	1.30E-02 J	5 / 8	1.94E+04	3.25E+01	NA			NA			NA		
Toluene	8.80E-03 J	8 / 8	2.52E+02	1.05E+01	NA			NA			NA		
m,p-Xylene (sum of isomers)	7.00E-04 J	6 / 8	1.02E+02	5.04E+00	NA			NA			NA		
o-Xylene	4.70E-02	3 / 8	1.32E+02	1.65E+02	NA			NA			NA		
PURGEABLE ORGANIC COMPOUNDS (mg/kg)													
All purgeable organic carbons reported nondetect	ND	0 / 6			ND	1.00E-03		ND	1.00E-03		ND	1.00E-03	
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)													
All SVOCs reported nondetect	ND	0 / 8			NA			NA			NA		
OIL AND GREASE (mg/kg)													
All oil and grease reported nondetect	ND	0 / 6			ND			ND			ND		
METALS (mg/kg)													
Lead	3.50E+01	14 / 14	4.00E+02	NE	1.50E+00	unk		2.30E+00	unk		1.10E+00	unk	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

AFB = Air Force Base
AOC = Area of Concern
DAF = dilution attenuation factor
GW = groundwater
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
NE = not established
NMED = New Mexico Environment Department
Qual = qualifier
RL = reporting limit
SSL = Soil Screening Level (NMED 2005)
SVOC = semi-volatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown

TABLE 1-3
SUMMARY OF PREVIOUS ANALYTICAL DATA SCREENING RESULTS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		19B-1			19B-2			19B-3		
DATE COLLECTED			Residential	Site-specific Migration to GW	December 19, 1984			December 19, 1984			December 19, 1984		
	Maximum	Frequency	Soil	(DAF 30.2)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)													
Benzene	9.00E-04 J	3 / 8	3.32E+00	3.05E-02	NA			NA			NA		
Bromomethane	2.20E-03 J	1 / 8	2.73E+00	5.69E-02	NA			NA			NA		
Chloroform	1.20E-02	7 / 8	1.21E+00	1.25E-02	NA			NA			NA		
Cyclohexane	3.50E-03 J	7 / 8	NE	NE	NA			NA			NA		
Dibromochloromethane	6.00E-03	7 / 8	4.42E+00	3.50E-02	NA			NA			NA		
Ethylbenzene	1.10E-03 J	3 / 8	1.28E+02	3.07E+01	NA			NA			NA		
Methylcyclohexane	3.90E-03 J	7 / 8	7.89E+00	8.89E+02	NA			NA			NA		
Methyl Acetate	1.30E-02 J	5 / 8	1.94E+04	3.25E+01	NA			NA			NA		
Toluene	8.80E-03 J	8 / 8	2.52E+02	1.05E+01	NA			NA			NA		
m,p-Xylene (sum of isomers)	7.00E-04 J	6 / 8	1.02E+02	5.04E+00	NA			NA			NA		
o-Xylene	4.70E-02	3 / 8	1.32E+02	1.65E+02	NA			NA			NA		
PURGEABLE ORGANIC COMPOUNDS (mg/kg)													
All purgeable organic carbons reported nondetect	ND	0 / 6			ND	1.00E-03		ND	1.00E-03		ND	1.00E-03	
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)													
All SVOCs reported nondetect	ND	0 / 8			NA			NA			NA		
OIL AND GREASE (mg/kg)													
All oil and grease reported nondetect	ND	0 / 6			ND			ND			ND		
METALS (mg/kg)													
Lead	3.50E+01	14 / 14	4.00E+02	NE	3.50E+01	unk		9.50E-01	unk		9.90E-01	unk	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

AFB = Air Force Base
AOC = Area of Concern
DAF = dilution attenuation factor
GW = groundwater
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
NE = not established
NMED = New Mexico Environment Department
Qual = qualifier
RL = reporting limit
SSL = Soil Screening Level (NMED 2005)
SVOC = semi-volatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown

TABLE 1-3
SUMMARY OF PREVIOUS ANALYTICAL DATA SCREENING RESULTS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		CAA-SB01-005			CAA-SB01-010			CAA-SB02-020		
DATE COLLECTED			Residential	Site-specific Migration to GW	February 16, 2005			February 16, 2005			February 17, 2005		
	Maximum	Frequency	Soil	(DAF 30.2)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)													
Benzene	9.00E-04 J	3 / 8	3.32E+00	3.05E-02	ND	5.90E-03	U	ND	5.60E-03	U	ND	5.90E-03	U
Bromomethane	2.20E-03 J	1 / 8	2.73E+00	5.69E-02	ND	1.20E-02	U	ND	1.10E-02	U	2.20E-03	1.20E-02	J
Chloroform	1.20E-02	7 / 8	1.21E+00	1.25E-02	9.20E-03	5.90E-03		ND	5.60E-03	U	9.80E-03	5.90E-03	
Cyclohexane	3.50E-03 J	7 / 8	NE	NE	2.30E-03	5.90E-03	J	ND	5.60E-03	U	2.40E-03	5.90E-03	J
Dibromochloromethane	6.00E-03	7 / 8	4.42E+00	3.50E-02	2.60E-03	5.90E-03	J	ND	5.60E-03	U	3.10E-03	5.90E-03	J
Ethylbenzene	1.10E-03 J	3 / 8	1.28E+02	3.07E+01	ND	5.90E-03	U	ND	5.60E-03	U	ND	5.90E-03	U
Methylcyclohexane	3.90E-03 J	7 / 8	7.89E+00	8.89E+02	6.00E-03	2.40E-02	J	ND	2.30E-02	U	6.80E-03	2.40E-02	J
Methyl Acetate	1.30E-02 J	5 / 8	1.94E+04	3.25E+01	ND	1.20E-02	U	2.70E-03	1.10E-02	J	1.80E-03	1.20E-02	J
Toluene	8.80E-03 J	8 / 8	2.52E+02	1.05E+01	1.90E-02	5.90E-03		1.50E-03	5.60E-03	J	2.50E-02	5.90E-03	
m,p-Xylene (sum of isomers)	7.00E-04 J	6 / 8	1.02E+02	5.04E+00	1.20E-03	5.90E-03	J	ND	5.60E-03	U	1.80E-03	5.90E-03	J
o-Xylene	4.70E-02	3 / 8	1.32E+02	1.65E+02	ND	5.90E-03	U	ND	5.60E-03	U	ND	5.90E-03	U
PURGEABLE ORGANIC COMPOUNDS (mg/kg)													
All purgeable organic carbons reported nondetect	ND	0 / 6			NA			NA			NA		
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)													
All SVOCs reported nondetect	ND	0 / 8			ND			ND			ND		
OIL AND GREASE (mg/kg)													
All oil and grease reported nondetect	ND	0 / 6			NA			NA			NA		
METALS (mg/kg)													
Lead	3.50E+01	14 / 14	4.00E+02	NE	5.40E-01	6.00E-01	J	7.10E-01	6.00E-01		3.20E+00	6.00E-01	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

AFB = Air Force Base
AOC = Area of Concern
DAF = dilution attenuation factor
GW = groundwater
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
NE = not established
NMED = New Mexico Environment Department
Qual = qualifier
RL = reporting limit
SSL = Soil Screening Level (NMED 2005)
SVOC = semi-volatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown

TABLE 1-3
SUMMARY OF PREVIOUS ANALYTICAL DATA SCREENING RESULTS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		CAA-SB02-023			CAA-SB03-015			CAA-SB03-019		
DATE COLLECTED			Residential	Site-specific Migration to GW	February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Soil	(DAF 30.2)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)													
Benzene	9.00E-04 J	3 / 8	3.32E+00	3.05E-02	ND	5.90E-03	U	8.00E-04	5.50E-03	J	9.00E-04	5.70E-03	J
Bromomethane	2.20E-03 J	1 / 8	2.73E+00	5.69E-02	ND	1.20E-02	UJ	ND	1.10E-02	U	ND	1.10E-02	U
Chloroform	1.20E-02	7 / 8	1.21E+00	1.25E-02	1.20E-02	5.90E-03		1.20E-02	5.50E-03		1.10E-02	5.70E-03	
Cyclohexane	3.50E-03 J	7 / 8	NE	NE	3.20E-03	5.90E-03	J	3.10E-03	5.50E-03	J	3.00E-03	5.70E-03	J
Dibromochloromethane	6.00E-03	7 / 8	4.42E+00	3.50E-02	5.80E-03	5.90E-03	J	6.00E-03	5.50E-03		4.70E-03	5.70E-03	J
Ethylbenzene	1.10E-03 J	3 / 8	1.28E+02	3.07E+01	ND	5.90E-03	U	1.00E-03	5.50E-03	J	9.00E-04	5.70E-03	J
Methylcyclohexane	3.90E-03 J	7 / 8	7.89E+00	8.89E+02	1.10E-02	2.40E-02	J	1.20E-02	2.20E-02	J	9.30E-03	2.30E-02	J
Methyl Acetate	1.30E-02 J	5 / 8	1.94E+04	3.25E+01	ND	1.20E-02	U	4.90E-03	1.10E-02	J	8.80E-03	1.10E-02	J
Toluene	8.80E-03 J	8 / 8	2.52E+02	1.05E+01	4.60E-02	5.90E-03		4.40E-02	5.50E-03		3.70E-02	5.70E-03	
m,p-Xylene (sum of isomers)	7.00E-04 J	6 / 8	1.02E+02	5.04E+00	3.30E-03	5.90E-03	J	ND	5.50E-03	U	3.00E-03	5.70E-03	J
o-Xylene	4.70E-02	3 / 8	1.32E+02	1.65E+02	ND	5.90E-03	U	7.00E-04	5.50E-03	J	7.00E-04	5.70E-03	J
PURGEABLE ORGANIC COMPOUNDS (mg/kg)													
All purgeable organic carbons reported nondetect	ND	0 / 6			NA			NA			NA		
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)													
All SVOCs reported nondetect	ND	0 / 8			ND			ND			ND		
OIL AND GREASE (mg/kg)													
All oil and grease reported nondetect	ND	0 / 6			NA			NA			NA		
METALS (mg/kg)													
Lead	3.50E+01	14 / 14	4.00E+02	NE	1.40E+00	6.00E-01		5.90E+00	6.00E-01		1.70E+00	6.00E-01	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

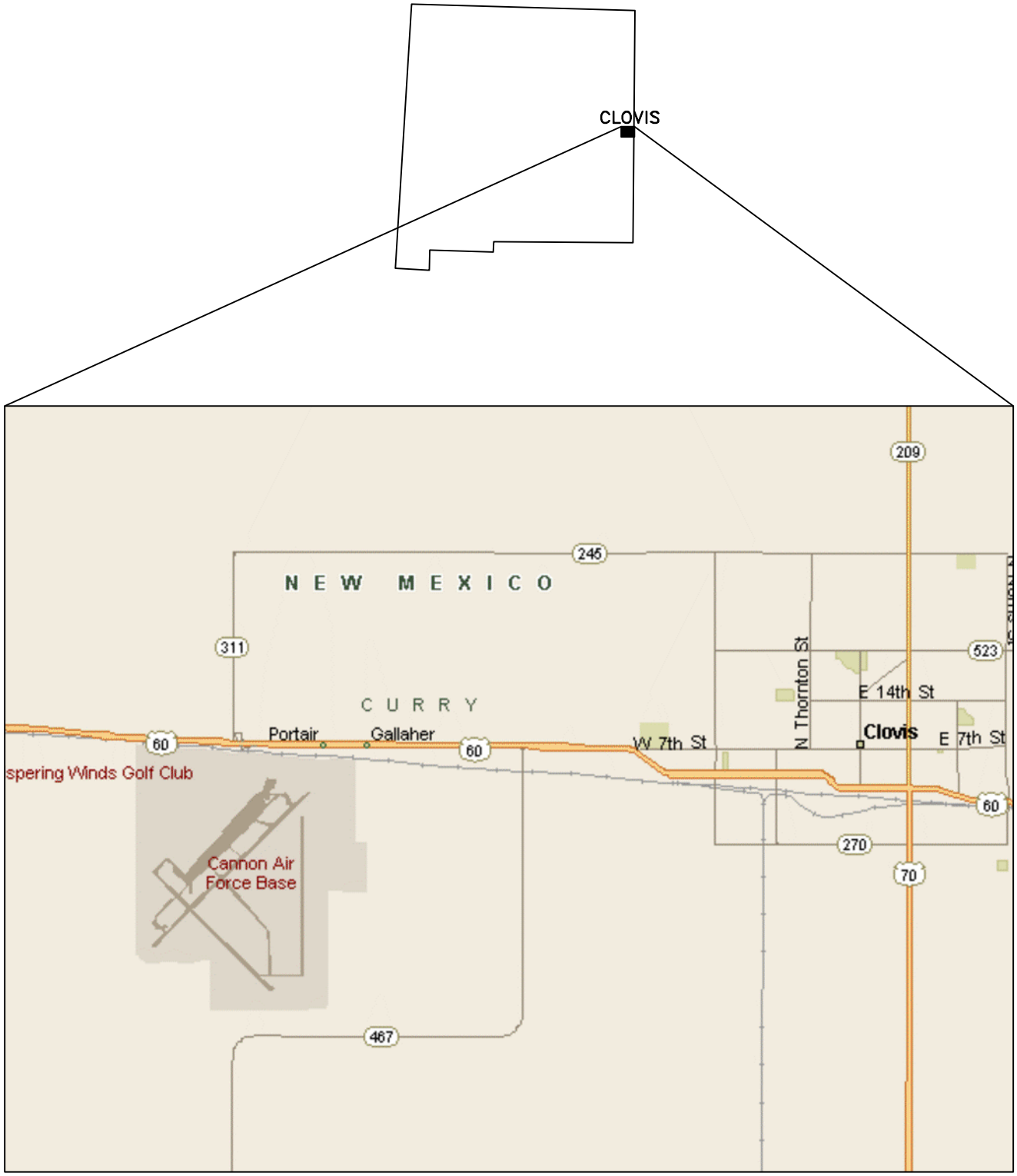
AFB = Air Force Base
AOC = Area of Concern
DAF = dilution attenuation factor
GW = groundwater
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
NE = not established
NMED = New Mexico Environment Department
Qual = qualifier
RL = reporting limit
SSL = Soil Screening Level (NMED 2005)
SVOC = semi-volatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown

TABLE 1-3
SUMMARY OF PREVIOUS ANALYTICAL DATA SCREENING RESULTS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		CAA-SB04-020			CAA-SB04-025		
DATE COLLECTED			Residential	Site-specific Migration to GW	February 17, 2005			February 17, 2005		
	Maximum	Frequency	Soil	(DAF 30.2)	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (mg/kg)										
Benzene	9.00E-04 J	3 / 8	3.32E+00	3.05E-02	ND	5.80E-03	U	8.00E-04	5.60E-03	J
Bromomethane	2.20E-03 J	1 / 8	2.73E+00	5.69E-02	ND	1.20E-02	U	ND	1.10E-02	U
Chloroform	1.20E-02	7 / 8	1.21E+00	1.25E-02	1.00E-02	5.80E-03		1.20E-02	5.60E-03	
Cyclohexane	3.50E-03 J	7 / 8	NE	NE	2.90E-03	5.80E-03	J	3.50E-03	5.60E-03	J
Dibromochloromethane	6.00E-03	7 / 8	4.42E+00	3.50E-02	3.30E-03	5.80E-03	J	5.40E-03	5.60E-03	J
Ethylbenzene	1.10E-03 J	3 / 8	1.28E+02	3.07E+01	ND	5.80E-03	U	1.10E-03	5.60E-03	J
Methylcyclohexane	3.90E-03 J	7 / 8	7.89E+00	8.89E+02	9.10E-03	2.30E-02	J	1.30E-02	2.20E-02	J
Methyl Acetate	1.30E-02 J	5 / 8	1.94E+04	3.25E+01	5.20E-03	1.20E-02	J	ND	1.10E-02	U
Toluene	8.80E-03 J	8 / 8	2.52E+02	1.05E+01	3.00E-02	5.80E-03		4.70E-02	5.60E-03	
m,p-Xylene (sum of isomers)	7.00E-04 J	6 / 8	1.02E+02	5.04E+00	2.30E-03	5.80E-03	J	3.90E-03	5.60E-03	J
o-Xylene	4.70E-02	3 / 8	1.32E+02	1.65E+02	ND	5.80E-03	U	7.00E-04	5.60E-03	J
PURGEABLE ORGANIC COMPOUNDS (mg/kg)										
All purgeable organic carbons reported nondetect	ND	0 / 6			NA			NA		
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)										
All SVOCs reported nondetect	ND	0 / 8			ND			ND		
OIL AND GREASE (mg/kg)										
All oil and grease reported nondetect	ND	0 / 6			NA			NA		
METALS (mg/kg)										
Lead	3.50E+01	14 / 14	4.00E+02	NE	1.40E+00	6.00E-01		4.40E+00	6.00E-01	

Notes:
The calculation of detection frequency does not include results from reanalyzed samples.

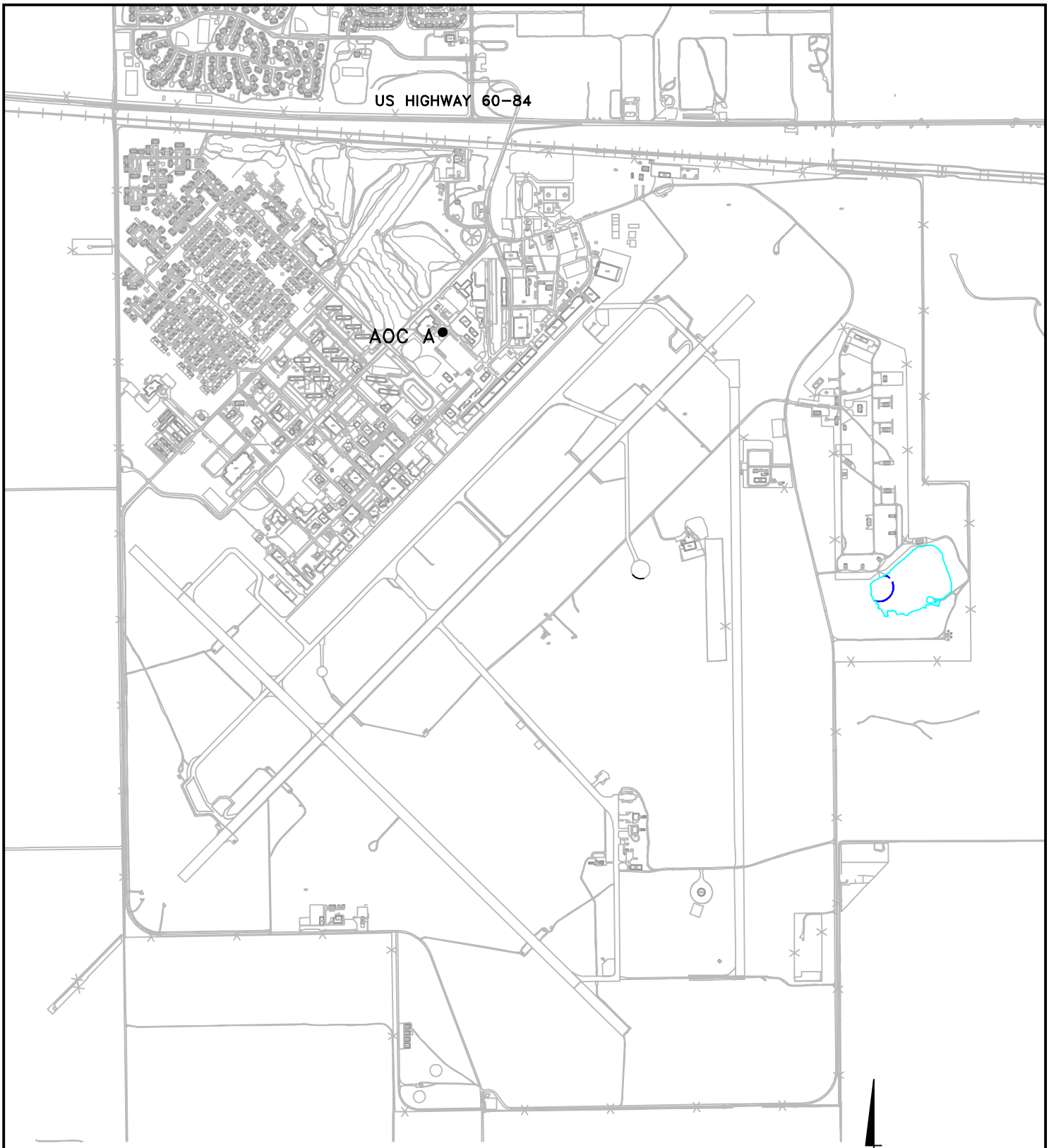
AFB = Air Force Base
AOC = Area of Concern
DAF = dilution attenuation factor
GW = groundwater
ID = identification
J = estimated
mg/kg = milligrams per kilogram
NA = not analyzed
ND = not detected
NE = not established
NMED = New Mexico Environment Department
Qual = qualifier
RL = reporting limit
SSL = Soil Screening Level (NMED 2005)
SVOC = semi-volatile organic compound
U = nondetect
UJ = estimated nondetect
unk = unknown



INSTALLATION LOCATION MAP
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 12/16/11	PROJECT NO. 16170618	FIG. NO. 1-1
CHK'D. BY: SJ	REVISION: 0		

January 31, 2012 8:48:34 a.m.
Drawing: T:\CANNON\16170618\500\1-1.dwg



LEGEND

AOC ● AREA OF CONCERN

SWMU No.	DESIGNATED AREA
AOC A	SS-19 MOGAS SPILL

N

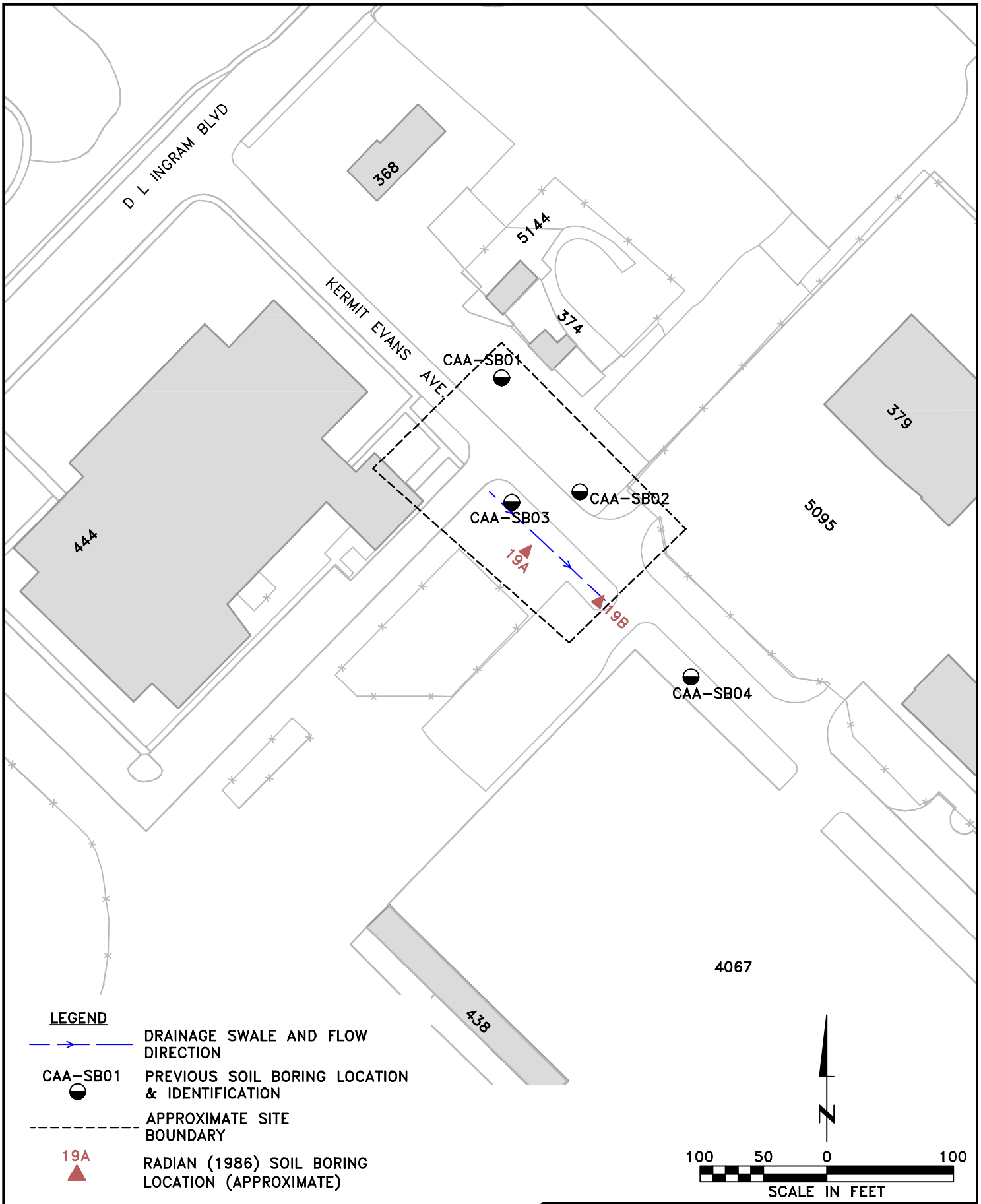
2000 1000 0 2000

SCALE IN FEET

SITE LOCATION PLAN
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 12/15/11	PROJECT NO. 16170618	FIG. NO. 1-2
CHK'D. BY: SJ	REVISION: 0		

January 31, 2012 8:49:27 a.m.
Drawing: T:\CANNON\16170618\500\1-2.dwg



LEGEND

DRAINAGE SWALE AND FLOW DIRECTION

CAA-SB01 PREVIOUS SOIL BORING LOCATION & IDENTIFICATION

APPROXIMATE SITE BOUNDARY

19A RADIAN (1986) SOIL BORING LOCATION (APPROXIMATE)

BUILDING

PREVIOUS SOIL SAMPLING LOCATIONS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 12/15/11	PROJECT NO. 16170618	FIG. NO. 1-3
CHK'D. BY: SJ	REVISION: 0		

January 31, 2012 8:50:02 a.m.
Drawing: T:\CANNON\16170618\500\1-3.dwg

This section summarizes the field activities completed for the Phase II Supplemental Assessment at AOC A (SS-19). Sample designations, sampling equipment and procedures, and sample handling and documentation procedures are described in this section.

2.1 SAMPLING OVERVIEW

Five surface soil samples were collected from ground surface to 0.5 feet bgs at five locations in the drainage swale southwest of Kermit Evans Avenue on December 6, 2011 (as shown on **Figures 2-1** and **2-2**). Sample locations were agreed upon by Cannon AFB and NMED personnel prior to sample collection, and are summarized in **Table 2-1**.

2.2 FIELD ACTIVITIES

The following sections describe the field activities completed including: utility locates, surface soil sampling, surveying, photographic documentation, sample handling documentation and analysis, and investigation-derived waste (IDW) management.

2.2.1 Utility Locates

Utility clearances were obtained prior to the start of field activities. No underground utilities were marked within the project area. The completed and approved Base Civil Engineering Work Clearance Request (AF Form 103 – Modified for Cannon AFB) is included as **Appendix A**.

2.2.2 Surface Soil Sampling

Surface soil samples for laboratory analysis were collected using a stainless steel trowel and mixed thoroughly in a stainless steel bowl in an attempt to obtain a homogeneous soil sample. Visible plant material, debris, and any rock fragments or gravel were excluded from the sample. Following homogenization, a sample from each location was placed into a laboratory-provided glass jar. Surface soil SCFSs, documenting the collection of each sample, were completed and are included in **Appendix B**.

The Field Team Leader was responsible for ensuring that samples were collected with properly decontaminated equipment and containerized. Specific responsibilities included oversight of the following:

- Sampling locations, equipment, and requirements
- Number and type of samples
- Sample identification
- Preservation requirements
- Analytical parameters

- Equipment decontamination procedures
- COC requirements

All sampling equipment was decontaminated before starting work and after the collection of each individual sample. Only hand tools, which were decontaminated at the site, were used during sampling. Decontamination included cleaning with Alconox, then a tap water rinse and two deionized water rinses.

Discrete surface soil samples were collected by hand using stainless-steel utensils and transferred to the appropriate laboratory-provided sample containers. Samples were collected at each location from 0 to 0.5 feet bgs, from the bottom of the grassed drainage swale. Prior to sample collection, the surface was cleared of vegetation and surface debris such as rocks. Immediately upon retrieving the surface soil sample, a small amount of soil was placed into a zipper-lock plastic bag for headspace analysis. The plastic bag containing the headspace sample was sealed, shaken to expose the soil to air trapped in the bag, and placed in a warm environment. After a minimum of 20 minutes, a headspace reading was taken using a MiniRae 2000 photoionization detector (PID) with a 10.6 electron volt (eV) lamp. Headspace readings were recorded on SCFSs. Prior to obtaining headspace readings, the PID was calibrated with isobutylene gas (100 parts per million [ppm]). PID calibration was documented in the field logbook.

The remaining soil was composited by thoroughly mixing it in a clean stainless steel bowl with a stainless steel spoon. A soil description in accordance with the Unified Soil Classification System (USCS) was recorded on the SCFS. Samples were placed in laboratory-provided containers and wrapped in protective packing material (i.e., foam liners and bubble packing).

2.2.3 Survey and Photographic Documentation

The general sampling area, surface soil sampling activities, and surface soil sampling locations were photographed to document the field sampling activities (see **Appendix C**). Survey coordinates were recorded using a hand-held global positioning system (GPS). Horizontal coordinates were surveyed to within 1 meter of actual locations using North American Datum of 1983 (NAD83). Surface soil sampling locations were also documented by measuring distances from fixed objects at the project site (e.g., tops of curbs on perpendicular roads or driveways) in order to verify the accuracy of the GPS. Soil sampling location survey coordinates are provided in **Table 2-1**.

2.2.4 Sample Handling, Documentation, and Analysis

The labeling, preservation, handling, shipping, documentation, and tracking procedures for all samples collected during this investigation at Cannon AFB were performed as described in the following paragraphs.

All sample labels were completed using waterproof ink. Each sample was labeled with a unique code indicating the site number, sample location number, matrix identifier, and sample depth. Labels included the date and time of sample collection, analysis required, and sampler's initials. Soil sample labels were supplied by URS. Samples were placed in a cooler for overnight express carrier shipment to the laboratory. A completed and signed COC was placed in the cooler. Samples were shipped to EMAX Laboratories, Inc. (EMAX).

2.2.4.1 Field Notes

Field observations and data were recorded using a pen with permanent waterproof ink in a permanently bound, weatherproof field logbook containing consecutively numbered pages and on SCFSs. The information in the field logbook and on the SCFSs included, but was not limited to, the sample location, date and time of sample collection, sample identification code, description of samples (matrix sampled), sample depth, sampling methods, analytical methods, field observations, and personnel present. Each page in the field book was signed by the person making the entry at the end of the day.

2.2.4.2 Sample Chain-of-Custody

Information concerning the custody, transfer, handling, and shipping of samples was recorded on a COC form. The sampler filled out the COC form and kept the samples in his possession until he relinquished them to the delivery service (FedEx). One COC form and one cooler were utilized for this sampling event. The completed COC is included in **Appendix D**.

2.2.4.3 Laboratory Information

The contact information for the analytical chemistry laboratory used for this investigation is listed below:

EMAX Laboratories, Inc. (EMAX)
Point of Contact: Molly Nguyen
1835 West 205th Street
Torrance CA 90501
Tel: 310-618-8889
Fax: 310-618-0818
Email: mnguyen@emaxlabs.com

EMAX has Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) accreditation for all environmental analytes that expires on January 10, 2014.

2.2.5 Investigation-derived Waste

No soil IDW was generated during project field activities. Decontamination water was placed into a zipper-lock plastic bag, a headspace reading was taken with a PID, and the water was

visually inspected for any signs of contamination. No signs of contamination were detected, therefore decontamination water was discharged to the ground surface. Personal protective equipment (PPE) and disposable sampling supplies were disposed of on the base as solid waste.

TABLE 2-1
SUMMARY OF SOIL SAMPLES FOR CHEMICAL ANALYSIS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

Sample Location Identification	Depth Interval (feet bgs)	Date Collected	Sample Coordinates (Northing, Easting)[1]		Lead USEPA Method 6010B[2]	Field Duplicate Samples[3]	MS/MSD Samples[4]
CAA-SS01	0-0.5	6-Dec-11	1237478.43	846609.75	X		
CAA-SS02	0-0.5	6-Dec-11	1237428.01	846652.74	X	X	
CAA-SS03	0-0.5	6-Dec-11	1237390.26	846692.83	X		
CAA-SS04	0-0.5	6-Dec-11	1237349.75	846733.78	X		X
CAA-SS05	0-0.5	6-Dec-11	1237285.23	846802.03	X		
				Totals	**5**	**1**	**1**

Notes:

[1]Horizontal coordinates are in New Mexico East State Plane, North American Datum of 1983.

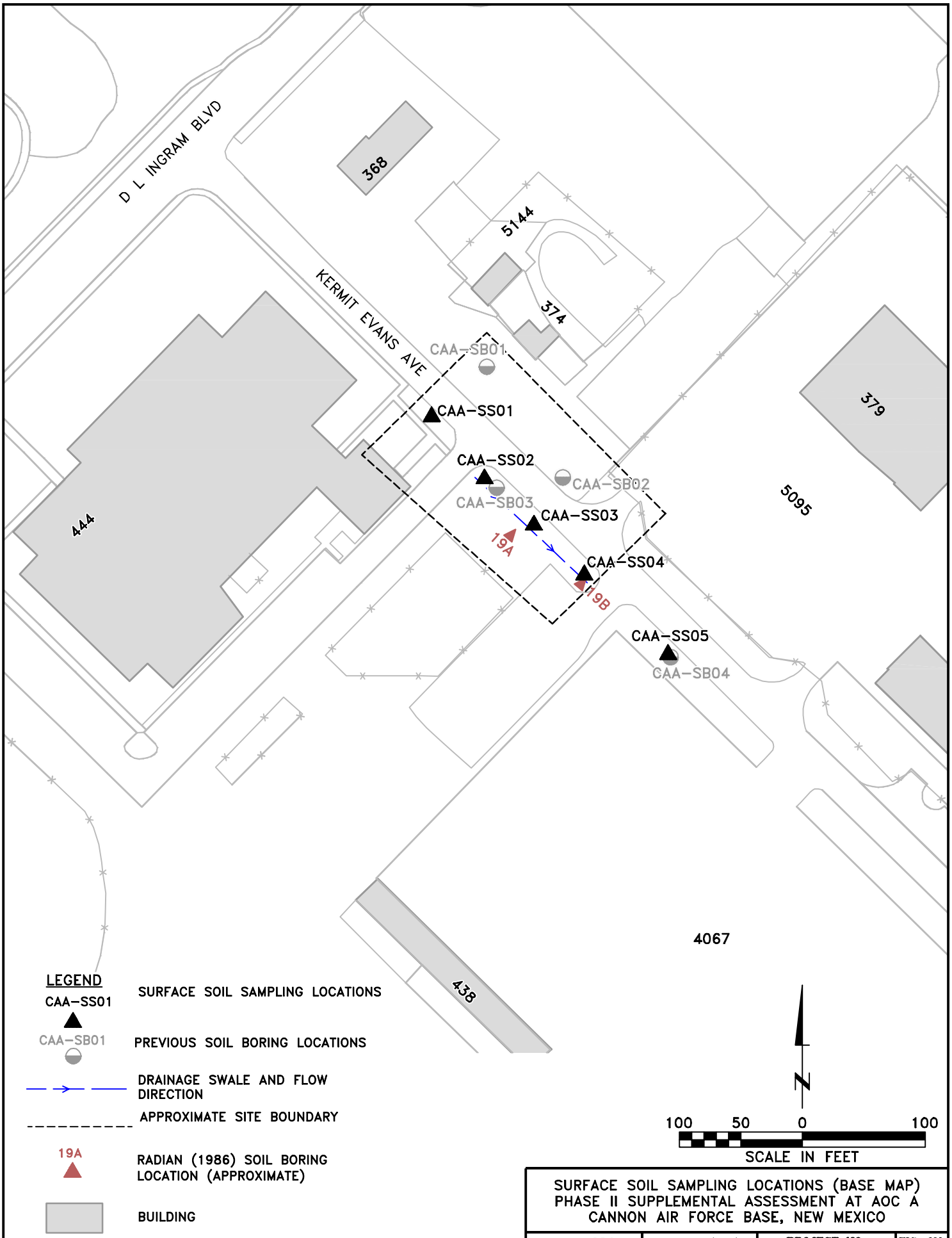
[2]Lead analysis completed on a quick-turn (48 hour) basis.

[3]Field duplicate samples were collected at a rate of 20 percent (1 per 5 samples collected) for laboratory analysis.

[4]MS/MSD samples were collected at a rate of 20 percent (1 per 5 samples collected) for laboratory analysis.

Laboratory analysis completed by EMAX Laboratories, Torrance, California.

AFB = Air Force Base
AOC = Area of Concern
bgs = below ground surface
MS/MSD = matrix spike/matrix spike duplicate
USEPA = United States Environmental Protection Agency



SURFACE SOIL SAMPLING LOCATIONS (BASE MAP)
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 02/07/11	PROJECT NO. 16170618	FIG. NO. 2-1
CHK'D. BY:	REVISION:		

January 31, 2012 8:50:33 a.m.
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LEGEND

CAA-SS01 — SURFACE SOIL SAMPLING LOCATIONS

CAA-SB01 — PREVIOUS SOIL BORING LOCATIONS

DRAINAGE SWALE AND FLOW DIRECTION

APPROXIMATE SITE BOUNDARY

19A — RADIAN (1986) SOIL BORING LOCATION (APPROXIMATE)

N

100 50 0 100

SCALE IN FEET

SURFACE SOIL SAMPLING LOCATIONS
(AERIAL PHOTO MAP)
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 12/15/11	PROJECT NO. 16170618	FIG. NO. 2-2
CHK'D. BY: SJ	REVISION: 0		

January 31, 2012 8:50:52 a.m.
Drawing: T:\CANNON\16170618\500\2-2.dwg

This section presents the chemical results of the surface soil sampling activities for the Phase II Supplemental Assessment at AOC A (SS-19), and provides a summary of the data review and validation results for the chemical data. This section also presents the analytical data screening results and baseline ecological risk assessment.

3.1 SUMMARY OF ANALYTICAL RESULTS

Surface soil samples were collected from AOC A (SS-19) and sent to EMAX to be analyzed for lead by United States Environmental Protection Agency (USEPA) Method 6010B. Samples CAA-SS01 through CAA-SS05 were collected from the drainage swale along the southwest side of Kermit Evans Avenue.

Lead was detected in all five surface soil samples collected. Lead concentrations ranged from 1.05E+01 to 1.12E+02 mg/kg, as shown on **Figure 3-1**.

A summary of the analytical results is presented in **Table 3-1**. The complete set of analytical results is included in **Appendix D**.

3.2 DATA REVIEW AND VALIDATION

Five analytical samples, one field duplicate, and one matrix spike/matrix spike duplicate (MS/MSD) soil sample were submitted to the laboratory for chemical analysis. Soil samples were analyzed for lead. All chemical data were reviewed following procedures identified in the WPA Quality Assurance Project Plan (QAPP) (URS 2011) and Department of Defense Quality Systems Manual, Version 4.2. No analytical data were rejected. Select analytical data from the AOC A samples collected during the supplemental assessment were qualified estimated (**J**) based on matrix spike duplicate recovery and field duplicate relative percent difference outside evaluation criteria. A tabular list of qualified data, including quality control (QC) parameters for which qualifications were made, and a summary of data reviews and validations is presented in **Appendix D**.

Acceptable levels of accuracy and precision were achieved for the AOC A (SS-19) Phase II Supplemental Assessment sample data. The analytical data from the samples were determined to be acceptable for their intended use, including estimated (**J**) data.

3.3 SCREENING RESULTS

The maximum lead concentration (1.12E+02 mg/kg) is below the NMED residential screening level for lead (4.00E+02 mg/kg) (see **Appendix E**). Additionally, the site risk and site hazard index were calculated using lead concentrations identified in surface soil samples (**Appendix I**). Results of these calculations were 5.93×10^{-6} for the site risk and 0.593 for the site hazard index (equations 34 and 35 [NMED 2012]), indicating that concentrations at the site are unlikely to result in adverse health impacts. Five of the six surface soil samples from AOC A were above

LANL ESLs (see **Appendix F**) and the background UTL for lead in surface soil (1.20E+01 mg/kg) (W-C 1997). The following LANL ESLs were exceeded: American robin (Avian insectivore-1.40E+01 mg/kg, Avian omnivore-1.60E+01 mg/kg, and Avian herbivore-2.10E+01 mg/kg) and Montane shrew (Mammalian insectivore-7.20E+01 mg/kg). A summary of the analytical data screening results for AOC A (SS-19) is presented in **Table 3-2**.

3.4 BASELINE ECOLOGICAL RISK ASSESSMENT

The Hazardous Waste Bureau (HWB) of NMED has developed guidance for evaluating current and potential ecological risk from exposure to chemical contaminants associated with a site (NMED 2008). NMED guidance details a two-level process, the first of which is a screening-level ecological risk assessment (referred to as the Ecoscreen). The Ecoscreen uses conservative (protective) assumptions to identify sites which clearly do not present a risk to ecological receptors in order that resources and investigations can be targeted to sites with higher potential risk (NMED 2008). As discussed in NMED guidance, the Ecoscreen has two phases: a Qualitative Assessment Phase, in which basic information on the physical and biological aspects of the site is compiled and potentially complete exposure pathways are identified; and a Quantitative Phase, in which concentrations of contaminants a receptor is exposed to are compared with relevant toxicity reference values (TRVs) to characterize potential risk. The Ecoscreen moves from the qualitative assessment phase to the quantitative phase only if the ecological receptors have the potential for exposure to hazardous material.

3.4.1 Qualitative Assessment and Checklists

To assist in the Qualitative Assessment Phase, NMED has developed two checklist tools: a Scoping Site Assessment Checklist and an Ecological Site Exclusion Criteria Checklist (with Decision Tree) (NMED 2012). These tools serve to document the investigator's observations (NMED 2008). NMED specifically states that scoping is "intended to identify sites that are obviously devoid of ecological habitats (e.g., buildings, paved parking lots) and/or where exposure pathways are obviously incomplete" (NMED 2008). These checklists are particularly applicable to AOC A (SS-19) because much of the site is covered in buildings, roads, parking lots and lawns which, as is discussed below, provide essentially no ecological habitat.

The Scoping Site Assessment Checklist is designed to assist in the compilation of information on the physical and biological aspects of the site including the site environmental setting, usage of the site, releases at the site, contaminant fate and transport mechanisms, and the area's habitats, receptors, and exposure pathways. A complete exposure pathway is one in which a source (or release from a source), an environmental transport mechanism, an exposure point, and an exposure route, as well as a receptor to be exposed, are present. In most cases, without a complete exposure pathway between contaminants and receptors, additional ecological evaluation is not warranted.

If further ecological evaluation is not warranted, then the Ecological Site Exclusion Criteria Checklist is completed. Information presented in the Scoping Site Assessment Checklist provides documentation justifying and supporting the responses to yes/no questions in the Exclusion Checklist and Decision Tree.

Both checklists have been completed for AOC A (SS-19) and are provided in **Appendix G**. The following text presents a summary and discussion of the findings of the checklists.

Scoping Site Assessment Checklist

The Scoping Site Assessment Checklist consists of four sections:

1. Site Location, which provides general information including location of ecological habitats, if present;

2. Site Characterization, which provides additional temporal and contextual information about the site with regard to ecologically viable habitat or receptors;

3. Habitat Evaluation, which provides information on the physical and biological characteristics of the different habitat types present at or in the locality of the site; and,

4. Exposure Pathway Evaluation, which serves to determine if contaminants at the site have the potential to impact habitat or receptors identified at or in the locality of the site.

Physical characteristics of AOC A (SS-19) are described in **Section 1.3.2**. With respect to ecological habitat, land currently on and in the vicinity of AOC A (SS-19) has been developed for light industry and office purposes. Approximately 67 percent of AOC A (SS-19) is covered in roads, parking lots and buildings with unpaved areas (approximately 33 percent) covered in lawn grass that is regularly maintained by mowing (**Figure 3-1**). The lawns have no shrubs, trees or other vegetation that could serve as refuge for ecological receptors; therefore, AOC A (SS-19) provides little or no ecological habitat. Opportunistic species, such as weeds, house mice, pigeons, etc., may inhabit the lawn areas and may be consumed by occasional transient visitors to the lawn areas, but, due to the frequent disturbance by mowing and lack of shelter, foraging at the site is expected to be infrequent and insignificant quantities of organisms consumed from the site are not expected to be a significant proportion of a transient receptor's diet.

No federal- or state-listed threatened or endangered species are known to permanently reside on Cannon AFB; however, some species have been observed in Curry County in a transitory state while in migration (INRMP 2009). The following table presents the species that are listed as threatened or endangered or are candidates for listing that have been observed in Curry County.

Federal- and State-Listed Species Occurring in Curry County

Common Name	Scientific Name	Federal Status	State Status
Bald Eagle	*Haliaeetus leucocephalus alascanus*	Not applicable	Threatened
Peregrine Falcon	*Falco peregrinus anatum*	Not applicable	Threatened
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	Not applicable	Threatened
Sprague's Pipit	*Anthus spragueii*	Candidate for listing	Not applicable
Lesser Prairie-Chicken	*Tympanuchus pallidicinctus*	Candidate for listing	Not applicable
Baird's Sparrow	*Ammodramus bairdii*	Not applicable	Threatened
Least Tern	*Sterna antillarum athalassos*	Endangered	Endangered

Source: Biota Information System of New Mexico (BISON), New Mexico Game & Fish

None of the above has the potential to inhabit or forage in AOC A (SS-19). The bald eagle favors tall trees along a watercourse or reservoir where it generally feeds on fish; although, in New Mexico, their diet includes jack rabbits, prairie dogs, and pocket gophers (NMACP 2012). None of these mammals have been observed or are likely to occur on or in the vicinity of AOC A (SS-19). Both subspecies of peregrine falcon are rare migrants in Curry County (BISON 2012) and both feed almost exclusively on birds taken in the air. Sprague's pipit, Baird's sparrow and the lesser prairie-chicken are all denizens of the open prairie (NMACP 2012) and are unlikely to occur in a developed area such as AOC A (SS-19). The least tern, which is rare to uncommon in Curry County, prefers riverine habitat (BISON 2012).

There are no surface water bodies present within the boundaries of AOC A (SS-19), nor is surface runoff directed off-site toward any other surface water body. Stormwater in the drainage swale flows past the site boundary to the southeast along the south side of Kermit Evans Avenue. At the intersection of Kermit Evans Avenue and North Torch Boulevard, a culvert directs stormwater to the southeast side of North Torch Boulevard. On the southeast side of North Torch Boulevard, the drainage swale turns to the northeast and flows to a storm sewer inlet located near the convergence of North Torch Boulevard and Access Road. The storm sewer eventually discharges to an open area approximately 1,000 feet southeast of the flightline, between Buildings 2312 and 4080. The National Wetland Inventory Mapper was used to identify wetland habitat within a 0.5-mile radius of the site (USFWS 2011). Although a freshwater pond approximately 1,000 feet north–northwest of AOC A (SS-19) and near the seventh hole of Whispering Winds Golf Course appears on the United States Fish and Wildlife Service (USFWS) National Wetland Inventory map (Figure WET in **Appendix G**), a 2005 wetland delineation concluded that this water body is not subject to regulation under the Clean Water Act (AFCEE 2009). This and other water bodies within the golf course are man-made, "intensely maintained, lined golf course ponds," and are stocked with sterile grass carp to control algal blooms (AFCEE 2009). Although the golf course pond could be considered a non-flowing aquatic feature, it neither receives discharge/runoff from AOC A (SS-19) nor does it discharge to the surrounding area. Management issues related to the biota associated with the golf course

ponds are addressed in the Whispering Pines Golf Course Management (GEM) Plan for Cannon AFB, NM (AFCEE 2009).

New Mexico Ecological Exclusion Criteria Checklist

NMED's Ecological Exclusion Criteria Checklist, along with information collected for the Scoping Site Assessment Checklist is intended to identify sites which clearly do not present a risk to ecological receptors. As illustrated in the Ecological Exclusion Criteria Decision Tree (**Appendix G**), if the answers to three questions regarding habitat at the site are "No," an exclusion is granted and no further ecological assessment is warranted. Details are provided in the full text of the checklist (see **Appendix G**). Brief responses and rationale for AOC A (SS-19) are as follows:

1. Are there sensitive areas at, adjacent to, or in the locality of the affected property?

   Response: No. The site is located in a light industrial area, primarily covered in roadways and asphalt parking lots, with all unpaved areas maintained as lawns.

2. Does the affected property contain other land areas that could be considered viable ecological habitat?

   Response: No. The majority of the site is paved and unpaved areas are maintained as lawns.

3. Does the affected property contain any perennial or ephemeral aquatic features?

   Response: No. There are no water bodies on or associated with the site.

3.4.2 Refined Ecological Risk Assessment

NMED conducted an ERA because the initial screening resulted in slightly elevated hazard quotients (HQs) (see **Appendix J**). The results of the refined ERA determined that the calculated ecological HQs would be well below target levels for both individual American robin and Montane shrew receptors and populations, indicating that lead in soil at AOC A (SS-19) would not likely pose an ecological risk.

TABLE 3-1
SUMMARY OF ANALYTICAL DATA
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			CAA-SS01				CAA-SS02				CAA-SS03			
DATE COLLECTED			December 6, 2011				December 6, 2011				December 6, 2011			
	Maximum	Frequency	Result	DL	LOQ	Qual	Result	DL	LOQ	Qual	Result	DL	LOQ	Qual
METALS (mg/kg)														
Lead	1.12E+02	5 / 5	1.71E+01	3.39E-01	1.13E+00		1.90E+01	3.11E-01	1.04E+00	J	1.05E+01	3.35E-01	1.12E+00	

Notes:
AFB = Air Force Base
AOC = Area of Concern
DL = detection limit
ID = identification
J = estimated
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
Qual = qualification
SS = surface soil

TABLE 3-1
SUMMARY OF ANALYTICAL DATA
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID			CAA-SS04				CAA-SS05			
DATE COLLECTED			December 6, 2011				December 6, 2011			
	Maximum	Frequency	Result	DL	LOQ	Qual	Result	DL	LOQ	Qual
METALS (mg/kg)										
Lead	1.12E+02	5 / 5	4.32E+01	3.42E-01	1.14E+00	J	1.12E+02	3.33E-01	1.11E+00	

Notes:
AFB = Air Force Base
AOC = Area of Concern
DL = detection limit
ID = identification
J = estimated
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
Qual = qualification
SS = surface soil

TABLE 3-2
SUMMARY OF ANALYTICAL DATA SCREENING RESULTS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID	NMED SSLs		LANL ESLs			CAA-SS01				CAA-SS02			
DATE COLLECTED	Residential Soil	Migration to GW (DAF 20)	Soil[1]	Maximum	Frequency	December 6, 2011				December 6, 2011			
						Result	DL	LOQ	Qual	Result	DL	LOQ	Qual
METALS (mg/kg)													
Lead	4.00E+02	NE	1.40E+01	1.12E+02	5 / 5	1.71E+01	3.39E-01	1.13E+00		1.90E+01	3.11E-01	1.04E+00	J

Notes:
[1]The LANL ESL for the American robin (avian insectivore) was the lowest available, and was, therefore, used as the ecological screening level for this project.
= Result exceeds the corresponding ESL.
AFB = Air Force Base
AOC = Area of Concern
DAF = dilution attenuation factor
DL = detection limit
ESL = Ecological Screening Level (LANL 2010)
GW = groundwater
ID = identification
J = estimated
LANL = Los Alamos National Laboratory
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
NE = not established
NMED = New Mexico Environment Department
Qual = qualification
SS = surface soil
SSL = Soil Screening Level (NMED 2005)

TABLE 3-2
SUMMARY OF ANALYTICAL DATA SCREENING RESULTS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

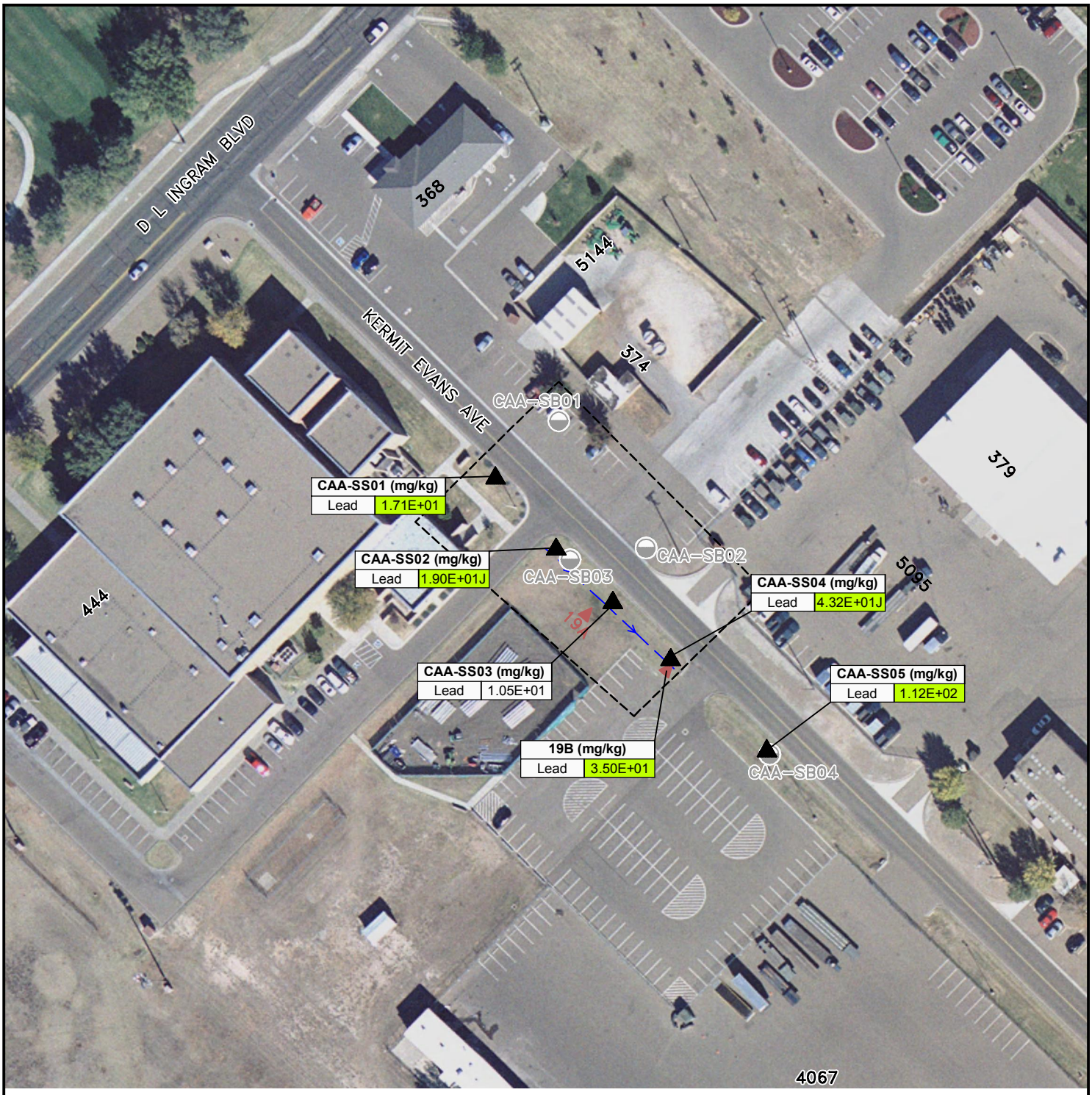
FIELD ID	NMED SSLs		LANL ESLs			CAA-SS03				CAA-SS04			
DATE COLLECTED						December 6, 2011				December 6, 2011			
	Residential Soil	Migration to GW (DAF 20)	Soil[1]	Maximum	Frequency	Result	DL	LOQ	Qual	Result	DL	LOQ	Qual
METALS (mg/kg)													
Lead	4.00E+02	NE	1.40E+01	1.12E+02	5 / 5	1.05E+01	3.35E-01	1.12E+00		4.32E+01	3.42E-01	1.14E+00	J

Notes:
[1]The LANL ESL for the American robin (avian insectivore) was the lowest available, and was, therefore, used as the ecological screening level for this project.
= Result exceeds the corresponding ESL.
AFB = Air Force Base
AOC = Area of Concern
DAF = dilution attenuation factor
DL = detection limit
ESL = Ecological Screening Level (LANL 2010)
GW = groundwater
ID = identification
J = estimated
LANL = Los Alamos National Laboratory
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
NE = not established
NMED = New Mexico Environment Department
Qual = qualification
SS = surface soil
SSL = Soil Screening Level (NMED 2005)

TABLE 3-2
SUMMARY OF ANALYTICAL DATA SCREENING RESULTS
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID	NMED SSLs		LANL ESLs			CAA-SS05			
DATE COLLECTED	Residential Soil	Migration to GW (DAF 20)	Soil[1]	Maximum	Frequency	December 6, 2011			
						Result	DL	LOQ	Qual
METALS (mg/kg)									
Lead	4.00E+02	NE	1.40E+01	1.12E+02	5 / 5	1.12E+02	3.33E-01	1.11E+00	

Notes:
[1]The LANL ESL for the American robin (avian insectivore) was the lowest available, and was, therefore, used as the ecological screening level for this project.
= Result exceeds the corresponding ESL.
AFB = Air Force Base
AOC = Area of Concern
DAF = dilution attenuation factor
DL = detection limit
ESL = Ecological Screening Level (LANL 2010)
GW = groundwater
ID = identification
J = estimated
LANL = Los Alamos National Laboratory
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
NE = not established
NMED = New Mexico Environment Department
Qual = qualification
SS = surface soil
SSL = Soil Screening Level (NMED 2005)



LEGEND

CAA-SS01 ▲ SURFACE SOIL SAMPLING LOCATIONS

CAA-SB01 PREVIOUS SOIL BORING LOCATIONS

DRAINAGE SWALE AND FLOW DIRECTION

APPROXIMATE SITE BOUNDARY

19A RADIAN (1986) SOIL BORING LOCATION (APPROXIMATE)

4.32E+01J CONCENTRATION EXCEEDS ECOLOGICAL SCREENING LEVELS (1.40E+01 mg/kg)

ALL CONCENTRATIONS WERE BELOW HUMAN HEALTH SSL (4.00E+02 mg/kg)

N

100 50 0 100

SCALE IN FEET

SURFACE SOIL SAMPLING RESULTS
(AERIAL PHOTO MAP)
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 01/18/12	PROJECT NO. 16170618	FIG. NO. 3-1
CHK'D. BY: SJ	REVISION: 0		

January 31, 2012 8:54:08 a.m.
Drawing: T:\CANNON\16170618\500\3-1.dwg

4.1 SUMMARY OF FINDINGS

- Lead was detected in all five surface soil samples collected at AOC A (SS-19). The maximum lead concentration detected (1.12E+02 mg/kg) is below the NMED residential screening level for lead, but above the background UTL for lead in surface soil and LANL ESLs.
- Based on NMED ecological risk assessment guidance (NMED 2012), no further ecological assessment is warranted for AOC A (SS-19).
- Based on the supplemental assessment results and on previous sampling results, where all concentrations were below current NMED residential SSLs, no further risk screening is warranted for AOC A (SS-19).

4.2 RECOMMENDATIONS

Based on the results of the supplemental assessment of AOC A (SS-19), CAC without controls is recommended for AOC A (SS-19).

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Woodward-Clyde (W-C). 1997. Naturally Occurring Concentrations of Inorganics and Background Concentrations of Pesticides at Cannon Air Force Base, New Mexico. Final Report. September.

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

(See Instructions on Reverse)

Date: 18 Nov 2011

1. Clearance is requested to proceed with work at: AOC A (east of Bldg 444 on S side of Kermit Evans [formerly Argentia] Ave)
On Work Order No 4PAE08 Contract No. FA8903-08-D-8783_utility disturbance per attached figure. (Sample locations are 5 black triangles shown on figure). This area: [ ] has [X] has not been staked or clearly marked.

2. TYPE OF FACILITY/ WORK INVOLVED

	A. PAVEMENT		D. FIRE DETECTION & PROTECTION SYSTEM					G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW
	B. DRAINAGE SYSTEM		E. UTILITY		OVERHEAD		UNDERGROUND	H. SECURITY
	C. RAILROAD TRACKS		F. COMM		OVERHEAD		UNDERGROUND X	I. OTHER/ **Sample 6" of soil**

3. DATE CLEARANCE REQUIRED: 01 Dec 2011

4. DATE OF CLEARANCE:

5. SIGNATURE OF REQUESTING OFFICIAL: Matthew Higginbotham, DAF

6. TELEPHONE NO.: 575-784-1092

7. ORGANIZATION: AFSOC 27 SOCES/CEAN

8. BASE CIVIL ENGINEERING

ORGANIZATION	REMARKS *(Use Reverse for additional comments)*	REVIEWER'S NAME AND INITIALS
A. ELECTRICAL DISTRIBUTION	Contact 48 hr prior to clearance requirement 784-4371 - Call clearance and utility location	Clear Tu Power 784-4371
B. GAS DISTRIBUTION	Contact 48 hr prior to clearance requirement 309-9481 - Call clearance and utility location	
C. WATER DISTRIBUTION	Contact 48 hr prior to clearance requirement 309-9481 - Call clearance and utility location	All Clear
D. SEWER DISTRIBUTION	Contact 48 hr prior to clearance requirement 309-9481 - Call clearance and utility location	
E. POL DISTRIBUTION	Contact 48 hr prior to clearance requirement 784-2112 - Call clearance and utility location	
F. ENVIRONMENTAL	Contact 48 hr prior to clearance requirement 784-1092 - Call clearance and utility location	OK John Bolman 1 Dec 11
G. PAVEMENTS / GROUNDS	Contact 48 hr prior to clearance requirement 784-4383 - Call clearance and utility location	
H. FIRE PROTECTION	Contact 48 hr prior to clearance requirement 784-2578 - Call clearance and utility location	
I. ZONE EMCS / HVAC	Contact 48 hr prior to clearance requirement 784-1195 - Call clearance and utility location	Clear Tu Power 784-4371
J. MAINTENANCE OPERATIONS CENTER	Contact 48 hr prior to clearance requirement 784-2135 - Call clearance and utility location	
9. SECURITY POLICE	Contact 48 hr prior to clearance requirement 784-4111 - Call clearance and utility location	22 Nov 11 Kenneth Brandley, MSgt, USAF
10. SAFETY 1	Contact 48 hr prior to clearance requirement 784-2811 - Call clearance and utility location	22 Nov 11
11. COMMUNICATIONS 10	Contact 48 hr prior to clearance requirement 784-6622 - Call clearance and utility location	22 Nov 11
12. BASE OPERATIONS	Contact 48 hr prior to clearance requirement 784-2801 - Call clearance and utility location	No Issues 22 Nov 11
13. SCX	Contact 48 hr prior to clearance requirement 784-6103 - Call clearance and utility location	N/A because of the depth
14. COMMERCIAL UTILITY COMPANY: X TELEPHONE; X Cable	Contact 48 hr prior to clearance requirement 1 - 800 - 321 -2537 Note date & request number on the reverse of this form that will be provided by the call.	N/A because of the depth

15. OTHER *(Specify)*:

16. REQUESTED CLEARANCE: [X] APPROVED [ ] DISAPPROVED

17. TYPED NAME AND SIGNATURE OF APPROVING OFFICER *(Chief of Operations Flight or Chief of Engineering Flight)*
ERIN J. OWENS, Maj, USAF
Operations Flight Commander

17a. DATE SIGNED (ddmmyy): 061211

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: **Phase II Supplemental Assessment at AOC A (SS-19)** PROJECT NO. **16170618**

SAMPLE NO. **CAA-SS01** BORING NO. **CAA-SS01**

DATE/TIME COLLECTED: 12-6-11 / ~~1340~~ SJ 1307 PERSONNEL: SJ

SAMPLE METHOD / DEPTH: trowel / 0.5' bgs

SAMPLE MEDIA: **SOIL** SEDIMENT SLUDGE

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO.

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO.

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1- 4 oz. glass jar	none	Total Lead (EPA 6010B)

PID MEASUREMENTS

Background	ND
Breathing zone	↓
Boring	↓
Headspace	2.5 (possibly due to moisture)

SAMPLE DESCRIPTION

DEPTH: 0-0.5' DESCRIPTION: SILTY SAND (SM) - Loose, moist, brown, fine-grained, trace clay

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: **Phase II Supplemental Assessment at AOC A (SS-19)** PROJECT NO. **16170618**

SAMPLE NO. **CAA-SS02** BORING NO. **CAA-SS02**

DATE/TIME COLLECTED: 12-6-11 / 1340 PERSONNEL: SJ

SAMPLE METHOD / DEPTH: trowel / 0.5' bgs

SAMPLE MEDIA: **SOIL** SEDIMENT SLUDGE

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO.

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. CAA-SS52 (0800)

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1- 4 oz. glass jar	none	Total Lead (EPA 6010B)

PID MEASUREMENTS

Background	ND
Breathing zone	↓
Boring	↓
Headspace	2.3 (possibly due to moisture)

SAMPLE DESCRIPTION

DEPTH: 0-0.5' DESCRIPTION: SANDY SILT (ML) - Medium stiff, moist, brownish red, low to medium plastic, sand is fine-grained, some clay

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: **Phase II Supplemental Assessment at AOC A (SS-19)** PROJECT NO. **16170618**

SAMPLE NO. **CAA-SS03** BORING NO. **CAA-SS03**

DATE/TIME COLLECTED: 12-6-11 / 1430 PERSONNEL: SJ

SAMPLE METHOD / DEPTH: trowel / 0.5' bgs

SAMPLE MEDIA: **SOIL** SEDIMENT SLUDGE

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO.

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO.

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1- 4 oz. glass jar	none	Total Lead (EPA 6010B)

PID MEASUREMENTS

Background ND

Breathing zone ↓

Boring ↓

Headspace 2.3 (possibly due to moisture)

SAMPLE DESCRIPTION

DEPTH: 0-0.5' DESCRIPTION: SILTY (SM) SAND (SP) - Loose, moist, red, fine-grained, ~~some silt~~ SJ SJ

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Phase II Supplemental Assessment at AOC A (SS-19)

PROJECT NO. 16170618

SAMPLE NO. CAA-SS04

BORING NO. CAA-SS04

DATE/TIME COLLECTED: 12-6-11 / 1500

PERSONNEL: SJ

SAMPLE METHOD / DEPTH: trowel / 0.5' bgs

SAMPLE MEDIA: **SOIL** SEDIMENT SLUDGE

SAMPLE QA SPLIT: YES NO

SPLIT SAMPLE NO.

SAMPLE QC DUPLICATE: YES NO

DUPLICATE SAMPLE NO.

MS/MSD REQUESTED: YES NO

+ MS/MSD

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1- 4 oz. glass jar	none	Total Lead (EPA 6010B)

PID MEASUREMENTS

Background	ND
Breathing zone	↓
Boring	↓
Headspace	4.1 (possibly due to moisture)

SAMPLE DESCRIPTION

DEPTH: 0 -0.5'

DESCRIPTION: SANDY SILT (ML) - Soft, moist, reddish brown, low to medium plastic, some clay, sand is fine-grained, trace fine gravel

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: **Phase II Supplemental Assessment at AOC A (SS-19)** PROJECT NO. **16170618**

SAMPLE NO. **CAA-SS05** BORING NO. **CAA-SS05**

DATE/TIME COLLECTED: 12-6-11 / 1550 PERSONNEL: SJ

SAMPLE METHOD / DEPTH: trowel / 0.5' bgs

SAMPLE MEDIA: **SOIL** SEDIMENT SLUDGE

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO.

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO.

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1- 4 oz. glass jar	none	Total Lead (EPA 6010B)

PID MEASUREMENTS

Background	ND
Breathing zone	↓
Boring	↓
Headspace	4.6 (possibly due to moisture)

SAMPLE DESCRIPTION

DEPTH: 0 - 0.5' DESCRIPTION: SANDY SILT (ML) - Soft, moist, reddish brown, low to medium plastic, some clay, sand is fine-grained

GENERAL COMMENTS

SITE ACTIVITIES PHOTOGRAPHIC LOG

Phase II Supplemental Assessment at AOC A (SS-19) **Cannon Air Force Base, New Mexico**	**AFCEC**	**Contract No. FA8903-08-D-8783** **Task Order No. 0170**

Photograph No. 1

Description:

View of the site, looking northwest.

Photograph No. 2

Description:

View of CAA-SS01, prior to sampling. The soil sample was mixed in a clean, stainless steel bowl prior to placement in a laboratory-provided, glass jar.

SITE ACTIVITIES PHOTOGRAPHIC LOG

Phase II Supplemental Assessment at AOC A (SS-19) Cannon Air Force Base, New Mexico	AFCEC	Contract No. FA8903-08-D-8783 Task Order No. 0170

Photograph No. 3

Description:

View of CAA-SS01, following sampling. All samples were collected from ground surface to 0.5 feet below ground surface (bgs).

Photograph No. 4

Description:

View of CAA-SS02, prior to sampling.

SITE ACTIVITIES PHOTOGRAPHIC LOG

Phase II Supplemental Assessment at AOC A (SS-19) Cannon Air Force Base, New Mexico	AFCEC	Contract No. FA8903-08-D-8783 Task Order No. 0170

Photograph No. 5

Description:

View of CAA-SS02 following sampling.

Photograph No. 6

Description:

View of CAA-SS03, prior to sampling.

SITE ACTIVITIES PHOTOGRAPHIC LOG

Phase II Supplemental Assessment at AOC A (SS-19) Cannon Air Force Base, New Mexico	AFCEC	Contract No. FA8903-08-D-8783 Task Order No. 0170

Photograph No. 7

Description:

View of CAA-SS03 following sampling.

Photograph No. 8

Description:

View of CAA-SS04 following sampling.

SITE ACTIVITIES PHOTOGRAPHIC LOG

Phase II Supplemental Assessment at AOC A (SS-19) Cannon Air Force Base, New Mexico	AFCEC	Contract No. FA8903-08-D-8783 Task Order No. 0170

Photograph No. 9

Description:

View of CAA-SS05, prior to sampling.

Photograph No. 10

Description:

View of CAA-SS05 following sampling.

SITE ACTIVITIES PHOTOGRAPHIC LOG

Phase II Supplemental Assessment at AOC A (SS-19) **Cannon Air Force Base, New Mexico**	**AFCEC**	**Contract No. FA8903-08-D-8783** **Task Order No. 0170**

Photograph No. 11

Description:

Sample locations were backfilled with soil located directly adjacent to the sampling location.

Photograph No. 12

Description:

View of the site, looking southeast (20 April 2011).

TABLE D-1
SUMMARY OF METALS SOIL ANALYTICAL DATA
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID	NMED SSLs		LANL ESLs			CAA-SS01				CAA-SS02				CAA-SS03			
DATE COLLECTED	Residential Soil	Migration to GW (DAF 20)	Soil[1]	Maximum	Frequency	December 6, 2011				December 6, 2011				December 6, 2011			
						Result	DL	LOQ	Qual	Result	DL	LOQ	Qual	Result	DL	LOQ	Qual
METALS (mg/kg)																	
Lead	4.00E+02	NE	1.40E+01	1.12E+02	5 / 5	1.71E+01	3.39E-01	1.13E+00		1.90E+01	3.11E-01	1.04E+00	J	1.05E+01	3.35E-01	1.12E+00	

Notes:
[1]The LANL ESL for the American robin (avian insectivore) was the lowest available, and was, therefore, used as the ecological screening level for this project.
= Result exceeds the corresponding ESL.
AOC = Area of Concern
DAF = dilution attenuation factor
DL = detection limit
ESL = Ecological Screening Level (LANL 2010)
GW = groundwater
ID = identification
J = estimated
LANL = Los Alamos National Laboratory
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
NE = not established
NMED = New Mexico Environment Department
Qual = qualification
SS = surface soil
SSL = Soil Screening Level (NMED 2005)

TABLE D-1
SUMMARY OF METALS SOIL ANALYTICAL DATA
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID	NMED SSLs		LANL ESLs			CAA-SS04				CAA-SS05			
DATE COLLECTED	Residential Soil	Migration to GW (DAF 20)	Soil[1]	Maximum	Frequency	December 6, 2011				December 6, 2011			
						Result	DL	LOQ	Qual	Result	DL	LOQ	Qual
METALS (mg/kg)													
Lead	4.00E+02	NE	1.40E+01	1.12E+02	5 / 5	4.32E+01	3.42E-01	1.14E+00	J	1.12E+02	3.33E-01	1.11E+00	

Notes:
[1]The LANL ESL for the American robin (avian insectivore) was the lowest available, and was, therefore, used as the ecological screening level for this project.
= Result exceeds the corresponding ESL.
AOC = Area of Concern
DAF = dilution attenuation factor
DL = detection limit
ESL = Ecological Screening Level (LANL 2010)
GW = groundwater
ID = identification
J = estimated
LANL = Los Alamos National Laboratory
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
NE = not established
NMED = New Mexico Environment Department
Qual = qualification
SS = surface soil
SSL = Soil Screening Level (NMED 2005)

TABLE D-2
SOIL FIELD DUPLICATE COMPARISON
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

FIELD ID	CAA-SS02				CAA-SS52				
DATE COLLECTED	December 6, 2011				December 6, 2011				
	Result	DL	LOQ	Qual	Result	DL	LOQ	Qual	RPD
METALS (mg/kg)									
Lead	1.90E+01	3.11E-01	1.04E+00	J	3.44E+01	3.15E-01	1.05E+00	J	**57.5**

Notes:
Bold values indicate RPD is outside evaluation criteria
AOC = Area of Concern
DL = detection limit
ID = identification
J = estimated
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
Qual = qualification
RPD = relative percent difference
SS = surface soil

TABLE D-3
SUMMARY OF DATA QUALIFICATIONS,
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A (SS-19)
CANNON AFB, NEW MEXICO

SDG	Field ID	Matrix	Analysis	Analyte	NEW LOQ	URS Qual.	Code	Comments
11L059	CAA-SS04	Soil	Metals	Lead	-	J	ML	MSD Recovery Low
11L059	CAA-SS02	Soil	Metals	Lead	-	J	FD	Field Duplicate RPD > 50%

Notes:
AOC = Area of Concern
% = Percent
> = greater than
FD= field duplicate
ID = identification
J = estimated
LOQ = limit of quantitation
ML = MSD Recovery Low
MSD = matrix spike duplicate
Qual = qualification
RPD = relative percent difference
SDG = sample delivery group
URS = URS Group, Inc.

Cannon AFB Data Review

Laboratory SDG: 11L059

Reviewer: Tony Sedlacek

Date Reviewed: 12/19/2011

Guidance: Department of Defense (DoD) Quality Systems Manual, Final Version 4.2 (DoD 2010)

Applicable QAPP: Cannon AOC A UPF-QAPP (URS 2011)

Sample Identification #	Sample Identification #
CAA-SS01	CAA-SS02
CAA-SS03	CAA-SS04
CAA-SS05	CAA-SS52

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative \ Cooler Receipt Form

Were problems noted in the laboratory case narrative or cooler receipt form?

Yes, the laboratory case narrative indicated the MSD recovery for lead was outside evaluation criteria in sample CAA-SS04. Although not indicated in the laboratory case narrative, the field duplicate RPD for lead was outside evaluation criteria. These issues are addressed further in the appropriate sections below.

The cooler receipt form indicated that no problems or discrepancies were encountered.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes

Field ID	Parameter	Analyte	Qualification

N/A			

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

No

Blank ID	Parameter	Analyte	Concentration	Units
N/A				

Qualifications due to blank contamination are included in the table below.

Field ID	Parameter	Analyte	New RL	Qualification
N/A				

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

Yes

LCS ID	Parameter	Analyte	LCS/LCSD Recovery	RPD	LCS/LCSD/RPD Criteria
N/A					

Analytical data that required qualification based on LCS data are included in the table below.

Field ID	Parameter	Analyte	Qualification
N/A			

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

N/A, Method 6010C does not utilize surrogates.

Field ID	Parameter	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below.

Field ID	Parameter	Analyte	Qualification
N/A			

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples collected as part of this SDG?

Yes, sample CAA-SS04 was spiked and analyzed for lead.

Were MS/MSD recoveries within evaluation criteria?

No

MS/MSD ID	Parameter	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Criteria
CAA-SS04	Metals	Lead	88/**78**	9	80-120/20

Analytical data that required qualification based on MS/MSD data are included in the table below.

Field ID	Parameter	Analyte	Qualification
CAA-SS04	Metals	Lead	**J**

8.0 Laboratory Duplicate Results

Were laboratory duplicate samples analyzed as part of this SDG?

No

Were laboratory duplicate sample RPDs within criteria?

N/A

Field ID	Parameter	Analyte	RPD	Criteria
N/A				

Data qualified due to outlying laboratory duplicate recoveries are identified below:

Field ID	Parameter	Analyte	Qualification
N/A			

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes

Field ID	Field Duplicate ID
CAA-SS02	CAA-SS52

Were field duplicates within evaluation criteria?

No

Field ID	Field Duplicate ID	Parameter	Analyte	RPD	Qualification
CAA-SS02	CAA-SS52	Metals	Lead	**57.7**	**J**

10.0 Additional Qualifications

Were additional qualifications applied?

No

URS Corporation URS1106 -

12120 Shamrock Plaza Suite 300, Omaha, NE 68154 (402) 334-8181 Fax (402) 334-1984

CHAIN OF CUSTODY RECORD

11L059

Page 1 of 1

Project Name: Phase II Supplemental Assessment at AOC A (SS-19)

Project No.: 16170618

Project Location: Cannon AFB, New Mexico

Project Manager: C. Anderson

Sampler(s): S. Jacobson

Analytical Parameters: Total Lead (6010B)

	Sample Date	Sample Time	Type Comp.	Type Grab	Sample Identification	Matrix	Containers No.	Containers Type	Total Lead (6010B)	Remarks
1	12/6/11	1307		X	CAA-SS01	soil	1	4 oz. jar	X	48 hr. T.A.T.
2		1340			CAA-SS02					
3		1430			CAA-SS03					
4		1500			CAA-SS04 + MS/MSD		2			
5		1550			CAA-SS05		1			
6		0800			CAA-SS52		"			

Signatures	Date	Time	Shipping Details	Special Instructions
Relinquished by:	12-7-11	0900	Method of Shipment: FedEx Priority Overnight	48 Hr. T.A.T.
Received by:			Airbill No.: 8742 0325 8823	R.T.
Relinquished by:			Lab Address: EMAX Laboratories, Inc. Attn: Molly Nguyen 1835 West 205th St Torrance, CA 90501 (301) 618-8889	
Received for Laboratory by:	12/8/11	09/45		

Custody.frm/jdg 3-09-92

White copy - Laboratory Yellow copy - Laboratory Pink copy - WCC

122865

CLIENT:	URS GROUP, INC.
PROJECT:	CANNON AFB TO170
SDG:	11L059

I certify this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than that the conditions detailed in the report. Release of the data contained in this hardcopy data package and in the computer-readable data submitted in CD ROM has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

for

Caspar J. Pang
Laboratory Director

LABORATORY REPORT

CLIENT: URS GROUP, INC.

PROJECT: CANNON AFB TO170

SDG: 11L059

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EMAX
LABORATORIES, INC.
1835 W. 205th Street
Torrance, CA 90501
Tel: (310) 618-8889
Fax: (310) 618-0818

Date: 12-14-2011
EMAX Batch No.: 11L059

Attn: Anthony J. Sedlacek

URS Group, Inc.
12120 Shamrock Plaza, Suite 300
Omaha, NE 68154

Subject: Laboratory Report
Project: Cannon AFB T0170

Enclosed is the Laboratory report for samples received on 12/08/11.
The data reported relate only to samples listed below :

Sample ID	Control #	Col Date	Matrix	Analysis
CAA-SS01	L059-01	12/06/11	SOIL	LEAD
CAA-SS02	L059-02	12/06/11	SOIL	LEAD
CAA-SS03	L059-03	12/06/11	SOIL	LEAD
CAA-SS04	L059-04	12/06/11	SOIL	LEAD
CAA-SS05	L059-05	12/06/11	SOIL	LEAD
CAA-SS52	L059-06	12/06/11	SOIL	LEAD
CAA-SS04MS	L059-04M	12/06/11	SOIL	LEAD
CAA-SS04MSD	L059-04S	12/06/11	SOIL	LEAD

The results are summarized on the following pages.

Please feel free to call if you have any questions concerning
these results.

Sincerely yours,

for

Caspar J. Pang
Laboratory Director

This report is confidential and intended solely for the use of the individual or entity to whom it is addressed. This report shall not be reproduced except in full or without the written approval of EMAX.

EMAX certifies that results included in this report meets all NELAC & DOD requirements unless noted in the Case Narrative.

NELAC Accredited Certificate Number 02116CA
L-A-B Accredited DoD ELAP and ISO/IEC 17025 Certificate Number L2278 Testing

CASE NARRATIVE

Client : URS GROUP, INC.

Project : CANNON AFB TO170

SDG : 11L059

METHOD SW3050B/6010C
LEAD BY ICP

A total of six (6) soil samples were received on 12/08/11 for Lead analysis, Method SW3050B/6010C in accordance with Project Specific QAPP, September 2011.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Initial Calibration was established as prescribed by the method and was verified using a secondary source. Interference checks were performed and results were within required limits. Continuing calibration verifications and continuing calibration blanks were carried out at the frequency specified by the project. All calibration requirements were within acceptance criteria. MRL was analyzed as required by the project and met QC criteria. Refer to MRL summary for detail.

Method Blank
Method blank was analyzed at the frequency required by the project. For this SDG, one method blank was analyzed with the samples. Result was compliant to project requirement.

Lab Control Sample
A set of LCS/LCD was analyzed with the samples in this SDG.
Percent recoveries for IPL015SX/Y were all within QC limits.

Matrix QC Sample
Matrix QC sample was analyzed at the frequency prescribed by the project. Percent recovery was within project QC limits in L059-04M (CAA-SS04MS) but was slightly below limits in L059-04S (CAA-SS04MSD). Refer to QC summary form for details.
In addition, analytical spike and serial dilution were analyzed for matrix interference evaluation. Results were within method acceptance criteria.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. All project requirements were met otherwise anomalies were discussed within the associated QC parameter.

EMAX LABORATORIES, INC.

SAMPLE RECEIPT FORM 1

Type of Delivery	Delivered By/Airbill	ECN 11L059
☐ EMAX Courier		Recepient J-LUND
☐ Client Delivery		Date 12-8-11
☑ Third Party FEDEX	SEE COC	Time 0945

COC Inspection

☑ Client Name	☑ Client PM/FC	☑ Sampler Name	☑ Sampling Date/Time/Location	☑ Sample ID	☑ Matrix
☑ Address	☑ Tel # / Fax #	☐ Courier Signature	☑ Analysis Required	☐ Preservative (if any)	☑ TAT
Safety Issues	☑ None	☐ High concentrations expected	☐ Superfund Site samples	☐ Rad screening required	

Comments:

Packaging Inspection

Container	☑ Cooler	☐ Box	☐ Other		
Condition	☑ Custody Seal	☑ Intact	☐ Damaged		
Packaging	☑ Bubble Pack	☐ Styrofoam	☐ Popcorn	☑ Sufficient	☐ _____
Temperatures (Cool, ≤6 °C but not frozen) *	☑ Cooler 1 R.T °C	☐ Cooler 2_____ °C	☐ Cooler 3_____ °C	☐ Cooler 4_____ °C	☐ Cooler 5_____ °C
	☐ Cooler 6_____ °C	☐ Cooler 7_____ °C	☐ Cooler 8_____ °C	☐ Cooler 9_____ °C	☐ Cooler 10_____ °C

Thermometer: *A - S/N 101541371* *B - S/N 101541382*

Comments: ☐ **PM was informed on non-compliant coolers immediately.**

Note: **pH holding time requirement for water samples is 15 mins. Water samples for pH analysis are received beyond 15 minutes from sampling time.**

* ROOM TEMP

DISCREPANCIES

LSID	LSCID	Sample Label ID/COC ID	Discrepancy Code	Corrective Action Code

REVIEWS

Sample Labeling [signature] Date 12/8/11 | CS

SRF [signature] Date 12/8/11

PM [signature] Date 12/8/11

LEGEND:

Code	Description- Sample Management	Code	Description-Sample Management	Code	Description-Project Management
A1	Analysis is not indicated in COC	D1	Date and/or time is not indicated in COC	R1	Hold sample(s); wait for further instructions
A2	Analysis is not indicated in label	D2	Date and/or time is not indicated in label	R2	Proceed as indicated in COC
A3	Analysis is inconsistent in COC vis-à-vis label	D3	Date and/or time is inconsistent in COC vis-à-vis label	R3	Refer to attached instruction
A4	_____	E1	Insuficient preservative	R4	Cancel the analysis
B1	Sample ID is not indicated in COC	E2	Improper preservation	R5	_____
B2	Sample ID is not indicated in label	F1	Insufficient Sample	R6	_____
B3	Sample ID is inconsistent in COC vis-à-vis label	F2	Bubble is> 6mm		
B4	_____	G1	Temperature is out of range		
C1	Wrong container	G2	Out of Holding Time		
C2	Broken container	G3	>20 % solid particle		
C3	Leaking container	H1	_____		
C4	_____	H2	_____		

304

400 **FedEx Express** *US Airbill* FedEx Tracking Number 8742 0325 8823

RECIPIENT: PEEL HERE

fedex.com 1800.GoFedEx 1.800.463.3339

1 From This portion can be removed for Recipient's records.

Date 12/7/11 FedEx Tracking Number 874203258823

Sender's Name Stephen Jacobson Phone 402 334-8181

Company URS

11L059

Address 12120 SHAMROCK PLZ STE 300 Dept/Room/Suite/Room

City OMAHA State NE ZIP 68154-3539

2 Your Internal Billing Reference 16170618.54210.00500

3 To Recipient's Name Molly Nguyen Phone 301. 618-8889

Company EMAX Laboratories, Inc.

Address 1835 West 205th St

We cannot deliver to P.O. boxes or P.O. ZIP codes.

HOLD Weekday FedEx location address REQUIRED. NOT available for FedEx First Overnight.

HOLD Saturday FedEx location address REQUIRED. Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Address

Use this line for the HOLD location address or for continuation of your shipping address.

City Torrance State CA ZIP 90501

0429240658

8742 0325 8823

FedEx Express Recipient's Copy

4a Express Package Service * To most locations. Packages up to 150 lbs.

- [X] FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.* Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

4b Express Freight Service * To most locations. Packages over 150 lbs.

- [ ] FedEx 1Day Freight — Next business day.** Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- FedEx 1Day Freight Booking No.
- [ ] FedEx 2Day Freight — Second business day.** Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx 3Day Freight — Third business day.** Saturday Delivery NOT available.

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak and FedEx Large Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling and Delivery Signature Options

- [ ] SATURDAY Delivery — NOT available for FedEx Standard Overnight, FedEx Express Saver, or FedEx 3Day Freight.
- [X] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Someone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, someone at a neighboring address may sign for delivery. For residential deliveries only. Fee applies.

Does this shipment contain dangerous goods?

One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ kg
- [ ] Cargo Aircraft Only

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging or placed in a FedEx Express Drop Box.

7 Payment *Bill to:*

- [X] Sender — Acct. No. in Sec. 1
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

Enter FedEx Acct. No. or Credit Card No. below. Obtain recip. Acct. No. [ ]

Total Weight ____ lbs. Credit Card Auth.

*Our liability is limited to $100 unless you declare a higher value. See our current FedEx Service Guide for details.

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fedex.com 1800.GoFedEx 1.800.463.3339

Molly Nguyen

From: Molly Nguyen
Sent: Friday, December 09, 2011 2:05 PM
To: 'Sedlacek, Tony'
Subject: Log in for Cannon AFB TO170, SDG 11L059
Attachments: 11L059.pdf

Hi Tony,

Attached is the login from Cannon AFB -TO 170, SDG 11L059, for your review. Note that all samples received at room temperature. The lab will proceed with analysis under this condition. Please advise if it's otherwise.

Thanks,
--Molly
310-618-8889 ext. 119

For the upcoming holidays, EMAX will be closed on:
1. Christmas: 12/23/11, 12/24/11 & 12/26/11
2. New Year: 12/30/11, 12/31/11 & 01/02/12

URS Corporation URS1106 -

12120 Shamrock Plaza Suite 300, Omaha, NE 68154 (402) 334-8181 Fax (402) 334-1984

CHAIN OF CUSTODY RECORD

11L059

Project Name: Phase II Supplemental Assessment at AOC A (SS-19)

Project No.: 16170618

Project Location: Cannon AFB, New Mexico

Project Manager: C. Anderson

Sampler(s): S. Jacobson

Analytical Parameters: Total Lead (6010B)

	Sample Date	Sample Time	Type Comp.	Type Grab	Sample Identification	Matrix	Containers No.	Containers Type	Total Lead (6010B)	Remarks
1	12/6/11	1307		X	CAA-SS01	soil	1	4 oz. jar	X	48 hr. T.A.T.
2		1340			CAA-SS02					
3		1430			CAA-SS03					
4		1500			CAA-SS04 + MS/MSD		2			
5		1550			CAA-SS05		1			
6		0800			CAA-SS52		"			

Signatures	Date	Time	Shipping Details	Special Instructions
Relinquished by:	12-7-11	0900	Method of Shipment: Fed Ex Priority Overnight	48 Hr. T.A.T.
Received by:			Airbill No. 8742 0325 8823	R.T.
Relinquished by:			Lab Address: EMAX Laboratories, Inc. Attn: Molly Nguyen 1835 West 205th St Torrance, CA 90501 (301) 618-8889	
Received for Laboratory by:	12/8/11	09/45		

Custody.frm/jdg 3-09-92

White copy - Laboratory Yellow copy - Laboratory Pink copy - WCC

122865

REPORTING CONVENTIONS

DATA QUALIFIERS:

Lab Qualifier	AFCEE Qualifier	Description
J	F	Indicates that the analyte is positively identified and the result is less than RL but greater than MDL.
N		Indicates presumptive evidence of a compound.
B	B	Indicates that the analyte is found in the associated method blank as well as in the sample at above QC level.
E	J	Indicates that the result is above the maximum calibration range.
*	*	Out of QC limit.

Note: The above qualifiers are used to flag the results unless the project requires a different set of qualification criteria.

ACRONYMS AND ABBREVIATIONS:

CRDL	Contract Required Detection Limit
RL	Reporting Limit
MRL	Method Reporting Limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
DO	Diluted out

DATES

The date and time information for leaching and preparation reflect the beginning date and time of the procedure unless the method, protocol, or project specifically requires otherwise.

LAB CHRONICLE
LEAD BY ICP

Client : URS GROUP, INC.
Project : CANNON AFB T0170

SDG NO. : 11L059
Instrument ID : T-ID8

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	IPL015SQ	1	NA	12/12/1117:08	12/08/1114:05	ID8L009022	ID8L009020	IPL015S	Method Blank
LCS1S	IPL015SX	1	NA	12/12/1117:11	12/08/1114:05	ID8L009023	ID8L009020	IPL015S	Lab Control Sample (LCS)
LCD1S	IPL015SY	1	NA	12/12/1117:14	12/08/1114:05	ID8L009024	ID8L009020	IPL015S	LCS Duplicate
CAA-SS04AS	L059-04A	0.952	16.5	12/12/1117:16	12/08/1114:05	ID8L009025	ID8L009020	IPL015S	Analytical Spike Sample
CAA-SS04	L059-04W	0.952	16.5	12/12/1117:20	12/08/1114:05	ID8L009026	ID8L009020	IPL015S	Field Sample
CAA-SS04DL	L059-04J	4.76	16.5	12/12/1117:23	12/08/1114:05	ID8L009027	ID8L009020	IPL015S	Diluted Sample
CAA-SS04MS	L059-04M	0.980	16.5	12/12/1117:26	12/08/1114:05	ID8L009028	ID8L009020	IPL015S	Matrix Spike Sample (MS)
CAA-SS04MSD	L059-04S	0.917	16.5	12/12/1117:29	12/08/1114:05	ID8L009029	ID8L009020	IPL015S	MS Duplicate (MSD)
CAA-SS01	L059-01W	0.943	16.6	12/12/1117:32	12/08/1114:05	ID8L009030	ID8L009020	IPL015S	Field Sample
CAA-SS02	L059-02W	0.943	9.1	12/12/1117:43	12/08/1114:05	ID8L009034	ID8L009032	IPL015S	Field Sample
CAA-SS03	L059-03W	0.971	13.1	12/12/1117:46	12/08/1114:05	ID8L009035	ID8L009032	IPL015S	Field Sample
CAA-SS05	L059-05W	0.877	21.0	12/12/1117:49	12/08/1114:05	ID8L009036	ID8L009032	IPL015S	Field Sample
CAA-SS52	L059-06W	0.952	9.3	12/12/1117:52	12/08/1114:05	ID8L009037	ID8L009032	IPL015S	Field Sample

FN - Filename
% Moist - Percent Moisture

RESULT SUMMARIES

METHOD SW3050B/6010C
LEAD BY ICP

Client	: URS GROUP, INC.	Date Collected:	12/06/11 13:07
Project	: CANNON AFB TO170	Date Received:	12/08/11
SDG NO.	: 11L059	Date Extracted:	12/08/11 14:05
Sample ID:	CAA-SS01	Date Analyzed:	12/12/11 17:32
Lab Samp ID:	L059-01W	Dilution Factor:	0.943
Lab File ID:	ID8L009030	Matrix :	SOIL
Ext Btch ID:	IPL015S	% Moisture :	16.6
Calib. Ref.:	ID8L009020	Instrument ID :	EMAXTID8

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	MDL (mg/kg)
Lead	17.1	1.13	0.339

METHOD SW3050B/6010C
LEAD BY ICP

Client	: URS GROUP, INC.	Date Collected:	12/06/11 13:40
Project	: CANNON AFB TO170	Date Received:	12/08/11
SDG NO.	: 11L059	Date Extracted:	12/08/11 14:05
Sample ID:	CAA-SS02	Date Analyzed:	12/12/11 17:43
Lab Samp ID:	L059-02W	Dilution Factor:	0.943
Lab File ID:	ID8L009034	Matrix :	SOIL
Ext Btch ID:	IPL015S	% Moisture :	9.1
Calib. Ref.:	ID8L009032	Instrument ID :	EMAXTID8

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	MDL (mg/kg)
Lead	19.0	1.04	0.311

METHOD SW3050B/6010C
LEAD BY ICP

Client	: URS GROUP, INC.	Date Collected:	12/06/11 14:30
Project	: CANNON AFB TO170	Date Received:	12/08/11
SDG NO.	: 11L059	Date Extracted:	12/08/11 14:05
Sample ID:	CAA-SS03	Date Analyzed:	12/12/11 17:46
Lab Samp ID:	L059-03W	Dilution Factor:	0.971
Lab File ID:	ID8L009035	Matrix :	SOIL
Ext Btch ID:	IPL015S	% Moisture :	13.1
Calib. Ref.:	ID8L009032	Instrument ID :	EMAXTID8

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	MDL (mg/kg)
Lead	10.5	1.12	0.335

METHOD SW3050B/6010C
LEAD BY ICP

Client	: URS GROUP, INC.	Date Collected:	12/06/11 15:00
Project	: CANNON AFB TO170	Date Received:	12/08/11
SDG NO.	: 11L059	Date Extracted:	12/08/11 14:05
Sample ID:	CAA-SS04	Date Analyzed:	12/12/11 17:20
Lab Samp ID:	L059-04W	Dilution Factor:	0.952
Lab File ID:	ID8L009026	Matrix :	SOIL
Ext Btch ID:	IPL015S	% Moisture :	16.5
Calib. Ref.:	ID8L009020	Instrument ID :	EMAXTID8

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	MDL (mg/kg)
Lead	43.2	1.14	0.342

METHOD SW3050B/6010C
LEAD BY ICP

Client	: URS GROUP, INC.	Date Collected:	12/06/11 15:50
Project	: CANNON AFB TO170	Date Received:	12/08/11
SDG NO.	: 11L059	Date Extracted:	12/08/11 14:05
Sample ID:	CAA-SS05	Date Analyzed:	12/12/11 17:49
Lab Samp ID:	L059-05W	Dilution Factor:	0.877
Lab File ID:	ID8L009036	Matrix :	SOIL
Ext Btch ID:	IPL015S	% Moisture :	21.0
Calib. Ref.:	ID8L009032	Instrument ID :	EMAXTID8

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	MDL (mg/kg)
Lead	112	1.11	0.333

METHOD SW3050B/6010C
LEAD BY ICP

Client	: URS GROUP, INC.	Date Collected:	12/06/11 08:00
Project	: CANNON AFB TO170	Date Received:	12/08/11
SDG NO.	: 11L059	Date Extracted:	12/08/11 14:05
Sample ID:	CAA-SS52	Date Analyzed:	12/12/11 17:52
Lab Samp ID:	L059-06W	Dilution Factor:	0.952
Lab File ID:	ID8L009037	Matrix :	SOIL
Ext Btch ID:	IPL015S	% Moisture :	9.3
Calib. Ref.:	ID8L009032	Instrument ID :	EMAXTID8

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	MDL (mg/kg)
Lead	34.4	1.05	0.315

QC SUMMARIES

METHOD BLANK

Method: SW6010C

QC Measure: IPL015SQ

Associated Samples:

CAA-SS04
CAA-SS01
CAA-SS02
CAA-SS03
CAA-SS05
CAA-SS52

METHOD SW3050B/6010C
LEAD BY ICP

Client	: URS GROUP, INC.	Date Collected:	NA
Project	: CANNON AFB TO170	Date Received:	12/08/11
SDG NO.	: 11L059	Date Extracted:	12/08/11 14:05
Sample ID:	MBLK1S	Date Analyzed:	12/12/11 17:08
Lab Samp ID:	IPL015SQ	Dilution Factor:	1
Lab File ID:	ID8L009022	Matrix :	SOIL
Ext Btch ID:	IPL015S	% Moisture :	NA
Calib. Ref.:	ID8L009020	Instrument ID :	EMAXTID8

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	MDL (mg/kg)
Lead	ND	1.00	0.300

LAB CONTROL SAMPLE / LAB CONTROL SAMPLE DUPLICATE

Method: SW6010C

QC Measure: IPL015SY

Associated Samples:

CAA-SS04
CAA-SS01
CAA-SS02
CAA-SS03
CAA-SS05
CAA-SS52

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: URS GROUP, INC.
PROJECT: CANNON AFB T0170
SDG NO.: 11L059
METHOD: SW3050B/6010B

MATRIX:	SOIL			% MOISTURE:	NA
DILTN FACTR:	1	1	1		
SAMPLE ID:	MBLK1S				
CONTROL NO.:	IPL015SQ	IPL015SX	IPL015SY		
LAB FILE ID:	ID8L009022	ID8L009023	ID8L009024		
DATIME EXTRCTD:	12/08/1114:05	12/08/1114:05	12/08/1114:05	DATE COLLECTED:	NA
DATIME ANALYZD:	12/12/1117:08	12/12/1117:11	12/12/1117:14	DATE RECEIVED:	12/08/11
PREP. BATCH:	NA	NA	NA		
CALIB. REF:	ID8L009020	ID8L009020	ID8L009020		

ACCESSION:

PARAMETER	BLNK RSLT mg/kg	SPIKE AMT mg/kg	BS RSLT mg/kg	BS % REC	SPIKE AMT mg/kg	BSD RSLT mg/kg	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Lead	ND	50	49.9	100	50	48.3	97	3	80-120	20

MS/MSD
SERIAL DILUTION
ANALYTICAL SPIKE

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: URS GROUP, INC.
PROJECT: CANNON AFB T0170
SDG NO.: 11L059
METHOD: SW3050B/6010B

MATRIX:	SOIL			% MOISTURE:	16.5
DILTN FACTR:	0.952	0.980	0.917		
SAMPLE ID:	CAA-SS04				
CONTROL NO.:	L059-04W	L059-04M	L059-04S		
LAB FILE ID:	ID8L009026	ID8L009028	ID8L009029		
DATIME EXTRCTD:	12/08/1114:05	12/08/1114:05	12/08/1114:05	DATE COLLECTED:	12/06/11 15:00
DATIME ANALYZD:	12/12/1117:20	12/12/1117:26	12/12/1117:29	DATE RECEIVED:	12/08/11
PREP. BATCH:	NA	NA	NA		
CALIB. REF:	ID8L009020	ID8L009020	ID8L009020		

ACCESSION:

PARAMETER	SMPL RSLT mg/kg	SPIKE AMT mg/kg	MS RSLT mg/kg	MS % REC	SPIKE AMT mg/kg	MSD RSLT mg/kg	MSD % REC	RPD %	QC LIMIT %	MAX RPD %
Lead	43.2	58.7	94.8	88	54.9	86.3	78*	9	80-120	20

APPENDIX E New Mexico Environment Department Soil Screening Levels

This appendix presents an excerpt from Table A-1 from New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation, February 2012.

Chemical	Residential Soil (mg/kg)	End-point	Industrial/ Occupational Soil (mg/kg)	End-point	Construction Worker Soil (mg/kg)	End-point	Tap Water (µg/L)	End-point	Risk-based SSL for a DAF of 1 (mg/kg)	Risk-based SSL for a DAF of 20 (mg/kg)
2,4/2,6-Dintrotoluene Mixture	7.15E+00	c	2.82E+01	c	2.45E+02	c	9.88E-01	c	1.08E-03	2.08E-02
1,4-Dioxane	4.86E+01	c	1.92E+02	c	1.66E+03	c	6.72E+00	c	1.20E-03	2.38E-02
1,2-Diphenylhydrazine	6.08E+00	c	2.39E+01	c	2.07E+02	c	8.40E-01	c	2.04E-03	4.08E-02
Endosulfan	3.67E+02	n	4.10E+03	n	1.43E+03	n	2.19E+02	n	2.26E+00	4.52E+01
Endrin	1.83E+01	n	2.05E+02	n	7.15E+01	n	1.10E+01	n	3.33E-01	6.64E+00
Epichlorohydrin	4.10E+01	n	2.06E+02	n	3.84E+01	n	2.07E+00	n	4.41E-04	7.78E-03
Ethyl acetate	7.04E+04	ns	1.02E+06	nls	2.79E+05	nls	3.29E+04	n	6.01E+00	1.20E+02
Ethyl acrylate	1.33E+02	c	6.62E+02	c	4.52E+03	cs	1.40E+01	c	2.76E-03	5.34E-02
Ethyl chloride	2.98E+04	ns	1.41E+05	nls	2.61E+04	nls	2.09E+04	n	5.29E+00	1.07E+02
Ethyl ether	1.56E+04	ns	2.27E+05	nls	6.19E+04	ns	7.30E+03	n	2.29E+00	2.83E+01
Ethyl methacrylate	4.55E+03	ns	3.80E+04	ns	2.79E+04	ns	5.26E+02	n	1.14E-01	2.09E+00
Ethylbenzene	6.84E+01	c	3.78E+02	cs	1.83E+03	cs	1.48E+01	c	1.36E-01	2.60E-01
Ethylene oxide	4.06E+00	c	2.22E+01	c	1.11E+02	c	4.41E-01	c	7.85E-05	1.58E-03
Fluoranthene	2.29E+03	n	2.44E+04	n	8.91E+03	n	1.46E+03	n	1.22E+02	2.43E+03
Fluorene	2.29E+03	n	2.44E+04	ns	8.91E+03	ns	1.46E+03	n	2.03E+01	4.06E+02
Fluoride	3.13E+03	n	4.54E+04	n	1.24E+04	n	1.46E+03	n	2.53E-01	8.37E+00
Furan	7.82E+01	n	1.14E+03	n	3.10E+02	n	3.65E+01	n	1.48E-02	2.32E-01
Heptachlor	1.08E+00	c	4.26E+00	c	3.68E+01	c	1.49E-01	c	9.27E-03	1.85E-01
Hexachlorobenzene	3.04E+00	c	1.20E+01	c	1.03E+02	c	4.20E-01	c	3.98E-03	7.96E-02
Hexachloro-1,3-butadiene	6.11E+01	n	2.46E+02	c	2.38E+02	n	8.62E+00	c	1.24E-02	2.57E-01
Hexachlorocyclopentadiene	3.67E+02	n	4.10E+03	n	8.11E+02	n	2.19E+02	n	1.08E+00	1.05E+01
Hexachloroethane	4.28E+01	n	4.79E+02	n	1.67E+02	n	1.68E+01	c	7.87E-03	1.64E-01
n-Hexane	9.38E+02	ns	5.11E+03	ns	9.73E+02	ns	8.76E+02	n	4.24E-01	1.53E+02
HMX	3.91E+03	n	5.68E+04	n	1.55E+04	n	1.83E+03	n	1.87E+00	3.54E+01
Hydrazine anhydride	2.13E+00	c	1.06E+01	c	6.85E+01	c	2.24E-01	c	5.08E-04	1.02E-02
Hydrogen cyanide	1.07E+01	n	5.98E+01	n	1.14E+01	n	1.55E+00	n	4.44E-04	5.39E-03
Indeno(1,2,3-c,d)pyrene	1.48E+00	c	2.34E+01	c	2.13E+02	c	2.95E-01	c	8.63E-01	1.73E+01
Iron	5.48E+04	n	7.95E+05	nl	2.17E+05	nl	2.56E+04	n	6.43E+02	1.29E+04
Isobutanol (Isobutyl alcohol)	2.35E+04	ns	3.41E+05	nls	9.29E+04	ns	1.10E+04	n	1.95E+00	3.89E+01
Isophorone	5.12E+03	c	1.37E+05	cs	4.75E+04	n	7.07E+02	c	1.92E-01	3.84E+00
Lead	4.00E+02	IEUB	8.00E+02	IEUB	8.00E+02	IEU				

APPENDIXF Los Alamos National Laboratory Ecological Screening Levels

This appendix presents an excerpt from the ESLs_R2.5.xlsx file from the ECORISK Database Release 2.5, October 2010

Analyte Group	Analyte Name	Analyte Code	ESL Medium	ESL Receptor	ESL	Units	Final ESL	Note	ESL ID
Inorganic Compound	Lead	PB	SOIL	American kestrel (Avian intermediate carnivore)	120	mg/kg			SOIL_AK(fi)_PB
Inorganic Compound	Lead	PB	SOIL	American kestrel (Avian top carnivore)	810	mg/kg			SOIL_AK(f)_PB
Inorganic Compound	Lead	PB	SOIL	American robin (Avian herbivore)	21	mg/kg			SOIL_AR(p)_PB
Inorganic Compound	Lead	PB	SOIL	American robin (Avian insectivore)	14	mg/kg	FINAL		SOIL_AR(i)_PB
Inorganic Compound	Lead	PB	SOIL	American robin (Avian omnivore)	16	mg/kg			SOIL_AR(ip)_PB
Inorganic Compound	Lead	PB	SOIL	Deer mouse (Mammalian omnivore)	120	mg/kg			SOIL_DM(ip)_PB
Inorganic Compound	Lead	PB	SOIL	Desert cottontail (Mammalian herbivore)	370	mg/kg			SOIL_DC(p)_PB
Inorganic Compound	Lead	PB	SOIL	Earthworm (Soil-dwelling invertebrate)	1700	mg/kg			SOIL_EW_PB
Inorganic Compound	Lead	PB	SOIL	Generic plant (Terrestrial autotroph - producer)	120	mg/kg			SOIL_GP_PB
Inorganic Compound	Lead	PB	SOIL	Montane shrew (Mammalian insectivore)	72	mg/kg			SOIL_MS(i)_PB
Inorganic Compound	Lead	PB	SOIL	Red fox (Mammalian top carnivore)	3700	mg/kg			SOIL_RF(f)_PB

ATTACHMENT A

SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT
SCOPING ASSESSMENT
SITE ASSESSMENT CHECKLIST

NEW MEXICO ENVIRONMENT DEPARTMENT

SITE ASSESSMENT CHECKLIST

AOC A, CANNON AIR FORCE BASE, CLOVIS, NM

I. SITE LOCATION

North 34 degrees, 23 minutes, 49.56 seconds
West -103 degrees, 19 minutes, 15.96 seconds

1. Site Name: **AREA OF CONCERN A**
   US EPA I.D.Number: **NM7572124454**
   Location: **KERMIT EVANS AVENUE, CANNON AFB**
   County **CURRY**
   City: **CLOVIS** State: **NM**
2. Latitude: **N 34 deg., 23' 49.56"** Longitude: **W -103 deg., 19' 15.96"**

3. Attach site maps, including a topographical map, a diagram which illustrates the layout of the facility (e.g., site boundaries, structures, etc.), and maps showing all habitat areas identified in Section III of the checklist. Also, include maps which illustrate known release areas, sampling locations, and any other important features, if available.

II. SITE CHARACTERIZATION

1. Indicate the approximate area of the site (i.e., acres or sq. ft)

   0.6 acres (within the jurisdictional boundary see Map [Figure G-2] attached)
2. Provide an approximate breakdown of the land uses on the site:

_____% Heavy Industrial	**67% Light Industrial**	_____% Urban
_____% Residential	_____% Rural	_____% Agricultural[b]
_____% Recreational[a]	_____% Undisturbed	**33% Other**[c]

[a]For recreational areas, please describe the usage of the area (e.g., park, playing field, etc.):

[b]For agricultural areas, please list the crops and/or livestock which are present:

[c]For areas designated as "other", please describe the usage of the area: **LAWN GRASS**

3. Provide an approximate breakdown of the land uses in the area surrounding the site.

Indicate the radius (in miles) of the area described: **1,000 ft (0.19 miles)**

_____% Heavy Industrial	**67 % Light Industrial**	_____% Urban
_____% Residential	_____% Rural	_____% Agricultural[b]
33 % Recreational[a]	_____% Undisturbed	_____% Other [c]

[a]For recreational areas, please describe the usage of the area (e.g., park, playing field, golf course, etc.): **GOLF COURSE**

[b]For agricultural areas, please list the crops and/or livestock which are present:

[c]For areas designated as "other", please describe the usage of the area:

4. Describe reasonable and likely future land and/or water use(s) at the site.
Reasonable likely future land use is DEVELOPED as Open Recreational Area associated with a Residential housing complex .

Cannon AFB. 2010. General Plan, Cannon Air Force Base, New Mexico. Air Force Special Operations Command – 27th Special Operations Wing. Available at: http://not1moreacre.net/docs/Cannon%20AFB_General%20Plan%202010.pdf.

5. Describe the historical uses of the site. Include information on chemical releases that may have occurred as a result of previous land uses. For each chemical release, provide information on the form of the chemical released (i.e., solid, liquid, vapor) and the known or suspected causes or mechanism of the release (i.e., spills, leaks, material disposal, dumping, explosion, etc.).

AOC A (SS-19) is the site of two motor gasoline spills (MOGAS) from overturned fuel trucks. Both spills occurred in the early 1960s at the present location of Kermit Evans Avenue (formerly Argentia Avenue), across from the refueling area of Facility No. 379, southeast of Building 444. The total quantity of MOGAS spilled is estimated to be 2,000 to 3,000 gallons. No attempts were made to recover the fuel or to excavate and replace contaminated soils. The fire department reportedly washed down the area after the two spills occurred (CH2M Hill 1983).

CH2M Hill. 1983. Installation Restoration Program Records Search for Cannon Air Force Base. August.

6. If any movement of soil has taken place at the site, describe the degree of the disturbance. Indicate the likely source of any disturbances (e.g., erosion,

agricultural, mining, industrial activities, removals, etc.) and estimate when these events occurred.

The physical features of the site were changed in 1977 during the construction of Building 444. Some re-grading of the ground surface occurred in this area.

7. Describe the current uses of the site. Include information on recent (previous 5 years) disturbances or chemical releases that have occurred. For each chemical release, provide information on the form of the chemical released and the causes or mechanism of the release.
The area where the spill occurred is currently a roadside drainage swale covered with lawn grass which is regularly maintained through mowing. No new spills/releases have occurred in this area.

8. Identify the location or suspected location of chemical releases at the site. Provide an estimate of the distance between these locations and the areas identified in Section III.
A small drainage swale running to the southeast through a grassy area on the west side of Kermit Evans Avenue (formerly Argentia Avenue) near the driveway of Building 444, Cannon AFB, Clovis, NM. There are no Wetlands, Aquatic, Terrestrial, Wooded, Shrub/Scrub, or Grassland Habitats on, adjacent to, or in the vicinity of AOC A (See Section III).

9. Identify the suspected contaminants of concern (COCs) at the site. If known, include the maximum contaminant levels. Please indicate the source of data cited (e.g., RFI, confirmatory sampling, etc.).
Lead is the chemical of concern for AOC A. Soil samples were collected on 19 December 1984 (Radian Corporation. 1986. Installation Restoration Program , Phase II – Confirmation/Quantification, Stage 1), 15 February 2005 (URS. 2005. Supplemental Assessment of Areas of Concern A, B, & C), and 6 December 2011 (URS. Phase II Supplemental Assessment at AOC A [SS-19]); the maximum detected lead concentration was 1.12E+02 mg/kg.

10. Identify the media (e.g., soil (surface or subsurface), surface water, air, groundwater) which are known or suspected to contain COCs.
Surface soil is the medium of concern. There are no surface water bodies on or adjacent to the site. If lead was transferred to groundwater, potential direct exposure to groundwater for ecological receptors is incomplete; and there are no surface water bodies to which groundwater can be discharged.

11. Indicate the approximate depth to groundwater (in feet below ground surface [(bgs)].
Depth to groundwater is greater than 200 feet bgs.

12. Indicate the direction of groundwater flow (e.g., north, southeast, etc.)

Local groundwater flow is southeasterly (Lee Wan 1990).

Lee Wan Associates, Inc. 1990. RCRA Facility Investigation Work Plan, Field Sampling Plan, and Program Management Plan. June.

III. HABITAT EVALUATION

III.A Wetland Habitats

Are any wetland[2] areas such as marshes or swamps on or adjacent to the site?

☐ Yes **X No**

If yes, indicate the wetland area on the attached site map and answer the following questions regarding the wetland area. If more than one wetland area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual wetland area. Distinguish between wetland areas by using names or other designations (such as location), and clearly identify each area on the site map. Also, obtain and attach a National Wetlands Inventory Map (or maps) to illustrate each wetland area.

Identify the sources of the observations and information (e.g., National Wetland Inventory, Federal or State Agency, USGS topographic maps) used to make the determination that wetland areas are or are not present.

National Wetland Inventory (Map [Figure WET] Attached)
(Available at: http://www.fws.gov/wetlands/Data/Mapper.html

Although a freshwater pond approximately 1000 ft NNW of AOC A and near the 7th hole of Whispering Winds Golf Course appears on the USFWS National Wetland Inventory map, a 2005 wetland delineation concluded that this water body is not subject to regulation under the Clean Water Act (AFCEE 2009). This and other water bodies within the golf course have been converted to "intensely maintained, lined golf course ponds," and are stocked with sterile grass carp to control algal blooms (AFCEE 2009). Therefore, no wetlands are present on or adjacent to AOC A.

AFCEE. 2009. Whispering Winds Golf Course Environmental Management (GEM) Plan, Cannon AFB, NM. Air Force Center for Engineering and the Environment. September. Available online at:
http://www.afcee.lackland.af.mil/GEM/courses/Cannon/FinalCannonGEMPLan.pdf

If no wetland areas are present, proceed to Section III.B.

2Wetlands are defined in 40 CFR §232.2 as " Areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Examples of typical wetlands plants include: cattails, cordgrass, willows and cypress trees. National wetland inventory maps may be available at http:\\nwi.fws.gov. Additional information on wetland delineation criteria is also available from the Army Corps of Engineers.

Wetland Area Questions

☐ Onsite ☐ Offsite

Name or Designation **None present.**

_____

1. Indicate the approximate area of the wetland (acres or ft^2)_____

2. Identify the type(s) of vegetation present in the wetland.

   - ❑ Submergent (i.e., underwater) vegetation
   - ❑ Emergent (i.e., rooted in the water, but rising above it) vegetation
   - ❑ Floating vegetation
   - ❑ Scrub/shrub
   - ❑ Wooded
   - ❑ Other (Please describe):_____

3. Estimate the vegetation density of the wetland area.

   - ❑ Dense (i.e., greater than 75% vegetation)
   - ❑ Moderate (i.e., 25% to 75% vegetation)
   - ❑ Sparse (i.e., less than 25% vegetation)

4. Is standing water present? ☐ Yes ☐ No

   If yes, is the water primarily: ☐ Fresh or ☐ Brackish

   Indicate the approximate area of the standing water (ft^2):

   _____

   Indicate the approximate depth of the standing water, if known (ft. or in.)_____

5. If known, indicate the source of the water in the wetland.

   - ❑ Stream/River/Creek/Lake/Pond
   - ❑ Flooding
   - ❑ Groundwater
   - ❑ Surface runoff

6. Is there a discharge from the facility to the wetland? ☐ Yes ☐ No

   If yes, please describe.

Wetland Area Questions (Continued)

7. Is there a discharge from the wetland? ☐ Yes ☐ No
   If yes, indicate the type of aquatic feature the wetland discharges into:

   - ❑ Surface stream/River (Name:_____)
   - ❑ Lake/Pond (Name:_____)
   - ❑ Groundwater
   - ❑ Not sure

8. Does the area show evidence of flooding? ☐ Yes ☐ No
   If yes, indicate which of the following are present (mark all that apply):

   - ❑ Standing water
   - ❑ Water-saturated soils
   - ❑ Water marks
   - ❑ Buttressing
   - ❑ Debris lines
   - ❑ Mud cracks
   - ❑ Other (Please describe):_____

9. Animals observed in the wetland area or suspected to be present based on indirect evidence or file material:

   - ❑ Birds
   - ❑ Fish
   - ❑ Mammals
   - ❑ Reptiles (e.g., snakes, turtles)
   - ❑ Amphibians (e.g., frogs, salamanders)
   - ❑ Sediment-dwelling invertebrates (e.g., mussels, crayfish, insect nymphs)

   Specify species, if known:
   _____
   _____
   _____
   _____

III.B Aquatic Habitats
III.B.1 Non-Flowing Aquatic Features

Are any non-flowing aquatic features (such as ponds or lakes) located at or adjacent to the site?

X Yes ☐No

If yes, indicate the aquatic feature on the attached site map and answer the following questions regarding the non-flowing aquatic features. If more than one non-flowing aquatic feature is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual aquatic feature. Distinguish between aquatic features by using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.B.2.

Non-Flowing Aquatic Feature Questions

☐ Onsite **X Offsite**

Name or Designation: **Pond near 7th hole of Whispering Winds Golf Course (approx.. 0.19 miles from AOC A, see Figure WET).**

1. Indicate the type of aquatic feature present:

   ❑ Natural (e.g., pond or lake)
   X **Man-made (e.g., impoundment, lagoon, canal, etc.)**

2. Estimate the approximate size of the water body (in acres or sq. ft.) **0.2 acres**

3. If known, indicate the depth of the water body (in ft. or in.)._**Unknown**

Non-Flowing Aquatic Feature Questions (Continued)

4. Indicate the general composition of the bottom substrate. Mark all sources that apply from the following list.

☐ Bedrock	☐ Sand	☐ Concrete
☐ Boulder (>10 in.)	☐ Silt	☐ Debris
☐ Cobble (2.5 - 10 in.)	☐ Clay	☐ Detritus
☐ Gravel (0.1 - 2.5 in.)	☐ Muck (fine/black)	

X Other (please specify): Lined with plastic (Cannon AFB General Plan 2010)

5. Indicate the source(s) of the water in the aquatic feature. Mark all sources that apply from the following list.

- ☐ River/Stream/Creek
- ☐ Groundwater
- ☐ Industrial Discharge
- **X Surface Runoff**
- ☐ Other (please specify):_____

6. Is there a discharge from the facility to the aquatic feature? ☐ Yes **X No**

   If yes, describe the origin of each discharge and its migration path:

   _____
   _____
   _____
   _____

7. Does the aquatic feature discharge to the surrounding environment? ☐ Yes **X No**

   If yes, indicate the features from the following list into which the aquatic feature discharges, and indicate whether the discharge occurs onsite or offsite:

- ☐ River/Stream/Creek ☐ onsite ☐ offsite
- ☐ Groundwater ☐ onsite ☐ offsite
- ☐ Wetland ☐ onsite ☐ offsite
- ☐ Impoundment ☐ onsite ☐ offsite
- ☐ Other (please describe)_____

Non-Flowing Aquatic Feature Questions (Continued)

8. Animals observed in the vicinity of the aquatic feature or suspected to be present based on indirect evidence or file material:

X **Birds**
X **Fish**
❑ Mammals
❑ Reptiles (e.g., snakes, turtles)
❑ Amphibians (e.g., frogs, salamanders)
❑ Sediment-dwelling invertebrates (e.g., mussels, crayfish, insect nymphs)

Specify species, if known:
Migratory shorebirds and waterfowl (e.g., Canada geese) stop seasonally. The pond is stocked with sterile grass carp (*Ctenopharyngodon idella*) to control algae; no other fish species are present. Because the pond is man-made, lined with plastic, and is not connected to any other waterbody, colonization by sediment-dwelling invertebrates and amphibians is expected to be limited.

III.B.2 Flowing Aquatic Features

Are any flowing aquatic features (such as streams or rivers) located at or adjacent to the site?

☐ Yes **X No**

If yes, indicate the aquatic feature on the attached site map and answer the following questions regarding the flowing aquatic features. If more than one flowing aquatic feature is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual aquatic feature. Distinguish between aquatic features by using names or other designations, and clearly identify each area on the site map

If no, proceed to Section III.C.

Flowing Aquatic Feature Questions

☐ Onsite ☐ Offsite

Name or Designation:_____

1. Indicate the type of flowing aquatic feature present.

   - ❑ River
   - ❑ Stream
   - ❑ Creek
   - ❑ Brook
   - ❑ Dry wash
   - ❑ Arroyo
   - ❑ Intermittent stream
   - ❑ Artificially created (ditch, etc.)
   - ❑ Other (specify)
   - ❑

2. Indicate the general composition of the bottom substrate.

   ☐ Bedrock ☐ Sand ☐ Concrete
   ☐ Boulder (>10 in.) ☐ Silt ☐ Debris
   ☐ Cobble (2.5 - 10 in.) ☐ Clay ☐ Detritus
   ☐ Gravel (0.1 - 2.5 in.) ☐ Muck (fine/black)
   ☐ Other (please specify):_____

3. Describe the condition of the bank (e.g., height, slope, extent of vegetative cover) of the aquatic feature.

   _____
   _____
   _____
   _____

4. Is there a discharge from the facility to the aquatic feature? ☐ Yes ☐ No
   If yes, describe the origin of each discharge and its migration path:

   _____
   _____
   _____
   _____

5. Indicate the discharge point of the water body. Specify name, if known.

   _____
   _____
   _____

Flowing Aquatic Feature Questions (Continued)

6. If the flowing aquatic feature is a dry wash or arroyo, answer the following questions.
   - ❑ Check here if feature is not a dry wash or arroyo

   If known, specify the average number of days in a year in which flowing water is present in the feature: _____

   Is standing water or mud present? Check all that apply.
   - ❑ Standing water
   - ❑ Mud
   - ❑ Neither standing water or mud

   Does the area show evidence of recent flow (e.g., flood debris clinging to vegetation)?
   - ❑ Yes
   - ❑ No
   - ❑ Not sure
7. Animals observed in the vicinity of the aquatic feature or suspected to be present based on indirect evidence or file material:

   - ❑ Birds
   - ❑ Fish
   - ❑ Mammals
   - ❑ Reptiles (e.g., snakes, turtles)
   - ❑ Amphibians (e.g., frogs, salamanders)
   - ❑ Sediment-dwelling invertebrates (e.g., mussels, crayfish, insect nymphs)

   Specify species, if known:

   _____
   _____
   _____
   _____

III.C Terrestrial Habitats
III.C.1 Wooded

Are any wooded areas on or adjacent to the site? ☐ Yes **X No**

If yes, indicate the wooded area on the attached site map and answer the following questions. If more than one wooded area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual wooded area. Distinguish between wooded areas by using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.C.2.

Wooded Area Questions

☐ On-site ☐ Off-site

Name or Designation:_____

1. Estimate the approximate size of the wooded area (in acres or sq. ft.)_____

2. Indicate the dominant type of vegetation in the wooded area.

   - ❑ Evergreen
   - ❑ Deciduous
   - ❑ Mixed

   Dominant plant species, if known:_____

3. Estimate the vegetation density of the wooded area.

   - ❑ Dense (i.e., greater than 75% vegetation)
   - ❑ Moderate (i.e., 25% to 75% vegetation)
   - ❑ Sparse (i.e., less than 25% vegetation)

4. Indicate the predominant size of the trees at the site. Use diameter at chest height.

   - ❑ 0-6 inches
   - ❑ 6-12 inches
   - ❑ >12 inches
   - ❑ No single size range is predominant

5. Animals observed in the wooded area or suspected to be present based on indirect evidence or file material:

   - ❑ Birds
   - ❑ Mammals
   - ❑ Reptiles (e.g., snakes, lizards)
   - ❑ Amphibians (e.g., toads, salamanders)

   Specify species, if known:

   _____
   _____
   _____
   _____

III.C.2 Shrub/Scrub

Are any shrub/scrub areas on or adjacent to the site? ☐ Yes **X No**

If yes, indicate the shrub/scrub area on the attached site map and answer the following questions. If more than one shrub/scrub area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual shrub/scrub area. Distinguish between shrub/scrub areas, using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.C.3.

Shrub/Scrub Area Questions

☐ Onsite ☐ Offsite

Name or Designation:_____

1. Estimate the approximate size of the shrub/scrub area (in acres or sq. ft.)._____

2. Indicate the dominant type of shrub/scrub vegetation present, if known.

_____
_____
_____
_____

3. Estimate the vegetation density of the shrub/scrub area.

- ❑ Dense (i.e., greater than 75% vegetation)
- ❑ Moderate (i.e., 25% to 75% vegetation)
- ❑ Sparse (i.e., less than 25% vegetation)

4. Indicate the approximate average height of the scrub/shrub vegetation.

- ❑ 0-2 feet
- ❑ 2-5 feet
- ❑ >5 feet

5. Animals observed in the shrub/scrub area or suspected to be present based on indirect evidence or file material:

- ❑ Birds
- ❑ Mammals
- ❑ Reptiles (e.g., snakes, lizards)
- ❑ Amphibians (e.g., toads, salamanders)

Specify species, if known:

_____
_____
_____
_____

III.C.3 Grassland

Are any grassland areas on or adjacent to the site? **X Yes** ☐ No

If yes, indicate the grassland area on the attached site map and answer the following questions. If more than one grassland area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual grassland area. Distinguish between grassland areas by using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.C.4.

Grassland Area Questions

X Onsite ☐ Offsite

Name or Designation: **LAWN GRASSES**

1. Estimate the approximate size of the grassland area (in acres or sq. ft.). **0.2 acres**
2. Indicate the dominant plant type, if known.

   Plants present are expected to be typical grass species used for lawns in this region. Lawn maintained by mowing on a regular basis.

3. Estimate the vegetation density of the grassland area.

   - ❑ Dense (i.e., greater than 75% vegetation)
   - **X** **Moderate (i.e., 25% to 75% vegetation)**
   - ❑ Sparse (i.e., less than 25% vegetation)

Indicate the approximate average height of the dominant plant type (in ft. or in.) **2 in**

4. Animals observed in the grassland area or **suspected to be present** based on indirect evidence or file material:

   - ❑ Birds
   - ❑ Mammals
   - ❑ Reptiles (e.g., snakes, lizards)
   - ❑ Amphibians (e.g., toads, salamanders)

   Specify species, if known: **Specific observations of biota within AOC A have not been recorded. It is assumed that opportunistic birds, mammals and reptiles typical of man-made structures and disturbed habitat may occasionally forage in the lawn area, but are not expected to reside, nest or maintain a territory in this area. Due to the absence of water, amphibians are unlikely to be found in this area.**

III.C.4 Desert

Are any desert areas on or adjacent to the site? ☐ Yes **X No**

If yes, indicate the desert area on the attached site map and answer the following questions. If more than one desert area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual desert area. Distinguish between desert areas by using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.C.5.

Desert Area Questions

☐ Onsite ☐ Offsite

Name or Designation:_____

1. Estimate the approximate size of the desert area (in acres or sq. ft.)._____

2. Describe the desert area (e.g., presence or absence of vegetation, vegetation types, presence/size of rocks, sand, etc.)

_____
_____
_____
_____
_____
_____
_____
_____
_____

3. Animals observed in the desert area or suspected to be present based on indirect evidence or file material:

- ❑ Birds
- ❑ Mammals
- ❑ Reptiles (e.g., snakes, lizards)
- ❑ Amphibians (e.g., toads, salamanders)

Specify species, if known:

_____

III.C.5 Other

1. Are there any other terrestrial communities or habitats on or adjacent to the site which were not previously described?

   ☐ Yes **X No**

   If yes, indicate the "other" area(s) on the attached site map and describe the area(s) below. Distinguish between onsite and offsite areas. If no, proceed to Section III.D.

III.D Sensitive Environments and Receptors

1. Do any other potentially sensitive environmental areas[3] exist adjacent to or within 0.5 miles of the site? If yes, list these areas and provide the source(s) of information used to identify sensitive areas. *Do not answer "no" without confirmation from the U.S. Fish and Wildlife Service and appropriate State of New Mexico division.* **No.**
   See response to Section III. A – Wetland Habitat regarding the status of a man-made pond in Whispering Winds Golf Course approximately 1,000 feet from AOC A.

2. Are any areas on or near (i.e., within 0.5 miles) the site which are owned or used by local tribes? If yes, describe. *Contact the Tribal Liason in the Office of the Secretary (505)827-2855 to obtain this information.* **No. Based on the Federal Register, October 1, 2010 (Volume 75, Number 190)(Page 60810-60814); NPS 2008, no federally-listed tribes are located within Curry County, New Mexico.**

4. Does the site serve or potentially serve as a habitat, foraging area, or refuge by rare, threatened, endangered, candidate and/or proposed species (plants or animals), or any otherwise protected species? If yes, identify species. *This information should be obtained from the U.S. Fish and Wildlife Service and appropriate State of New Mexico division.* **No. Table T&E provides a list of special-status species that have been observed in Curry County, their legal status, occurrence and habitat preferences as reported in NM Department of Fish and Game's *Biota Information System of New Mexico*. As described in Section 3.4.1 of the attached report, none of the special-status species has the potential to inhabit or forage in AOC A.**

---

3 Areas that provide unique and often protected habitat for wildlife species. These areas are typically used during critical life stages such as breeding, hatching, rearing of young and overwintering. Refer to **Table 1** at the end of this document for examples of sensitive environments.

5. Is the site potentially used as a breeding, roosting or feeding area by migratory bird species? If yes, identify which species. **No.**

Is the site used by any ecologically[4], recreationally, or commercially important species? If yes, explain. **No.**

IV. EXPOSURE PATHWAY EVALUATION

1. Do existing data provide sufficient information on the nature, rate, and extent of contamination at the site?

   X **Yes**
   ❑ No
   ❑ Uncertain

   Please provide an explanation for your answer: **Because the site is devoid of habitat, ecological receptor species are not present; therefore, no additional information on nature and extent relative to ecological evaluation is needed.**

2. Do existing data provide sufficient information on the nature, rate, and extent of contamination in offsite affected areas?

   ❑ Yes
   ❑ No
   X **Uncertain**
   ❑ No offsite contamination

   Please provide an explanation for your answer: **The site is bordered by light industrial areas, roads, and parking lots, which may contain sources of contamination.**

---

4 Ecologically important species include populations of species which provide a critical (i.e., not replaceable) food resource for higher organisms and whose function as such would not be replaced by more tolerant species; or perform a critical ecological function (such as organic matter decomposition) and whose functions will not be replaced by other species. Ecologically important species include pest and opportunistic species that populate an area <u>if they serve as a food source for other species</u>, but do <u>not</u> include domesticated animals (e.g., pets and livestock) or plants/animals whose existence is maintained by continuous human interventions (e.g., fish hatcheries, agricultural crops, etc.,)

3. Do existing data address potential migration pathways of contaminants at the site?

X **Yes**
- ❑ No
- ❑ Uncertain

Please provide an explanation for your answer **Previous investigations have included collection and analysis of subsurface soil samples. Results of the previous investigations are summarized in Section 1.3.3 of the attached report.**

4. Do existing data address potential migration pathways of contaminants in offsite affected areas?

X **Yes**
- ❑ No
- ❑ Uncertain
- ❑ No offsite contamination

Please provide an explanation for your answer. **Existing data indicate that surface runoff is carried southeast toward the runway.**

5. Are there visible indications of stressed habitats or receptors on or near (i.e., within 0.5 miles) the site that may be the result of a chemical release? If yes, explain. Attach photographs if available. **No.**

6. Is the location of the contamination such that receptors might be reasonably expected to come into contact with it? For soil, this means contamination in the soil 0 to 5 feet below ground surface (bgs). If yes, explain. **Maximum lead concentrations are in the surface soil. Lead concentrations in subsurface (to 10 ft, per NMED 2008 Guidance) is nominal.**

7. Are receptors located in or using habitats where chemicals exist in air, soil, sediment or surface water? If yes, explain. **No. There is no viable ecological habitat present.**

8. Could chemicals reach receptors via groundwater? Can chemicals leach or dissolve to groundwater? Are chemicals mobile in groundwater? Does groundwater discharge into receptor habitats? If yes, explain. **No. Groundwater is greater than 200 feet bgs.**

9. Could chemicals reach receptors through runoff or erosion? Answer the following questions: **No. Surface water gradient is toward similar light industrial environments.**

What is the approximate distance from the contaminated area to the nearest

watercourse or arroyo?

- ❑ 0 feet (i.e., contamination has reached a watercourse or arroyo)
- ❑ 1-10 feet
- ❑ 11-20 feet
- ❑ 21-50 feet
- ❑ 51-100 feet
- ❑ 101-200 feet
- ❑ > 200 feet
- ❑ > 500 feet
- **X** **> 1000 feet**

What is the slope of the ground in the contaminated area?

- **X** **0-10%**
- ❑ 10-30%
- ❑ > 30%

What is the approximate amount of ground and canopy vegetative cover in the contaminated area?

- **X** **< 25%**
- ❑ 25-75%
- ❑ > 75%

Is there visible evidence of erosion (e.g., a rill or gully) in or near the contaminated area?

- ❑ Yes
- **X** **No**
- ❑ Do not know

Do any structures, pavement, or natural drainage features direct run-on flow (i.e., surface flows originating upstream or uphill from the area of concern) into the contaminated area?

- ❑ Yes
- **X** **No**
- ❑ Do not know

10. Could chemicals reach receptors through the dispersion of contaminants in air (e.g., volatilization, vapors, fugitive dust)? If yes, explain. **No - Lead is not volatile and fugitive dust is minimized by pavement, asphalt, buildings and lawns covering potentially contaminated soil.**

_____
_____
_____

11. Could chemicals reach receptors through migration of non-aqueous phase liquids (NAPLs)? Is a NAPL present at the site that might be migrating towards receptors or habitats? Could NAPL discharge contact receptors or their habitat? **Not Applicable**

---

12. Could receptors be impacted by external irradiation at the site? Are gamma emitting radionuclides present at the site? Is the radionuclide contamination buried or at the surface? **Not Applicable.**

PHOTOGRAPHIC DOCUMENTATION

During the site visit(s), photographs should be taken to document the current conditions at the site and to support the information entered in the checklist. For example, photographs may be used to document the following:

- The nature, quality, and distribution of vegetation at the site
- Receptors or evidence of receptors
- Potentially important ecological features, such as ponds and drainage ditches
- Potential exposure pathways
- Any evidence of contamination or impact

The following space may be used to record photo subjects.

The attached figure (Figure G-2) showing sample locations is a satellite image of AOC A; it shows that the majority of the site is covered in pavement and that any open areas between pavements are covered with grass. There are no shrubs or trees associated with the spill area. When present, surface runoff flows south, but does not reach other terrestrial or aquatic habitats.

SUMMARY OF OBSERVATIONS AND SITE SETTING

Include information on significant source areas and migration pathways that are likely to constitute complete exposure pathways.

None present.

_____

Checklist Completed by Christine Copenhaver, PhD.
Affiliation URS Corporation
Author Assisted by_____

Date 18 January 2012

TABLE 1
EXAMPLES OF SENSITIVE ENVIRONMENTS

National Parks and National Monuments

Designated or Administratively Proposed Federal Wilderness Areas

National Preserves

National or State Wildlife Refuges

National Lakeshore Recreational Areas

Federal land designated for protection of natural ecosystems

State land designated for wildlife or game management

State designated Natural Areas

Federal or state designated Scenic or Wild River

All areas that provide or could potentially provide critical habitat[1] for state and federally listed Threatened or Endangered Species, those species that are currently petitioned for listing, and species designated by other agencies as sensitive or species of concern

All areas that provide or could potentially provide habitat for state protected species as defined in the Wildlife Code, Chapter 17 of the New Mexico Statutes

All areas that provide or could potentially provide habitat for migratory birds as protected by the Migratory Bird Treaty Act (16 U.S.C. §§ 703-712)

---

1 Critical habitats are defined by the Endangered Species Act (50 CFR §424.02(d)) as:

1) Specific areas within the geographical area currently occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (ii) that may require special management considerations or protection, and
2) Specific areas outside the geographical area occupied by a species at the time it is listed upon a determination by the Secretary [of Interior] that such areas are essential for the conservation of the species.

All areas that provide or could potentially provide habitat for bald eagles and golden eagles as protected by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d)

All areas that provide or could potentially provide habitat for song birds as protected by the State of New Mexico statute (New Mexico Statute, 1978, Chapter 17, Game and Fish, 17-2-13)

All areas that provide or could potentially provide habitat for hawks, vultures and owls as protected by the State of New Mexico statute (New Mexico Statute, 1978, Chapter 17, Game and Fish, 17-2-14)

All areas that provide or could potentially provide habitat for horned toads and Bullfrogs as protected by the State of New Mexico statute (New Mexico Statute, 1978, Chapter 17, Game and Fish, 17-2-15 and 16, resp.)

All perennial waters (e.g., rivers, lakes, playas, sloughs, ponds, etc)

All ephemeral drainage (e.g., arroyos, puddles/pools, intermittent streams, etc) that provide significant wildlife habitat or that could potentially transport contaminants off site to areas that provide wildlife habitat

All riparian habitats

All perennial and ephemeral wetlands (not limited to jurisdictional wetlands)

All areas that are potentially important breeding, staging, and overwintering habitats as well as other habitats important for the survival of animals during critical periods of their life cycle.

ATTACHMENT B

ECOLOGICAL SITE EXCLUSION CRITERIA CHECKLIST AND DECISION TREE

1. NEW MEXICO ECOLOGICAL EXCLUSION CRITERIA CHECKLIST

The following questions are designed to be used in conjunction with the Ecological Exclusion Criteria Decision Tree (Figure 1). After answering each question, refer to the Decision Tree to determine the appropriate next step. In some cases, questions will be omitted as the user is directed to another section as indicated by the flow diagram in the Decision Tree. For example, if the user answers "yes" to Question 1 of Section I, he or she is directed to proceed to Section II.

I. Habitat

In the following questions, "affected property" refers to all property on which a release has occurred or is believed to have occurred, including off-site areas where contamination may have occurred or migrated.

1. Are any of the below-listed sensitive environments at, adjacent to, or in the locality[1] of the affected property? **No.**

   - National Park or National Monument
   - Designated or administratively proposed Federal Wilderness Area
   - National Preserve
   - National or State Wildlife Refuge
   - Federal or State land designated for wildlife or game management
   - State designated Natural Areas
   - All areas that are owned or used by local tribes
   - All areas that are potentially important breeding, staging, and overwintering habitats as well as other habitats important for the survival of animals during critical periods of their life cycle
   - All areas that provide or could potentially provide habitat for state and federally listed Threatened or Endangered Species, those species that are currently petitioned for listing, and species designated by other agencies as sensitive or species of concern
   - All areas that provide or could potentially provide habitat for state protected species as defined in the Wildlife Code, Chapter 17 of the New Mexico Statutes
   - All areas that provide or could potentially provide habitat for migratory birds as protected by the Migratory Bird Treaty Act (16 U.S.C. §§ 703-712)

---

1 *Locality* of the site refers to any area where an ecological receptor is likely to contact site-related chemicals. The locality of the site considers the likelihood of contamination migrating over time and places the site in the context of its general surrounding. Therefore, the locality is typically larger than the site and the areas adjacent to the site.

- All areas that provide or could potentially provide habitat for bald eagles and golden eagles as protected by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d)
- All areas that provide or could potentially provide habitat for song birds as protected by the state of New Mexico statute (New Mexico Statute, 1978, Chapter 17, Game and Fish, 17-2-13)
- All areas that provide or could potentially provide habitat for hawks, vultures and owls as protected by the state of New Mexico statute (New Mexico Statute, 1978, Chapter 17, Game and Fish, 17-2-14)
- All areas that provide or could potentially provide habitat for horned toads and bullfrogs as protected by the state of New Mexico statute (New Mexico Statute, 1978, Chapter 17, Game and Fish, 17-2-15 and 16, respectively)

2. Does the affected property contain land areas which were not listed in Question 1, but could be considered viable ecological habitat? The following are examples (but not a complete listing) of viable ecological habitats: **No.**

- Wooded areas
- Shrub/scrub vegetated areas
- Open fields (prairie)
- Other grassy areas
- Desert areas
- Any other areas which support wildlife and/or vegetation, excluding areas which support only opportunistic species (such as house mice, Norway rats, pigeons, etc.) that do not serve as prey to species in adjacent habitats.

The following features are <u>not</u> considered ecologically viable:

- Pavement
- Buildings
- Paved areas of roadways
- Paved/concrete equipment storage pads
- Paved manufacturing or process areas
- Other non-natural surface cover or structure

3. Does the affected property contain any perennial or ephemeral aquatic features which were not listed in Question 1? **No.**

II. Receptors

1. Is any part of the affected property used for habitat, foraging area, or refuge by any rare, threatened, or endangered species (plant *or* animal), or otherwise protected species (e.g., raptors, migratory birds)? **No.**

2. Is any part of the affected property used for habitat, foraging area, or refuge by any species used as a recreational (e.g., game animals) and/or commercial resource? **No.**

3. Is any part of the affected property used for habitat, foraging area, or refuge by any plant or animal species? This includes plants considered "weeds" and opportunistic insect and animal species (such as cockroaches and rats) if they are used as a food source for other species in the area. **Opportunistic species may occur in the unpaved areas of the site; however, the area of contaminated soil is very small and vegetation or insects gleaned from the site would make up only a small portion of an individual receptor's diet if they should forage in this location. Furthermore, the site is disturbed frequently by mowing, has no shelter or refuge, and is in close proximity to traffic, all of which would deter receptors from utilizing the site to a significant extent.**

III. Exposure Pathways

1. Could receptors be impacted by contaminants via direct contact?

   Is a receptor located in or using an area where it could contact contaminated air, soil, or surface water? **No. Because the majority of the area is paved and all open areas maintained as lawns (with no shrubs or trees for refuge), no species of special concern (such as threatened or endangered species) would utilize the open areas. Opportunistic species or species adapted to man-made environments might occasionally forage in lawn areas, but at a very transient frequency.**

For Questions 2 and 3, note that one must answer "yes" to all three bullets in order to be directed to the "exclusion denied" box of the decision tree. This is because answering "no" to one of the questions in the bullet list indicates that a complete exposure pathway is not present. For example, in Question 2, if the chemical cannot leach or dissolve to groundwater (bullet 1), there is no chance of ecological receptors being exposed to the chemical through contact with contaminated groundwater. Similarly, the responses to the questions in Question 4 determine whether a complete pathway exists for exposure to NAPL.

2. Could receptors contact contaminants via groundwater? **No.**
   - Can the chemical leach or dissolve to groundwater[4]? **Yes, lead can leach or dissolve to some extent depending on the pH, organic content and other properties of the soil.**
   - Can groundwater mobilize the chemical? **Yes. However, based on depth to groundwater (>200 ft), lead is considered unlikely to reach groundwater.**
   - Could (does) contaminated groundwater discharge into known or potential receptor habitats? **No.**

---

4 Information on the environmental fate of specific chemicals can be found on the Internet at *http://www.epa.gov/opptintr/chemfact/* or at a local library in published copies of the *Hazardous Substances Data Bank*.

3. Could receptors contact contaminants via runoff (i.e., surface water and/or suspended sediment) or erosion by water or wind? **No. The topography in the area is very flat, much of the area is asphalt-paved, and, due to the arid conditions, any precipitation is rapidly evaporated. There is a small drainage swale running to the southeast through a grassy area in the southern portion of the site. The direction of flow is southeast toward more light industrial environments.**
   - Are chemicals present in surface soils? **Yes.**
   - Can the chemical be leached from or eroded with surface soils? **Yes.**
   - Is there a receptor habitat located downgradient of the leached/eroded surface soil? **No, the area downgradient is also paved with roadways and parking lots and does not contain ecological habitat.**

4. Could receptors contact contaminants via migration of non-aqueous phase liquids (NAPL)? **No.**
   - Is NAPL present at the site? **No.**
   - Is NAPL migrating toward potential receptors or habitats? **No.**
   - Could NAPL discharge impact receptors or habitats? **No.**

Figure 1 -Ecological Exclusion Criteria Decision Tree

(Refer to corresponding checklist for the full text of each question)

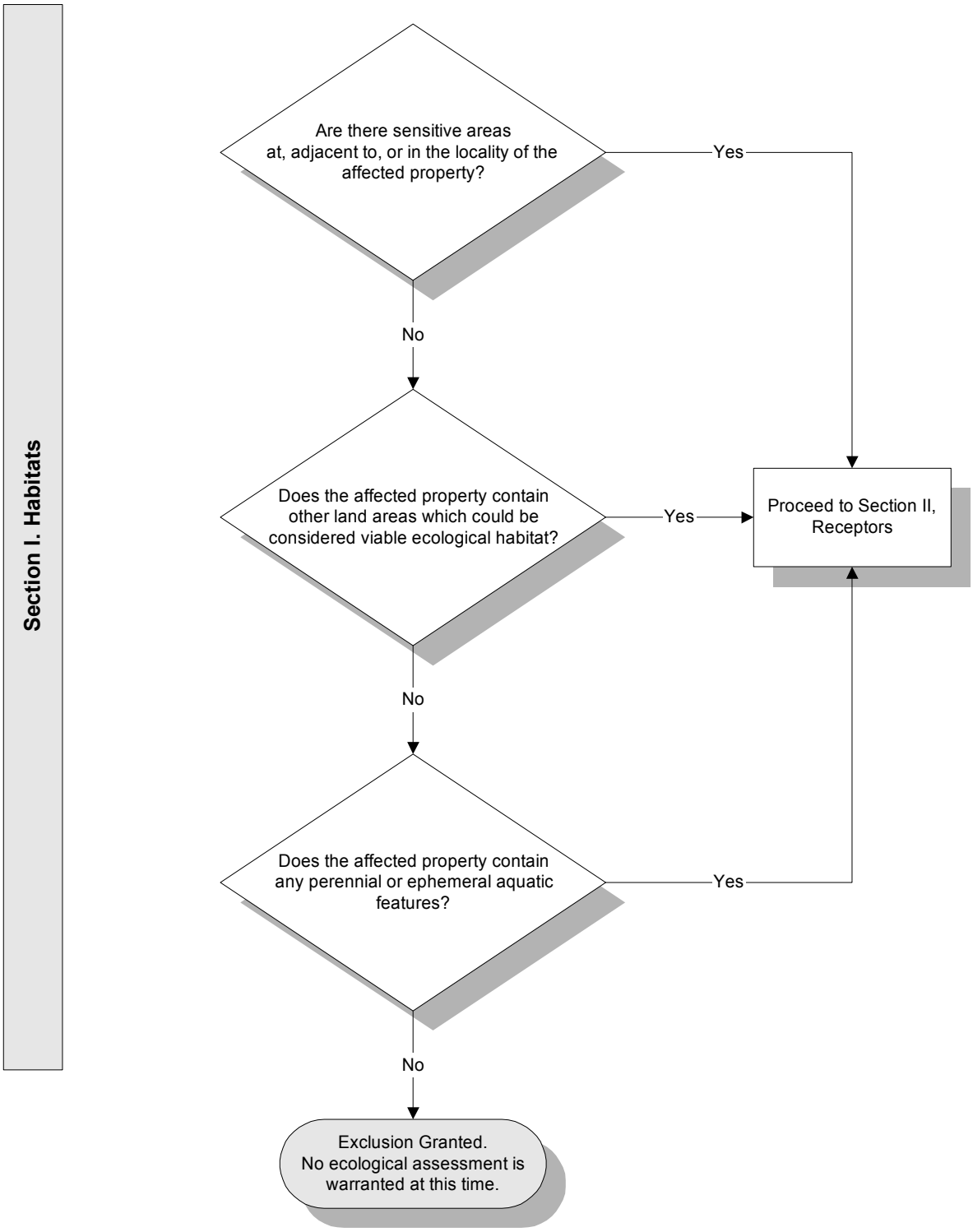


Figure 1 - Exclusion Criteria Decision Tree (continued)

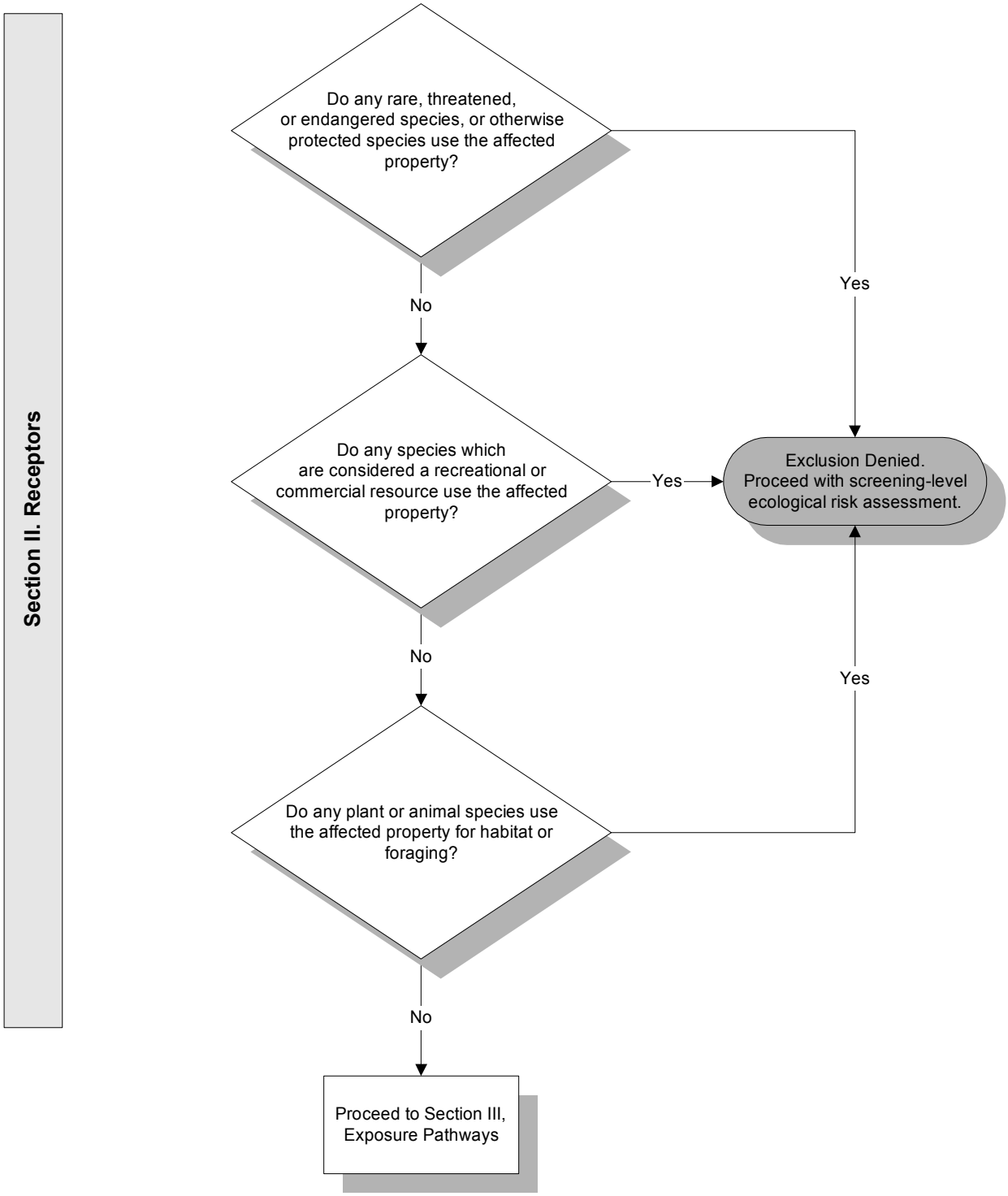


Figure 1 - Exclusion Criteria Decision Tree (continued)

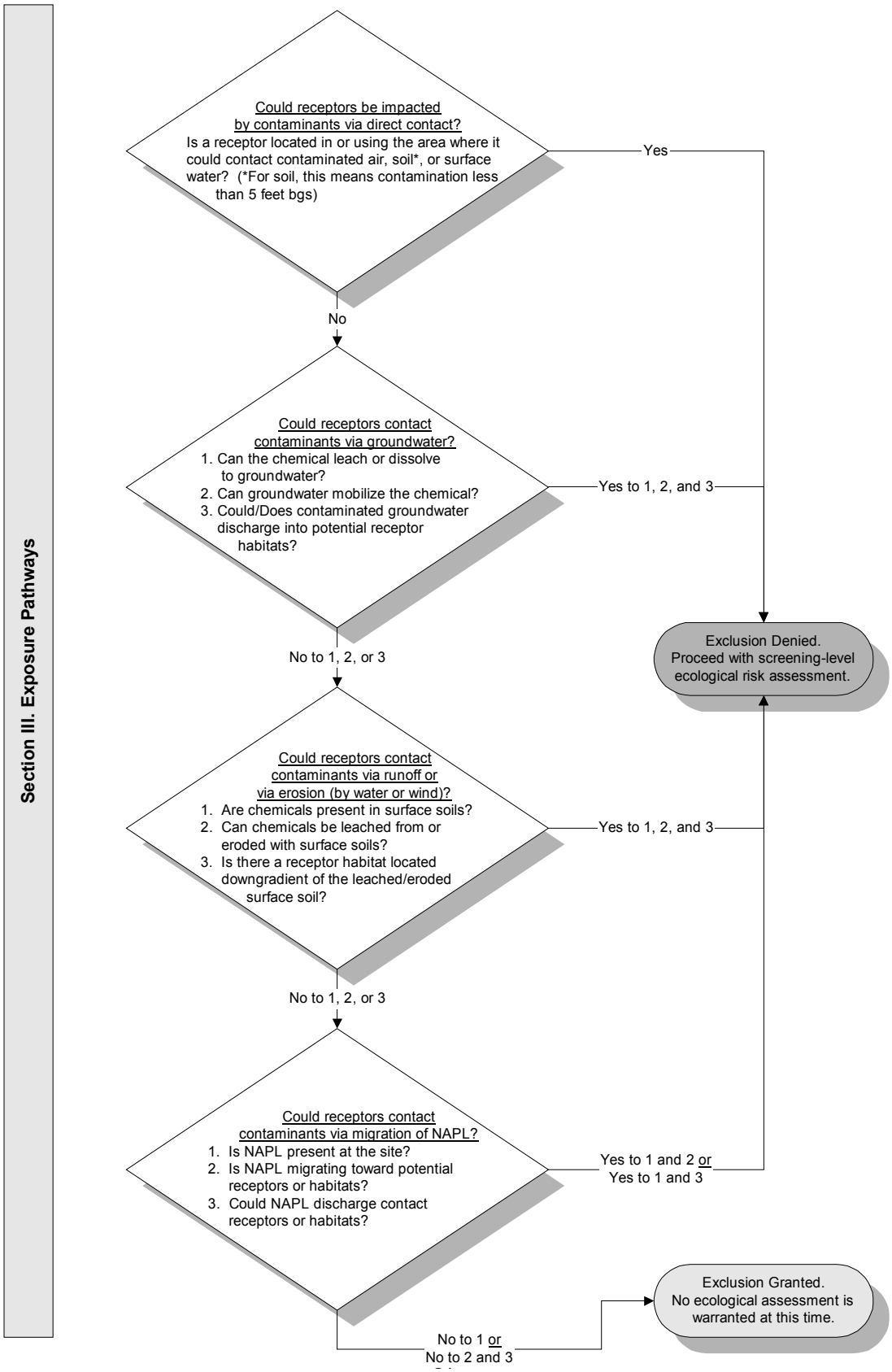
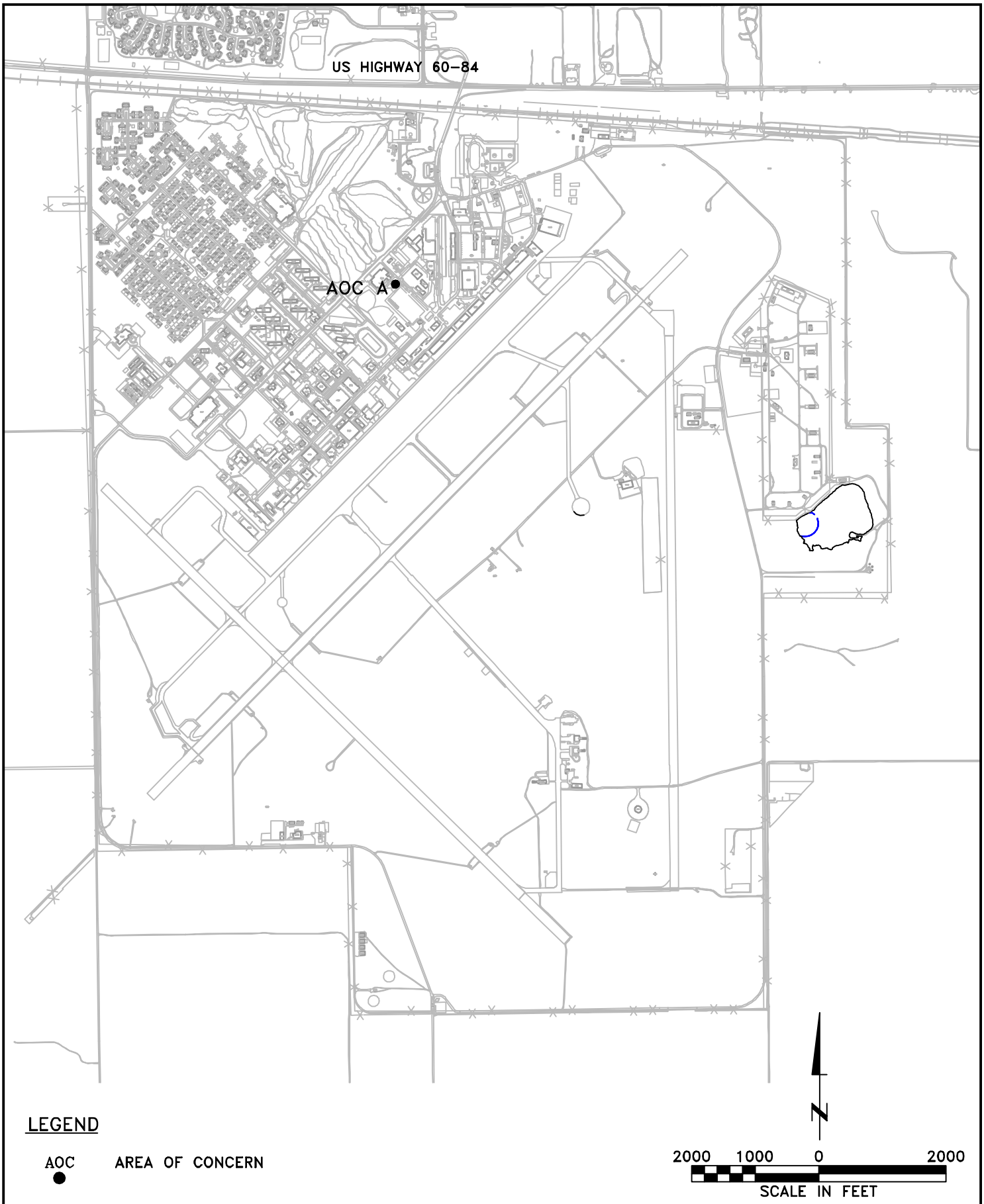


TABLE T-E
STATUS, OCCURENCE AND BEHAVIOR OF FEDERAL AND STATE-LISTED SPECIES
REPORTED FOR CURRY COUNTY, NM

	Scientific Name	Federal Status	State Status	Ocurrence	Behavior
Eagle, Bald	Haliaeetus leucocephalus alascanus (NM)		Threatened	Rare-Uncommon	Regular Transient; possible breeder in county
Falcon, Peregrine	Falco peregrinus anatum	FWS Species of Concern	Threatened	Rare-Uncommon	Regular Transient; possible breeder in mountain crags (not present on Cannon AFB)
Falcon, Peregrine, Arctic	Falco peregrinus tundrius	FWS Species of Concern	Threatened	Rare	Transient
Pipit, Sprague's	Anthus spragueii	Candidate for listing		Rare	Sporadic; in winter only Prefers open prairie grasslands
Prairie-Chicken, Lesser	Tympanuchus pallidicinctus	Candidate for listing	Sensitive taxa (informal)	Year-round	Mixed grass/dwarf shrub dominated prairies or steppes
Sparrow, Baird's	Ammodramus bairdii	FWS Species of Concern	Threatened	Rare-Uncommon	Ocassional Transient; prefers short-grass prairies
Tern, Least	Sterna antillarum athalassos	Endangered	Endangered	Rare-Uncommon	Regular Transient

Source: Biota Information System of New Mexico, New Mexico Department of Game & Fish. On-line at: www.bison-m.org/



LEGEND

AOC ● AREA OF CONCERN

SWMU No.	DESIGNATED AREA
AOC A	SS-19 MOGAS SPILL

January 31, 2012 8:47:31 a.m.
Drawing: T:\CANNON\16170618\200\G-1.dwg

SITE LOCATION PLAN
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 01/21/12	PROJECT NO. 16170618	FIG. NO. G-1
CHK'D. BY: SJ	REVISION: 0		

LEGEND

CAA-SS01 — SURFACE SOIL SAMPLING LOCATIONS

CAA-SB01 — PREVIOUS SOIL BORING LOCATIONS

DRAINAGE SWALE AND FLOW DIRECTION

APPROXIMATE SITE BOUNDARY

19A — RADIAN (1986) SOIL BORING LOCATION (APPROXIMATE)

4308 — GROUND SURFACE ELEVATION CONTOUR

N

100 50 0 100

SCALE IN FEET

January 31, 2012 8:42:57 a.m.
Drawing: T:\CANNON\16170618\200\G-2.dwg

SITE FEATURES
(AERIAL PHOTO MAP)
PHASE II SUPPLEMENTAL ASSESSMENT AT AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 02/07/11	PROJECT NO. 16170618	FIG. NO. G-2
CHK'D. BY:	REVISION:		

U.S. Fish and Wildlife Service

National Wetlands Inventory

Jan 5, 2012

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Status

- Digital
- Scan
- Non-Digital
- No Data

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Approximate 0.5 mile radius

Figure Wet.
AOC A
Cannon AFB, NM

This appendix included electronically only on enclosed CD.

FINAL REPORT

SUPPLEMENTAL ASSESSMENT OF AREAS OF CONCERN A, B, & C CANNON AFB, NEW MEXICO

December 2005

Admin

DEPARTMENT OF THE AIR FORCE
27TH CIVIL ENGINEER SQUADRON (ACC)
CANNON AIR FORCE BASE NEW MEXICO

17 Mar 05

Lt Col Alexander P. Karibian
Commander
506 N DL Ingram Blvd
Cannon AFB NM 88103-5003

Mr. James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East
Building 1
P.O. Box 26110
Santa Fe, New Mexico 87505

Dear Mr. Bearzi

Cannon AFB respectfully submits two copies of the Final Work Plan for the Supplemental Assessment of Areas of Concern (AOC) "A", "B" and "C" for your review and records. This document is provided in response to your 12 Jan 04 letter to be considered for No Further Action (NFA) in order to have the listed AOCs removed from our Hazardous Waste Part "B" permit.

The additional information contained in this document should be sufficient for your office to complete the NFA review. Please inform us of what further action, if any, will need to be taken. If you have any questions, please contact Mr. Peter P. Zamie at (505) 784-4639.

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

Sincerely,

Alexander P. Karibian

ALEXANDER P. KARIBIAN, Lt Col, USAF

Attachment:
Final Work Plan for Supplemental Assessment of AOC A, B and C, dtd Feb 05

cc:
NMED (D. Cobrain)
EPA Region 6 (Bob Sturdivant)

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ACRONYMS & ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
A-E	Architect-Engineer
AFB	Air Force Base
APPL	Agriculture & Priority Pollutants Laboratories, Inc.
AOC	Area of Concern
B.P.	Before Present
bgs	below ground surface
BRA	Baseline Risk Assessment
CEC	cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/sec	centimeters per second
cm/yr	centimeters per year
COC	chain-of-custody
COPC	chemical of potential concern
DAF	dilution attenuation factor
DPDO	Defense Property Disposal Office
DQCR	daily quality control report
DQO	Data Quality Objective
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
ft/yr	feet per year
FS	Feasibility Study
gal/ft	gallons per foot
gpm	gallons per minute
HARZA	Harza Engineering Company
HQ	hazard quotient
IEUBK	Integrated Exposure Uptake Biokinetic
IS	internal standard
J	estimated value
JP-4	Jet Propulsion Fuel, Type 4
km/hr	kilometers per hour

L/min	liters per minute
LCS	laboratory control sample
m^3/m	cubic meters per meter
m/yr	meters per year
µg/dL	micrograms per deciliter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MOGAS	motor gasoline
mph	miles per hour
msl	mean sea level
NELAP	National Environmental Laboratory Accreditation Program
NFA	No Further Action
NMED	New Mexico Environment Department
PCB	polychlorinated biphenyl
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RfD	reference dose
SB	soil boring
SCFS	sample collection field sheet
SCEM	Site Conceptual Exposure Model
SOP	standard operating procedure
SSL	soil screening level
SVOC	semivolatile organic compound
TCL	Target Compound List
TPH	Total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
U	not detected
UJ	estimated as nondetect
URS	URS Group, Inc.
USACE	United States Army Corps of Engineers

USCS	Unified Soil Classification System
USDA-SCS	United States Department of Agriculture – Soil Conservation Service
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTL	upper tolerance limit
VOC	volatile organic compound
W-C	Woodward-Clyde

EXECUTIVE SUMMARY

The supplemental assessment was completed to obtain additional data in order to more accurately determine the presence or absence of chemical contaminants at Areas of Concern (AOCs) A, B, and C at Cannon Air Force Base (AFB) near Clovis, New Mexico. Previously, AOCs A, B, and C were included in a group of No Further Action (NFA) proposals. However, all three sites were subsequently listed in an attachment to a January 12, 2004 letter from Mr. Glenn von Gonten, Cannon AFB Project Leader, New Mexico Environment Department (NMED) to Colonel Robert Yates, Commander, 27th Fighter Wing as sites that did not yet qualify for NFA approval (i.e., the previous investigations were inadequate).

The soils investigation decision process was designed to identify appropriate actions based on three alternative actions: NFA, interim action, and further investigation or evaluation. Soil was sampled and analyzed for chemicals of potential concern (COPCs). Concentrations of COPCs detected were evaluated for potential human health and environmental risks by comparing maximum detected concentrations (which are likely higher than concentrations to which human receptors would routinely be exposed) to highly conservative (protective) human health risk-based concentrations (i.e., NMED Soil Screening Levels [SSLs]). These SSLs are based on 1×10^{-5}excess cancer risk or a hazard quotient equal to 1.0 for non-carcinogens. This is a highly conservative approach used for screening purposes only; risks estimated in a site-specific quantitative baseline risk assessment (BRA) are likely to be much lower than the risk levels calculated using these screening criteria.

Soil sampling was completed using a truck-mounted Mobile B-61 drill rig and stainless-steel split-spoon samplers, according to the applicable standard operating procedures (SOPs). Soil boring locations were finalized based on utility clearances and drilling rig access, and were agreed upon by Cannon AFB personnel prior to drilling.

The analytical chemistry laboratory used for the supplemental assessment of AOCs A, B, and C is Agriculture & Priority Pollutants Laboratories, Inc. (APPL) of Fresno, California.

AOC A

AOC A is the site of two MOGAS (motor gasoline) spills from overturned fuel trucks. The site, located southeast of the gymnasium (Building 444) in the north-central region of the Base, measures approximately 400 by 200 feet. The area of AOC A is relatively flat and much of it is asphalt-paved with a small drainage swale running to the southeast through a grassy area in the southern portion of the site.

As part of the supplemental assessment of AOC A, four soil borings were drilled to depths ranging from 9.8 to 24.5 feet below ground surface (bgs) and soil samples were collected at approximately five-foot intervals. Two samples from each boring (eight total) were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and lead.

Ten of 11 VOCs detected in samples from AOC A were detected at concentrations below or just slightly above the reporting limits. The exception, toluene, was present at maximum concentration that is well below the NMED residential screening level. However, concentrations of chloroform identified at the site exceed the generic migration to groundwater SSL. Therefore, a site-specific SSL was calculated for chloroform; this value (12.5 µg/kg) was above the

maximum concentration identified at AOC A (12 µg/kg). No SVOCs were detected in any of the eight samples collected at AOC A. Lead was detected in all eight samples collected at AOC A. The maximum lead concentration is below the NMED residential screening level for lead and the background upper tolerance limit (UTL) for lead in subsurface soil. Based on the supplemental assessment results and on previous sampling results, where all concentrations were below current NMED residential SSLs, no further risk screening is warranted for AOC A.

AOC B

AOC B is the site of a 1980 JP-4 spill from an aircraft fuel tank onto a concrete parking apron as a result of a broken fuel line coupling. The spill occurred in the west- central portion of the Base, southwest of the current location of Building 133. The site is flat and paved with concrete.

As part of the supplemental assessment of AOC B, two soil borings were drilled to depths of 23.9 and 23.4 feet bgs and soil samples were collected at approximately five-foot intervals. Two samples from each boring (four total) were analyzed off site for VOCs, SVOCs, and lead.

Seven of eight VOCs detected in samples from AOC B were present at concentrations below or just slightly above the reporting limits. The exception, toluene, was present at maximum concentration that is well below the NMED residential screening level. However, concentrations of chloroform identified at the site exceed the generic migration to groundwater SSL. Therefore, a site-specific SSL was calculated for chloroform; this value (12.5 µg/kg) was above the maximum concentration identified at AOC A (12 µg/kg). No SVOCs were detected in any of the four samples collected at AOC B. Lead was detected in all four samples collected at AOC B. The maximum lead concentration is below the NMED residential screening level for lead the background UTL for lead in subsurface soil. Based on the supplemental assessment results and on previous sampling results, where all concentrations were below current NMED residential SSLs, no further risk screening is warranted for AOC B.

AOC C

AOC C includes the area where three pole-mounted electrical capacitors ruptured when lightning struck a pole in 1978, which housed a total of six capacitors. The site is located near the northwest corner of the Base, near the fairway of Hole No. 13 on the golf course. This grass-covered site slopes slightly to the south.

As part of the supplemental assessment at AOC C, three soil borings were drilled to depths of 10, 10 and 15 feet bgs, and soil samples were collected at approximately five-foot intervals. All samples, three samples collected from each of the 10-foot borings and four samples collected from the 15-foot boring (ten total), were analyzed for polychlorinated biphenyls (PCBs).

No PCBs were detected in any of the ten samples collected at AOC C. Based on these results, no further risk screening is warranted for AOC C.

Conclusion

Based on the results of the supplemental assessment of AOCs A, B, and C, NFA is warranted for all three AOCs.

This document presents the supplemental assessment report for Areas of Concern (AOCs) A, B, and C at Cannon Air Force Base (AFB) near Clovis, New Mexico.

1.1 AUTHORITY

The U.S. Army Corps of Engineers (USACE) Omaha District contracted URS Group, Inc. (URS) under Contract Number W9128F-04-0001, Task Order 17, to complete a supplemental assessment of AOCs A, B, and C at Cannon AFB. This supplemental assessment is being addressed under the Environmental Restoration Program (ERP) for Cannon AFB.

1.2 PURPOSE AND SCOPE

The purpose of the supplemental assessment was to obtain additional data in order to more accurately determine the presence or absence of chemical contaminants at AOCs A, B, and C at Cannon AFB. Previously, AOCs A, B, and C were included in a group of No Further Action (NFA) proposals (URS 2000), but all three sites were subsequently listed in an attachment to a January 12, 2004 letter from Mr. Glenn von Gonten, Cannon AFB Project Leader, New Mexico Environment Department (NMED) to Colonel Robert Yates, Commander, 27th Fighter Wing as sites that did not yet qualify for NFA approval (i.e., the previous investigations were inadequate). A map of Cannon AFB and the locations of the three AOCs are shown on Figure 1-1.

This report describes the field activities used to complete the supplemental assessment of the three AOCs, presents the physical and chemical results, and provides a screening level risk evaluation for each AOC. The remaining sections of this report are organized as follows:

- Section 2 provides a description of Cannon AFB.
- Section 3 discusses the decision process used to evaluate data and the need for further evaluation, if any.
- Section 4 describes field sampling procedures used to complete the field activities.
- Sections 5 through 7 describe the sampling activities, physical and chemical results, nature and extent of contamination, screening level risk evaluation, and summary and recommendations for each of the three AOCs.
- Section 8 presents the summary and recommendations.
- Section 9 provides a list of the references used to produce this report.

The appendices contain the following information:

- Appendix A contains the Daily Quality Control Reports (DQCRs), boring logs, and sample collection field sheets (SCFSs)
- Appendix B contains the Data Quality Review and Validation results
- Appendix C contains the analytical data and chains of custody (COCs) for the samples
- Appendix D contains the NMED soil screening levels (SSLs)

1.3 SITE DESCRIPTIONS

Following NFA proposals (URS 2000), AOCs A, B, and C were all listed as sites that did not yet qualify for NFA approval (NMED 2004).

1.3.1 AOC A (MOGAS Spill Site, SS-19)

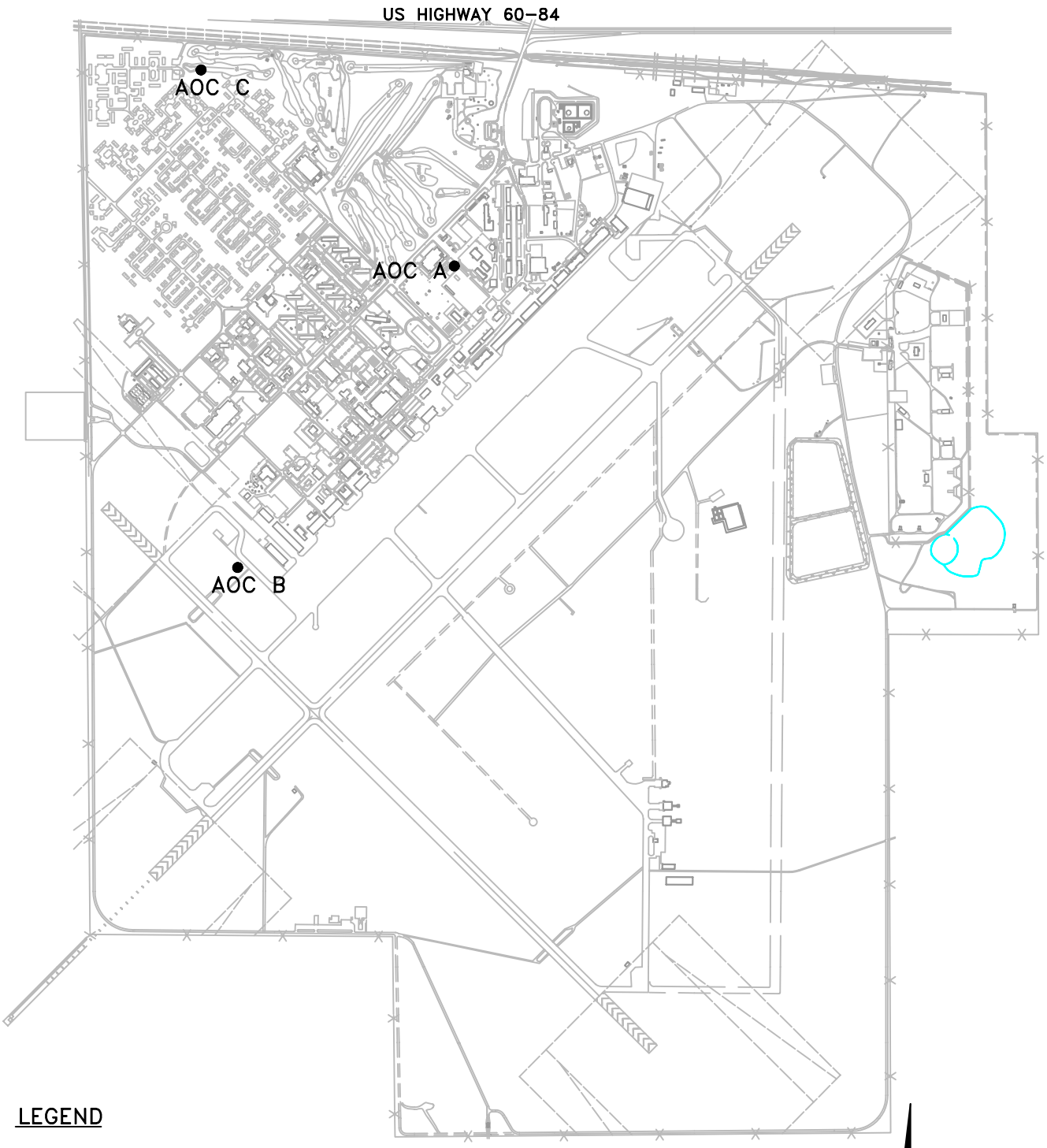
AOC A is the site of two spills of motor gasoline (MOGAS) from overturned fuel trucks. The site, located southeast of the gymnasium (Building 444) in the north-central region of the Base, measures approximately 400 by 200 feet.

1.3.2 AOC B (JP-4 Fuel Spill Site, SS-18)

AOC B is the site of a JP-4 spill from an aircraft fuel tank onto a concrete parking apron as a result of a broken fuel line coupling. The spill occurred in the west- central portion of the Base, southwest of the current location of Building 133.

1.3.3 AOC C (Blown Capacitor Site, OT-10)

AOC C includes the area where three pole-mounted electrical capacitors ruptured when lightning struck a pole, which housed a total of six capacitors. The site is located near the northwest corner of the Base, near the fairway of Hole No. 13 on the golf course.



LEGEND

AOC ● AREA OF CONCERN

SWMU No.	DESIGNATED AREA
AOC A	SS-19 MOGAS SPILL
AOC B	SS-18 JP-4 FUEL SPILL
AOC C	OT-10 BLOWN CAPACITORS SITE

N

2000 1000 0 2000

SCALE IN FEET

SITE PLAN AND LOCATION OF AREAS OF CONCERN
CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO

DRN. BY: DPG	DATE: 12/20/04	PROJECT NO. 16169869	FIG. NO. 1-1
CHK'D. BY: JLV	DATE: 07/07/05		

December 08, 2005 2:40:26 p.m.
Drawing: T:\CANNON\16169869\2\Fig1-1.dwg

2.1 SETTING – PHYSICAL GEOGRAPHY

Cannon AFB is situated in the Southern High Plains Physiographic Province in the Llano Estacado subprovince. The Llano Estacado is a nearly flat plain sloping gently (10 to 15 feet per mile) to the east and southeast. Elevations in the eastern New Mexico portion of the Llano Estacado exceed 4,000 feet above mean sea level (msl). In the vicinity of Cannon AFB, elevations range from 4,250 feet to 4,350 feet above msl.

The most prominent geomorphic features in the vicinity of Cannon AFB are blowouts and broad, widely spaced valleys. Less common landforms are relict sand dunes located along the northern side of the Portales Valley to the south of the Base. Relict dunes are not found on or near Cannon AFB.

Blowouts are broad shallow depressions, which form as the result of soil eroded by wind. Blowouts commonly collect surface runoff from small to moderate sized drainage areas. During periods of rainfall, runoff collects in blowouts to form ephemeral playa lakes. Playas have no external surface drainage. Water is lost by infiltration to the soil and evaporation; without recharge, playa lakes persist for only a few days or weeks. Three playas are located within the Base, and several more are found to the north and east of the Base.

Stream valleys tend to be fairly broad and widely spaced. Streams are ephemeral and drainages are poorly developed. No streams exist on or near Cannon AFB. Running Water Draw and Frio Draw, located about 10 and 20 miles, respectively, north of Cannon AFB, are the nearest streams. These are second-order streams. Both streams are very straight, flow southeast, and have rectilinear drainage patterns with short laterals (W-C 1991).

2.2 DEMOGRAPHICS AND LAND USE NEAR CANNON AFB

Cannon AFB is located just west of the City of Clovis, New Mexico and just south of U.S. Highway 60-84 in a farming and ranching area. The majority of the land surrounding Cannon AFB is productive, irrigated farmland or grassland. The major crops are wheat, sorghum, sugar beets, corn, cotton, alfalfa, barley, and peanuts. The land is also used for cattle grazing, both beef and dairy, and Clovis is considered the "Cattle Capital of the Southwest." There were 33,063 people living in Clovis in 2004 according to U.S. Census data, while the Cannon AFB population was estimated to be 4,650 in 1990 (W-C 1991).

2.3 CLIMATOLOGY

The climate of east-central New Mexico is classified as tropical semi-arid, with summer temperature and precipitation maxima. Average monthly temperatures range from a January low of 12°C (39°F) to a July high of 26°C (78°F). Extreme daily temperatures range from -24°C (-11°F) to 41°C (106°F) (Lee Wan 1990). Average monthly precipitation ranges from 1 cm (0.4 inches) in winter to 6.9 cm (2.7 inches) in July. The maximum-recorded 24-hour rainfall is 12.2 cm (4.8 inches), which occurred in the month of August. Rainfall occurs on eight or more days per month during the summer precipitation maximum. Mean annual precipitation is

approximately 41 cm (16 inches). The mean annual evapotranspiration rate is 181.4 centimeters per year (cm/yr) (71.4 inches/yr) (Lee Wan 1990). Prevailing winds are from the west at an average of 5 kilometers per hour (km/hr) (3.1 miles per hour [mph]) during fall, winter, and spring. During the summer, winds are from the south at an average of 3.7 km/hr (2.3 mph).

The atmosphere around the area of Cannon AFB is generally well mixed. The seasonal and annual average mixing heights can vary from 400 meters in the morning to 4,000 meters in the afternoon. The afternoon mixing heights are typically greater during the spring and fall seasons. The morning mixing heights are usually low, due to nighttime heat loss from the ground, producing surface-based temperature inversions. After sunrise, these inversions break up, and solar heating of the earth's surface causes vertical mixing in the atmosphere.

Dust is frequently entrained into the atmosphere in this region of the country because of gusty winds and the semiarid climate. The Texas Panhandle-eastern New Mexico area is considered the worst area in the United States for windblown dust. Occasionally, this windblown dust is of sufficient quantity to restrict visibility. Most of the seasonal dust storms occur in March and April, when the wind speeds are typically high (i.e., average 5 km/hr) (W-C 1991).

2.4 GEOLOGY

A generalized geologic section at Cannon AFB is shown in Figure 2-1. The near-surface stratigraphic units of interest at Cannon AFB are the Late Miocene-Late Pliocene-age Ogallala Formation and the Early Triassic Dockum Group.

The Dockum Group consists of three formations. The stratigraphically lowest unit is the Santa Rosa Sandstone. Overlying the Santa Rosa Sandstone are the Chinle and Redonda Formations. The Chinle and Redonda Formations are composed mainly of red shales with lesser interbedded sands, and are known locally as "redbeds." The top of the Dockum Group is marked by an erosional nonconformity having relief of up to several hundred feet (Lee Wan 1990).

Overlying the Dockum Group redbeds is the Ogallala Formation. The Ogallala Formation extends from eastern New Mexico and Colorado into Texas, Oklahoma, Kansas, Nebraska, and South Dakota. According to Lee Wan and Associates (1990), drillers' logs from Cannon AFB indicate that the Ogallala Formation varies from 360 feet to 415 feet in thickness. The incised upper surface of Triassic redbeds strongly influences Ogallala thickness. Paleo valleys in the post-Triassic nonconformity are deep and trend dominantly east to west. Ogallala thickness may thus vary significantly over short north to south distances.

The Ogallala Formation is erosionally truncated to the south along the abandoned Portales Valley, to the west along the Pecos River Valley, and to the north in a series of ephemeral stream valleys. The Ogallala Formation extends more than 125 miles to the east before terminating as an escarpment in Briscoe County, Texas. Springs and seeps are common along the erosional margins of the Ogallala.

The Ogallala Formation dips gently and monoclinally to the southeast in the vicinity of Cannon AFB. As reported in Lee Wan and Associates (1990), data suggest that some quaternary

warping may have occurred; however, most of these structures are located well to the northwest and southwest of Cannon AFB. No faults or buried structural lineaments are known to exist in the vicinity of Cannon AFB.

The Ogallala Formation is composed of unconsolidated poorly sorted gravel, sand, silts, and clays. The base of the Ogallala is generally marked by a gravel, cobble, and boulder deposit. This basal member contains sediments derived from igneous and sedimentary rocks transported from the mountains to the west. The Ogallala Formation was laid down as stream and overbank deposits formed within coalescing alluvial fans. These fans form a broad pediment along the eastern flank of the Rocky Mountains. As is typical of alluvial deposits, Ogallala internal stratigraphy varies vertically and horizontally over short distances.

Except where strongly cemented by calcium carbonate (caliche), the sediments of the Ogallala are loose and friable. Authigenic and allogenic clays are found as a trace to abundant matrix mineral (Lee Wan 1990). As reported by Lee Wan and Associates (1990), five zones have been distinguished within the Ogallala of east central New Mexico on the basis of clay minerals. Smectites (montmorillonites) and attapulgite (with sepeotite) are the dominant clays throughout the Ogallala. Illite is a lesser, but persistent clay, as is kaolinite. Smectite is a swelling clay, causing deep cracks to form in dry surface soils. Smectite in particular and, to a lesser extent, attapulgite and illite, are clays with moderate to high cation exchange capacities (CEC). The formation as a whole should therefore have a relatively high CEC, which should inhibit the migration of charged contaminants, and especially ionic forms of metals.

Caliche is a major feature of the Ogallala Formation, occurring as nearly continuous to discontinuous layers throughout. Caliche is hard, white to pale tan on fresh surfaces, weathering to gray, and has a chalky appearance. Caliche forms as calcium carbonate, leached from overlying sediments, and precipitates in the pore space of the host sediments. Precipitation is caused by the evaporation of downward percolating water. The caliche may thus mark the position of ancient vadose zones. As reported in Lee Wan and Associates (1990) radiocarbon dates for the upper “climax” caliche range from approximately 27,000 years Before Present (B.P.) to approximately 42,000 years B.P.

Caliche is relatively soluble in acidic water (i.e., water with a pH less than 7) or in waters containing dissolved carbon dioxide. The top surface of the uppermost or “climax” caliche in a fresh outcrop typically shows solution etching.

The Ogallala has numerous continuous to discontinuous caliche layers throughout its thickness. The climax caliche, is pisolitic (i.e., consisting of spherical concentrically laminated aggregates 1 to 10 mm in diameter) (Lee Wan 1990). The pisolites are thought to have formed as the caliche was repeatedly chemically-weathered and brecciated during Pleistocene pluvials (wet climate episodes) and later recemented during drier intervals. This upper caliche crops out around playas and the bounding escarpments of the Ogallala, and is locally termed “caprock.” The climax caliche is typically 3 to 5 feet thick. Caliches that occur lower in the Ogallala are platy and harder. Caliche may be thin or absent below playas (W-C 1991).

2.5 HYDROGEOLOGY

The lower portion of the Ogallala Formation is the primary regional aquifer for both potable and irrigation water. No deeper aquifers are utilized in the vicinity of Cannon AFB. The Ogallala aquifer is part of the High Plains Aquifer that extends continuously from Wyoming and South Dakota into New Mexico and Texas. In east-central New Mexico, the Ogallala aquifer rests on Dockum Group redbeds, which serve as the basal confining layer. The Ogallala is a water table, or unconfined, aquifer (Lee Wan 1990). The Ogallala aquifer has a southeasterly regional gradient of about 17 feet/mile (0.0032 m/m, see Figure 2-2). Well yields vary from less than one gallon per minute (gpm) in thin silts and sands, and up to 1,600 gpm in thick sands and gravels (Lee Wan 1990). Water quality is generally good, with hardness and fluorides being somewhat high (Lee Wan 1990).

At Cannon AFB, the depth to groundwater is greater than 200 feet, and the Ogallala aquifer has an average saturated thickness of 120 feet based on mid-1960s data. Saturated thickness ranges from 93 to 143 feet, and is influenced by the configuration of the erosional nonconformity surface marking the top of the Dockum Group. The local groundwater gradient is southeasterly at 7.5 feet/mile (Lee Wan 1990). Yields in tests of Cannon AFB water wells have ranged from 776 liters per minute (L/min) (205 gpm) to 4,353 L/min (1150 gpm). Specific capacities range from 0.14 cubic meters per meter (m^3/m) (11.4 gallons per foot [gal/ft]) to 0.35 m^3/m (27.9 gal/ft) (Lee Wan 1990).

Very rough estimates of hydraulic conductivity were made from well pump tests in water wells 5 and 9 (Figure 2-3) using the Theis equation. An estimate of hydraulic conductivity for water well 8 was based on water level recovery data using the Bouwer and Rice approach (Lee Wan 1990). The data used in these calculations were obtained to evaluate pump rates, efficiency, and well yield, and were not intended for use in calculating aquifer properties. The results of these calculations should therefore be considered as first approximations.

Hydraulic conductivity values for water wells 5 and 9 were found to be approximately 2.0×10^{-3} centimeters per second (cm/sec). Calculations for water well 8 resulted in a hydraulic conductivity of 2.0×10^{-2} cm/sec. In addition, slug testing of two monitoring wells (MW-O and MW-N) was completed by Woodward-Clyde in February 1995 (W-C 1995a). The estimated hydraulic conductivities from these slug tests were both 3×10^{-3} cm/sec. These estimates appear to be low when compared to published hydraulic conductivity data for sands and gravels. As reported in Lee Wan and Associates (1990), a groundwater flow velocity of about 45 meters per year (m/yr) (150 feet per year [ft/yr]) has been estimated. This calculates out to a hydraulic conductivity of approximately 1.4×10^{-4} cm/sec. Again, this appears to be low when compared with published data (Freeze and Cherry 1979).

The presence of interstitial clays may account for both the variability and the low values of hydraulic conductivities. Boring logs from Cannon AFB IRP projects and published reports (Lee Wan 1990) indicated that interstitial and interstratified clays are abundant in the Ogallala Formation.

Recharge to the Ogallala is primarily through precipitation. As reported in Lee Wan and Associates (1990), a recharge rate of 0.5 inches/year was calculated using the Theis equation. Lee Wan and Associates (1990) reported that the recharge rate may be as much as 1.0 inches/year. Due to the high evapotranspiration rate and low precipitation, recharge probably occurs only during heavy rainfall events in which the infiltration capacity of the soil is exceeded and runoff occurs, or during cool months when precipitation exceeds evapotranspiration. Excess runoff flows to playas, and the presence of water in playas may allow deep percolation to the aquifer. The occurrence of this process is evidenced by the presence of clay deposits in, and thin or nonexistent caliche layers directly below, playas. Caliche is soluble in acidic rainwaters, and is leached over time to form percolation pathways.

Discharge from the Ogallala occurs through well pumping and springs along the eroded margins of the formation. Spring discharge does not occur on or near Cannon AFB. Domestic and irrigation water wells are common on and around the Base, however. The rate of discharge exceeds the rate of recharge. Water levels in the Ogallala have declined steadily from the 1930s to the present. A decline of 50 to 100 feet has been observed in the area around Clovis, New Mexico for the period from the 1930s to 1980. Lee Wan and Associates (1990), states "the largest area of water level decline exceeding 100 feet occurs south of the Canadian River extending from Curry Co., New Mexico to Crosby Co., Texas."

The dominant uses of groundwater in the Cannon AFB area are as potable and irrigation water. Numerous wells are found in the Cannon AFB area, most of which provide only irrigation water (Figure 2-3).

The Ogallala will continue to be used as the primary source of potable and irrigation water for eastern New Mexico. The New Mexico State Engineer designated Curry County as a Water Basin in 1989. This designation allows for regulation of water rights, usage, and well drilling (W-C 1991).

2.6 SOILS

Soils in the vicinity of Cannon AFB are classified as SM to SC under the Unified Soil Classification System (USCS), and as aridisols (calciorthids) under the Soil Conservation Service Comprehensive Soil Classification System. The following summary is based on the Soil Conservation Service Curry County Soil Survey as reported in Lee Wan and Associates (1990).

The most common soil type on the Base is the Amarillo fine sandy loam, 0- to 2-percent slope phase (map symbol Ab on Figure 2-4). This soil consists of a thin sandy A horizon, well-defined clayey B_{1-3} horizons, with a calcic B_3 horizon at depths below 40 inches. The calcic B_3 horizon lies on a calcic C horizon, or on caliche. The Amarillo fine sandy loam is present on all relatively flat surfaces at the Base, but is also found on slopes associated with playas (map symbol Ac).

Clovis fine sandy loams, 0- to 2-percent slope phase (map symbol Cb) and 2- to 5-percent slope phase (map symbol Cc), are very similar to Amarillo fine sandy loams. In the Clovis soils, the

depth to the calcic C horizon ranges from 28 to 56 inches. The depth to caliche exceeds 56 inches. Clovis and Amarillo fine sandy loams occur in close association.

In a few limited areas, particularly along the steeper slopes around playas, Mausker fine sandy loam, 0- to 2-percent slope phase (map symbol Ma), and 2- to 5-percent phase (map symbol M6) are found. Mausker fine sandy loams have no B horizons and are very calcareous. The calcic C horizon is within 2 feet of the surface.

The A and B horizons of Amarillo and Clovis fine sandy loams are rapidly to moderately permeable. Mausker fine sandy loam A and Ac horizons are rapidly permeable. Permeabilities in calcic B and C horizons are moderate (Lee Wan 1990).

2.7 Background Metals Concentrations in Soil

The natural soils in the vicinity of Cannon AFB are alkaline and generally rich in metals. Typically high concentrations of aluminum, iron, magnesium, manganese, and potassium combine with elevated levels of many other metals in the natural soils. Calcium is naturally present in the soils at levels up to nearly 200,000 milligrams per kilogram (mg/kg). Tightly cemented layers of "caliche" are present in several horizons in the natural soils and the Ogallala aquifer below. As stated in Section 2.4, the Ogallala Formation as a whole should have a relatively high CEC, which should, in turn, inhibit the migration of charged contaminants, especially the ionic forms of metals.

The background levels of inorganic compounds in surface and subsurface soil at Cannon AFB are presented in Table 2-1 in the form of a mean value and statistical information on the ranges encountered for each element. Table 2-1 has been adapted from a final report by Woodward-Clyde dated September 1997 entitled "Naturally Occurring Concentrations of Inorganics and Background Concentrations of Pesticides at Cannon Air Force Base, New Mexico". This report summarizes background data for soil from numerous past investigations in the vicinity.

The mean values and upper tolerance limits (UTLs) presented in Table 2-1 are the background levels used in the screening of soil chemical results for the supplemental assessment of AOCs A, B, and C. In addition to comparison to the UTL of the Base-wide background data (which is necessarily from a limited data set), other sources of naturally-occurring metals concentrations, such as United States Geological Survey (USGS, 1984), were considered when determining whether metals concentrations are within background levels.

2.8 WATER QUALITY

The groundwater quality at Cannon AFB is generally good, with dissolved solids ranging from 250 to 500 mg/L (Gutentag et al. 1984) and fluorides ranging from 2.2 to 2.7 mg/L (William Matotan and Associates, Inc. 1985).

TABLE 2-1

SUMMARY OF BACKGROUND ELEMENTAL CONCENTRATIONS[1] IN SOIL SAMPLES[2] AT CANNON AFB, NEW MEXICO

	Mean (x)		Standard Deviation (s)		95% Upper Tolerance Limit (UTL) of Background Concentrations	
Element	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
Aluminum	5,508	5,932	1,964	2,183	8,950	12,214
Antimony	ND (3)	ND (3)	ND (3)	ND (3)	3.15 (3)	16 (3)
Arsenic	2.1	2.1(4)	0.48	0.96 (4)	3.6	4.3 (4)
Barium	100	210	165	199	670	890
Beryllium	0.35 (4)	0.35 (4)	0.13 (4)	0.17 (4)	0.78 (4)	0.73 (4)
Cadmium	ND (3)	ND (3)	ND (3)	ND (3)	0.435 (3)	1.3 (3)
Calcium	5,645	89,410	11,366	64,611	44,800	237,498
Chromium (total)	7.1	5.6	1.3	2.3	11	13
Cobalt	2.9	2.6 (4)	1.0	1.4 (4)	6.6	4.7 (4)
Copper	6.8	3.8 (4)	4.6	2.0 (4)	18.3	8.3 (4)
Iron	6,458	5,148	1,349	2,262	10,100	13,148
Lead	6.8	4.7	1.6	1.7	12	8.7
Magnesium	1,066	4,260	390	3,856	1,930	19,300
Manganese	139	83	51	50	307	333
Mercury	0.025 (4)	ND (3)	0.016 (4)	ND (3)	0.056 (4)	0.019 (3)
Nickel	5.5	5.9 (4)	1.6	2.4 (4)	11	15 (4)
Potassium	1,345	1,222	413	417	2,691	2,512
Selenium	ND (3)	0.47 (4)	ND (3)	0.31 (4)	0.26 (3)	1.1 (4)
Silver	--- (5)	ND (3)	--- (5)	ND (3)	0.4 (5)	2.7 (3)
Sodium	91	351(4)	10	253 (4)	102	1,227 (4)
Thallium	ND (3)	ND (3)	ND (3)	ND (3)	0.6 (3)	2.65 (3)
Vanadium	15	16	2.8	5.2	23	33
Zinc	15	12	5.2	4.8	32	31

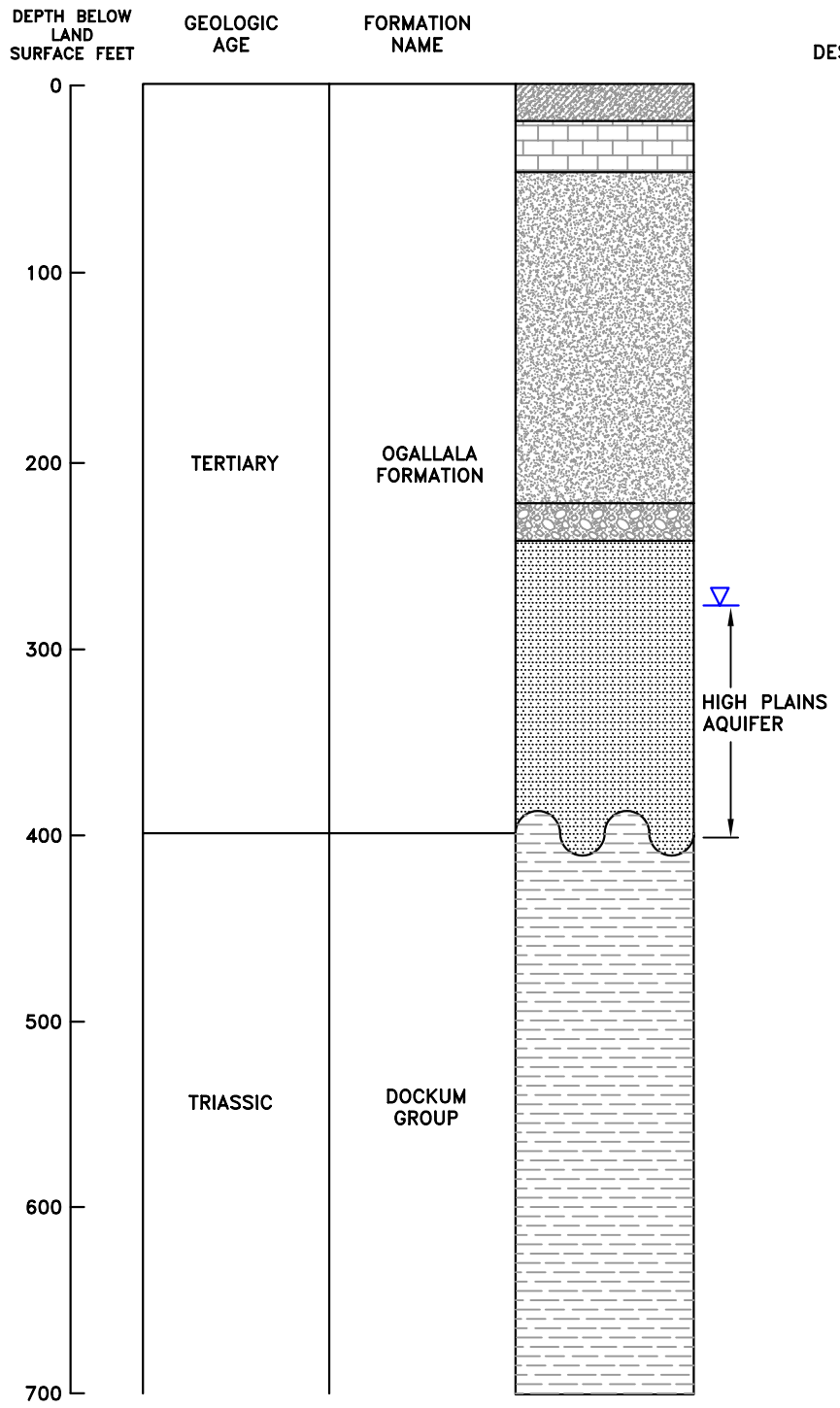
(1) All concentrations are in milligrams per kilogram (mg/kg).

(2) From report entitled "Naturally Occurring Concentrations of Inorganics and Background Concentrations of Pesticides at Cannon Air Force Base, New Mexico" (W-C 1997).

(3) All analytical samples were nondetect; therefore, a mean and standard deviation was not calculated. One-half the highest reporting limit is used as the 95% UTL. The actual mean, standard deviation, and UTL may be less than these values.

(4) Values determined from a data set including one-half of the reporting limits for nondetects.

(5) Silver was detected in only one sample; therefore, a mean and standard deviation was not calculated. The single detected concentration is used as the 95% UTL.



LEGEND

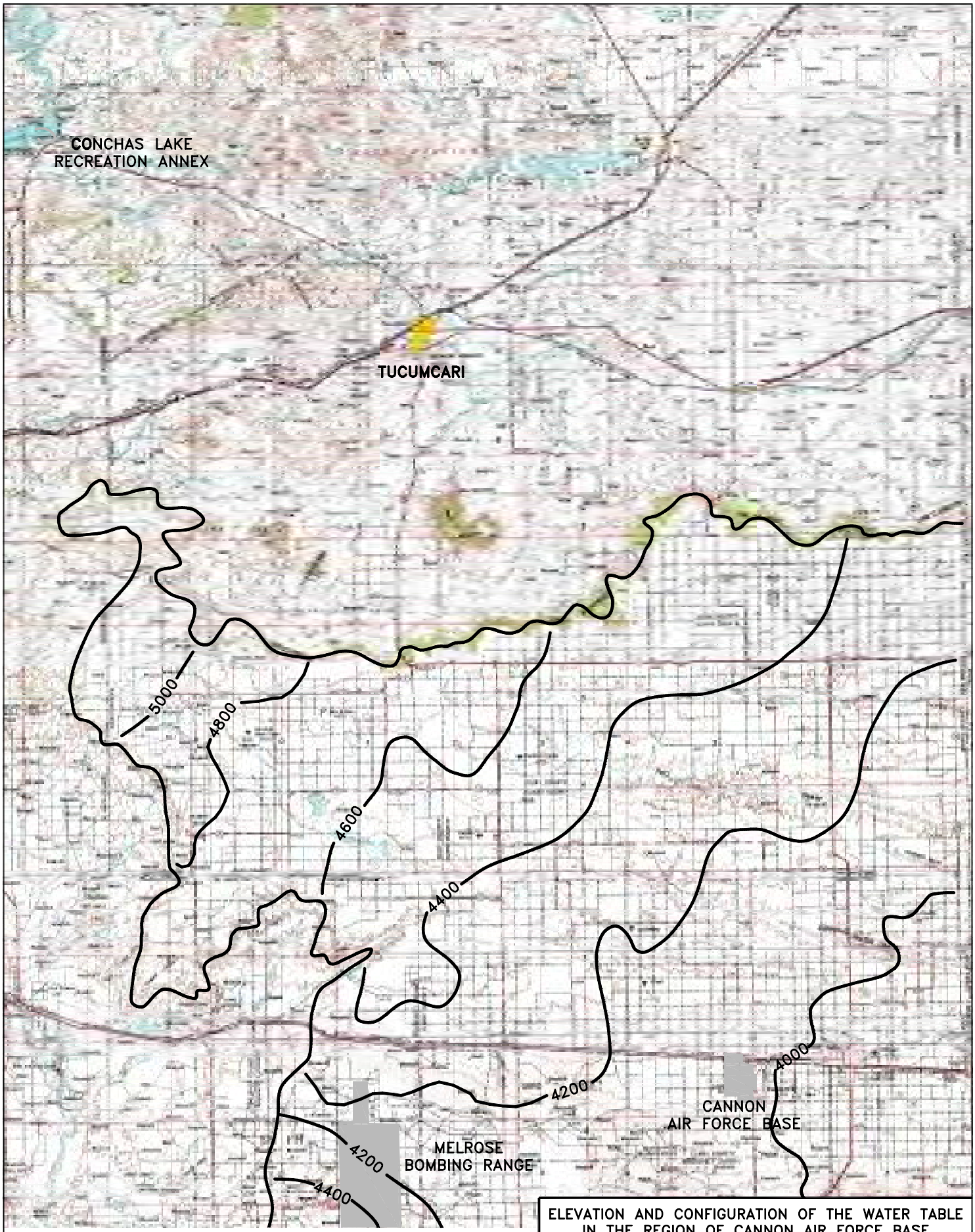
- SILTY SAND WITH CALICHE
- CALICHE
- SAND AND SILTY SAND
- SANDY GRAVEL
- SAND
- SANDSTONE (RED BEDS)
- LITHOLOGIC CONTACT
- EROSIONAL UNCONFORMITY
- WATER LEVEL

SOURCE: MODIFIED FROM GUTENTAG ET.AL., 1984

GENERALIZED GEOLOGIC STRATA AT
CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO

DRN. BY: DPG	DATE: 01/07/05	PROJECT NO.	FIG. NO.
CHK'D. BY: JLV	DATE: 07/07/05	16169869	2-1

December 08, 2005 2:41:36 p.m.
Drawing: T:\CANNON\16169869\2\fig2-1.dwg



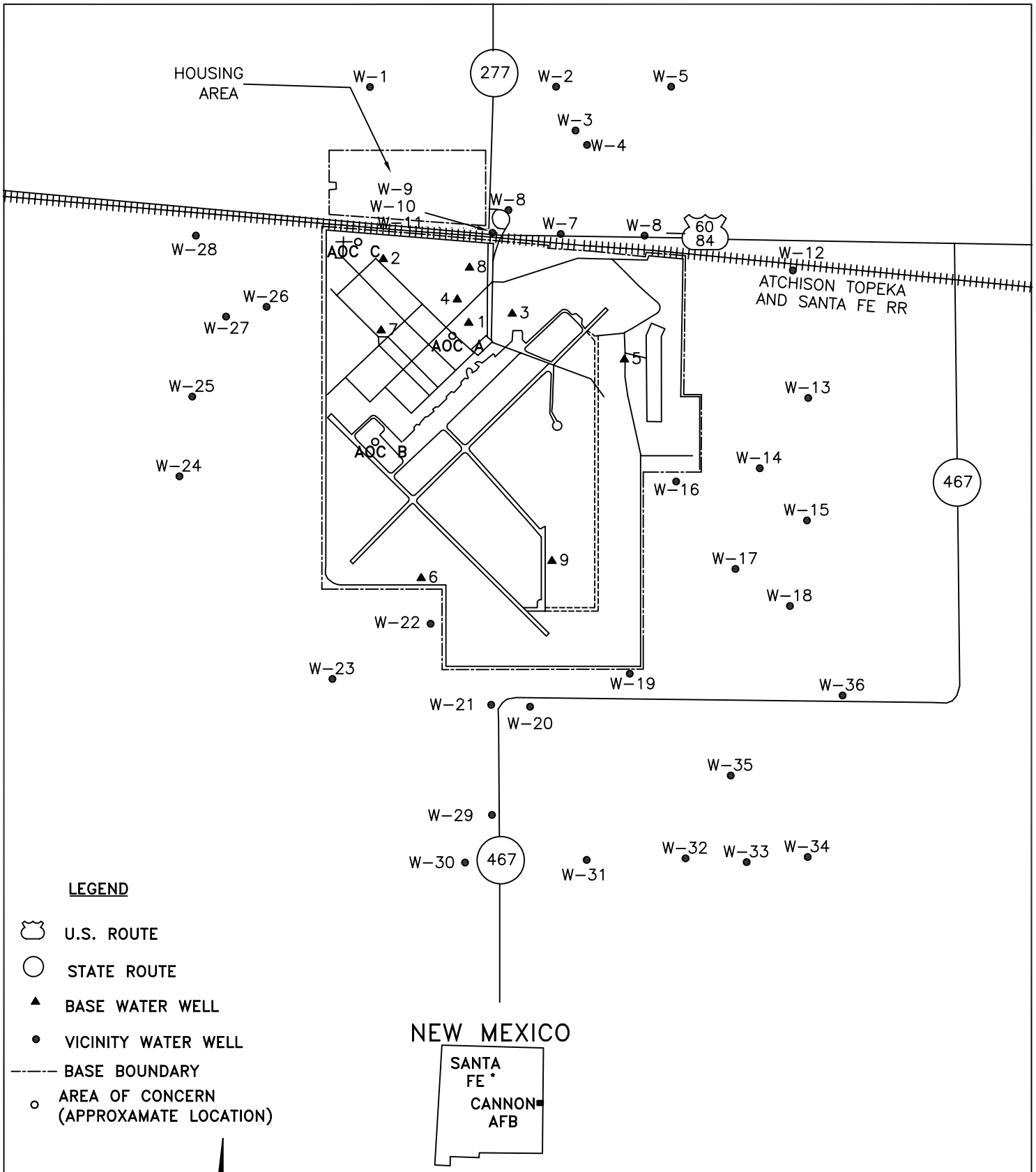
NOTE: ADAPTED FROM LEE WAN AND ASSOCIATES 1990
ORIGINAL SOURCE: USGS

8 4 0 8
SCALE IN MILES

December 08, 2005 2:42:07 p.m.
Drawing: T:\CANNON\16169869\2\fig2-2.dwg

ELEVATION AND CONFIGURATION OF THE WATER TABLE
IN THE REGION OF CANNON AIR FORCE BASE
CLOVES, NEW MEXICO

DRN. BY: DPG	DATE: 12/01/05	PROJECT NO.	FIG. NO.
CHK'D. BY: JLV	REVISION: 0	16169869	2-2

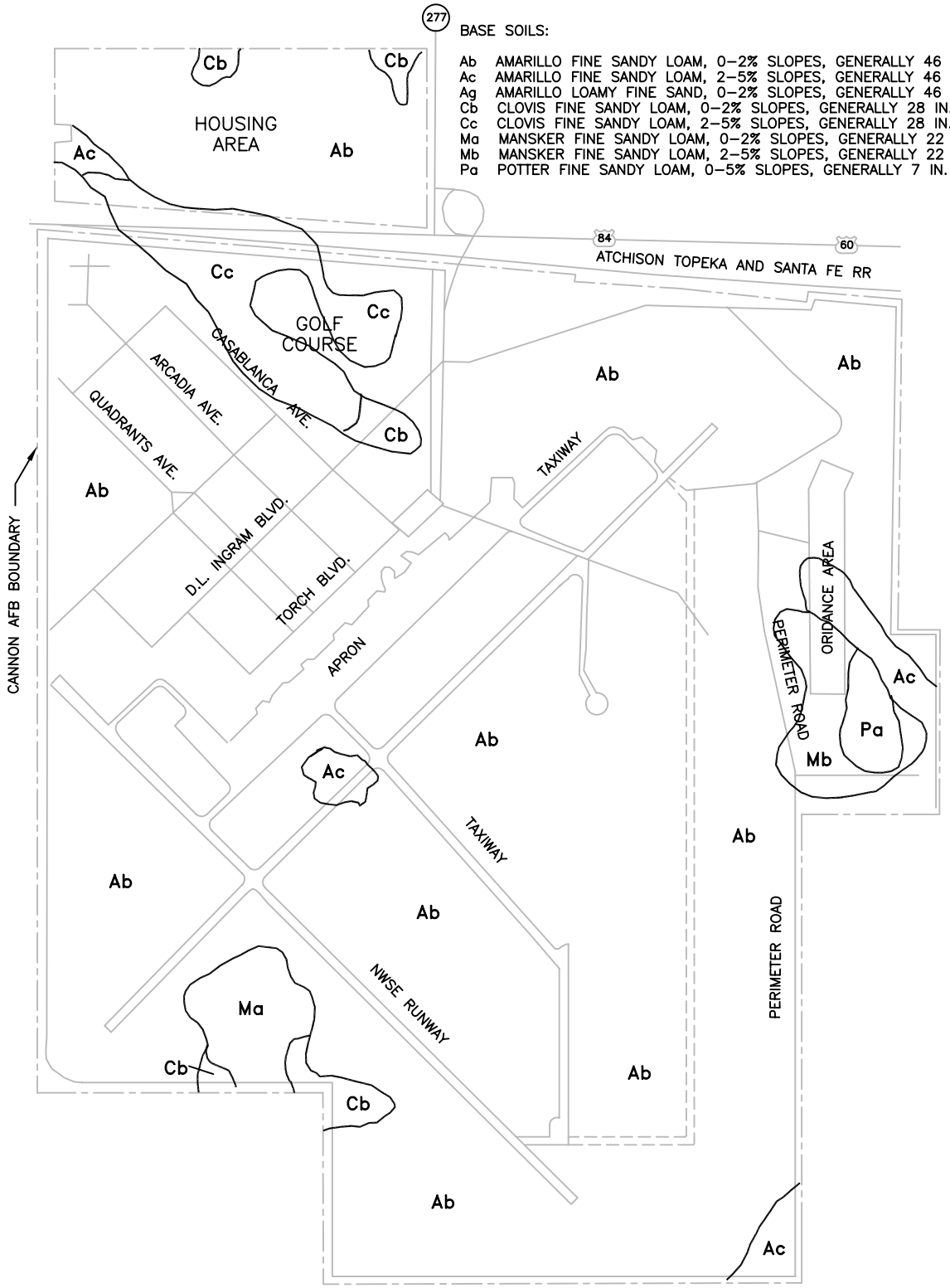


SOURCE: MODIFIED FROM BUTENTAG ET. AL., 1984

WATER WELL LOCATIONS ON AND NEAR
CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO

DRN. BY: DPG	DATE: 12/5/00	PROJECT NO. 16169869	FIG. NO. 2-3
CHK'D. BY: JLV	DATE: 07/07/05		

December 08, 2005 2:42:37 p.m.
Drawing: T:\CANNON\16169869\2\fig2-3.dwg



BASE SOILS:

Ab	AMARILLO FINE SANDY LOAM, 0–2% SLOPES, GENERALLY 46 IN. THICK
Ac	AMARILLO FINE SANDY LOAM, 2–5% SLOPES, GENERALLY 46 IN. THICK
Ag	AMARILLO LOAMY FINE SAND, 0–2% SLOPES, GENERALLY 46 IN. THICK
Cb	CLOVIS FINE SANDY LOAM, 0–2% SLOPES, GENERALLY 28 IN. THICK
Cc	CLOVIS FINE SANDY LOAM, 2–5% SLOPES, GENERALLY 28 IN. THICK
Ma	MANSKER FINE SANDY LOAM, 0–2% SLOPES, GENERALLY 22 IN. THICK
Mb	MANSKER FINE SANDY LOAM, 2–5% SLOPES, GENERALLY 22 IN. THICK
Pa	POTTER FINE SANDY LOAM, 0–5% SLOPES, GENERALLY 7 IN. THICK

N

2000 1000 0 2000

SCALE IN FEET

SOURCE: USDA–S.C.S., SOIL SURVEY OF CURRY COUNTY N.M., 1958

DISTRIBUTION OF SOILS BY TYPE AT CANNON AIR FORCE BASE CLOVIS, NEW MEXICO

DRN. BY: DPG	DATE: 12/5/00	PROJECT NO. 16169869	FIG. NO. 2–4
CHK'D. BY: JLV	DATE: 07/07/05		

December 08, 2005 2:43:05 p.m.
Drawing: T:\CANNON\16169869\2\fig2–4.dwg

3.1 DESCRIPTION OF THE DECISION PROCESS

The following decision process has been used to assess the data needs and investigative approach for AOCs A, B, and C. The Data Quality Objective (DQO) evaluation process is designed to provide soil data of sufficient quality and quantity to evaluate whether a release has occurred that could pose a risk to human health and to evaluate the need for further evaluation, such as collection of additional data, completion of a Baseline Risk Assessment (BRA), or possibly completion of a Feasibility Study (FS).

A general decision diagram (Figure 3-1) was developed for the Cannon AFB AOCs A, B, and C to present a logical decision process that was used to evaluate the data resulting from the investigation to assure that project objectives are met.

The soils investigation decision process was designed to identify appropriate actions based on three alternative actions: NFA, interim action, and further investigation or evaluation. The recommendation for the selection of alternative action depended on whether chemicals of potential concern (COPCs) were detected in soils at levels that may pose an unacceptable risk to human health or the environment. This section provides a summary of the decision-making process that was used.

Existing historical information and analytical data was evaluated and summarized as the first step in the implementation of the decision process. Historical information was used to identify COPCs and to identify potential sites of chemical release.

Soil was sampled and analyzed for COPCs. COPCs are defined as chemicals that are site-related (i.e., they are derived from the site and are at concentrations that exceed background levels), and that either have toxicity factors (i.e., carcinogenic slope factors or noncarcinogenic reference doses) derived by the United States Environmental Protection Agency (USEPA) or have potential toxicity that can be addressed qualitatively (e.g., lead). COPCs were derived from the analyte list described in the Quality Assurance Project Plan (QAPP) (URS 2005). Site-related COPCs were then selected based on the results of the sampling program. Metals that did not exceed background levels, and chemicals that are attributable to field or laboratory contamination were not included as site-related COPCs. Organic chemicals that do not have USEPA-established toxicity factors were not evaluated quantitatively, but their potential contribution to site risks was evaluated qualitatively.

Concentrations of COPCs detected were evaluated for potential human health and environmental risks by comparing maximum detected concentrations (which are likely higher than concentrations to which human receptors would routinely be exposed) to highly conservative (protective) human health risk-based concentrations (i.e., NMED SSLs). This conservative screening approach permits identification of sites that pose no unacceptable risk under highly conservative exposure assumptions and, therefore, warrant no further evaluation or action. This approach also permits identification of sites that may warrant further evaluation based on exceedance of stringent risk-based concentrations. The methods used in the screening-level human health risk evaluations are presented in Section 3.6.

The potential for site-related contaminants to impact groundwater was assessed by comparing maximum detected concentrations of COPCs to either generic NMED SSLs for the migration to groundwater pathway with a default dilution attenuation factor (DAF) of 20, or to site-specific SSLs developed by calculating a site-specific DAF in accordance with current NMED guidance (NMED 2005). If the concentrations of COPCs fell below the NMED SSLs or the site-specific SSLs for the migration to groundwater pathway, the potential for transport to groundwater was considered insignificant, and NFA was recommended with respect to the groundwater pathway. If any NMED or site-specific SSLs for the migration to groundwater pathway had been exceeded, an evaluation of the vertical distribution of contaminants in the soil column would have then been used, as necessary, to further assess the potential for an impact to groundwater. If the concentrations of COPCs decreased significantly with depth and the concentrations fell below levels that are likely to migrate to groundwater (based on fate and transport properties of the contaminant and the vadose zone), the potential for transport to groundwater would have been considered insignificant, and NFA would have been recommended with respect to the groundwater pathway. Had the potential for transport to groundwater been considered significant, it would have been modeled in accordance with Figure 3-1.

The results of this evaluation were used to make recommendations regarding the three alternatives stated above. The recommendations were made on the following bases:

- If the vertical and lateral extents of contamination have been defined, no threat to human health exists based on comparison of maximum concentrations (excluding metals below background, and field/laboratory contaminants) to NMED SSLs, and no potential threat to the environment is apparent, then NFA is recommended.
- If an unacceptable threat to human health and/or the environment had been imminent (based on comparison of maximum concentrations to NMED SSLs and and an ecological review), a source is well defined, and a source control could be readily identified, an interim action to control the source would have been recommended.
- If there had been a potential significant threat to human health based on exceedance of NMED SSLs and/or a threat to the environment had been apparent, further investigation would have been recommended.

3.2 DEVELOPMENT OF SITE CONCEPTUAL EXPOSURE MODELS (SCEMs)

The initial step in the evaluation of the site was the development of a Site Conceptual Exposure Model (SCEM) for each site, which provides a framework for evaluating potential risks associated with the site, aids in the identification of data needs, and assists in the identification of appropriate preliminary remediation goals targeted to significant exposure pathways. Following completion of the field sampling program, each site's SCEM was reviewed, taking into consideration the analytical results and fate and transport properties of site-related chemicals. Based on this review, it was determined that no modifications to the SCEM were necessary to re-evaluate the site.

The SCEMs present chemical release sources and transport media, potential human receptors, and intake mechanisms for each potential exposure pathway. An exposure pathway describes the

means by which release, transport, and intake by receptor populations of site-related COPCs occurs. An exposure pathway consists of four necessary elements:

- A source and mechanism of chemical release to the environment
- An environmental transport medium for the released chemical (e.g., air, groundwater, or surface water)
- A point of potential human exposure to transported chemicals (e.g., a domestic drinking water well)
- A human intake mechanism (e.g., inhalation or ingestion) at the point of exposure

All four elements must be present for an exposure pathway to be complete and for chemical exposure to occur. In the SCEM, potentially significant pathways are denoted with solid lines, and pathways that are considered to be insignificant relative to other pathways are denoted with dashed lines.

Potential exposure pathways were evaluated with respect to potential chemical sources at the site. Exposure pathways were considered to be potentially complete if there were chemical release and transport mechanisms, exposure points, and receptors identified for that exposure pathway. Incomplete exposure pathways do not result in actual exposure to human or environmental receptors; therefore, they do not pose a potential risk. Incomplete exposure pathways are not shown on the SCEM. Insignificant pathways are those that could conceivably be complete and result in an exposure, but the resulting exposure would unquestionably be at levels that would not pose a significant risk.

The SCEMs for AOCs A, B, and C are presented in Figures 3-2 through 3-4, respectively. The primary source at AOC A is MOGAS spilled at the site, in two separate events, from overturned fuel trucks. The primary source at AOC B is JP-4 fuel that spilled at the site from a fuel truck because of broken fuel line coupling. The primary source at AOC C is three capacitors that were ruptured at the site by a lightning strike, spilling dielectric fluid believed to contain polychlorinated biphenyls (PCBs).

Chemicals from the primary sources may be transported away from the primary source areas, affecting other media that may in turn act as secondary sources. Percolation and leaching of the wastes to the subsurface soil are shown as primary chemical release mechanisms. Subsurface soils are an important secondary source of potential chemical releases. Site-related chemicals in soils may infiltrate/percolate through the soil and be released to groundwater.

Other release mechanisms, such as direct contact (soil ingestion and dermal contact), surface runoff, wind erosion, or volatilization to the atmosphere, are also depicted in the SCEMs. Transport by storm runoff is not considered a significant pathway for human exposure at the AOCs because there are no developed drainageways at the sites and portions of the sites are covered with pavement.

Surface soils may provide exposures to Base workers (occupational exposures), hypothetical future construction workers, future trespassers, or residents. AOCs A and B are located in

industrialized areas of the Base; therefore, residential development is not a likely future land use. Residential exposures are possible at AOC C because the suspected area is located near the Base residential housing areas. Air emissions (volatile and particulates) from surface soil may also expose Base workers, construction workers, trespassers, and residents. Subsurface soils and air emissions from subsurface soil (i.e., during excavation) may expose construction workers. Groundwater is used for domestic purposes on and off Base, but the depth to groundwater in the area is greater than 200 feet.

Contact with surface soil is considered to be the only complete and significant pathway for ecological receptors. However, due to the small size and developed nature of the AOCs, it is unlikely that significant populations of valued ecological resources are present at the sites. Therefore, a screening-level ecological risk assessment is not warranted for any the three AOCs.

3.3 CRITICAL DATA

Critical data are data that are crucial for decision-making (e.g., determining whether a site warrants no further investigation or whether additional investigation should be considered). Critical data may be from special sampling locations or from a selected subset of samples from locations of roughly equal importance. Data from a specific field sample, such as a soil sample immediately downgradient of a discharge point, may be designated as critical if it were necessary to know contaminant concentrations at that specific location for source or exposure pathway characterization. In other cases, data from a select number of field samples (e.g., a subset of all surface soil samples collected at a site) may be designated as critical when the objective is to estimate mean contaminant concentrations over an area.

Following USEPA guidelines (USEPA 2001, 2004), critical data must be from environmental media representing each major exposure pathway and must be 100 percent complete, that is, valid results must be obtained for all data deemed critical. A complete set of critical data may be taken from more than one sample (i.e., if one sample has missing or rejected analytes, data from another comparable sample can be used to complete the critical data set). If the missing or rejected data do not hinder the decision-making process (e.g., they are not potential COPCs), they are not considered to be critical data, and the critical data set is still 100 percent complete. If decisions had hindered by missing or rejected data, a recommendation would have been made that the project managers determine the appropriate corrective action. This procedure permits retaining valid data from the original data set and compiling a complete, representative, and valid set of critical data without unnecessary resampling.

3.4 DETECTION LIMITS

To select appropriate analytical methods, method detection limits have been compared with analyte-specific concentrations of concern such as NMED SSLs. SSLs are concentrations that under given exposure assumptions, will produce a specified risk. For this discussion, NMED SSLs are based on excess carcinogenic risks of 1×10^{-5} and a non-carcinogenic hazard quotient of 1.0.

3.5 EVALUATION OF BACKGROUND CONCENTRATIONS

AOC sample concentrations were compared to established background concentrations to determine whether metals detected in soil samples are site related. Soils are derived from parent geologic materials as a result of physical, chemical, and biological processes. The soil system is naturally a highly heterogeneous matrix of inorganic and organic components. The relative proportions of these components are dependent upon factors influencing soil formations, such as topography, climate, depositional processes, and time (Sposito and Page 1984). Total concentrations of metals in soils may vary depending upon location; for example, at the surface, soils are influenced by leaching, runoff, atmospheric deposition, and biotic uptake, as well as anthropogenic activity. The ranges of naturally occurring or "background" concentrations of metals in soils is greatly varied due to the composition of parent material; therefore, care must be taken in the interpretation of metals data generated during an investigation.

For the supplemental assessment of AOCs A, B, and C, metal (i.e., lead) concentrations in AOC soils were compared to background soils concentrations presented in "Naturally Occurring Concentrations of Inorganics and Background Concentrations of Pesticides at Cannon Air Force Base, New Mexico" (W-C 1997). The approach compares the maximum concentrations detected at a given AOC to the 95% UTL of the background concentrations. Using this technique, individual samples at the AOCs with high concentrations relative to background levels (i.e., which could represent a site-related release) can be identified.

3.6 SCREENING-LEVEL HUMAN HEALTH RISK EVALUATION METHODOLOGY

This section describes the approach used in the screening-level human health risk evaluation for AOCs A, B, and C. Potential human health impacts were evaluated by comparing maximum chemical concentrations (of chemicals above background) found at the site to NMED SSLs.

The goal of this evaluation process was to determine whether or not a release had occurred at an AOC that could pose a potential risk to human health. The risk-based approach outlined in this section provides an upper-bound estimate of potential human health impacts because conservative screening criteria and maximum chemical concentrations were used to estimate potential impacts. If no potential human health risks are indicated for an AOC using these conservative criteria, then NFA was recommended for the AOC.

3.6.1 Derivation of Screening Criteria

The SSLs were taken from the NMED table, which is provided in Appendix D (NMED 2005). The latest available version was used. These SSLs are based on 1×10^{-5}excess cancer risk or a hazard quotient equal to 1.0 for non-carcinogens. This is a highly conservative approach used for screening purposes only; risks estimated in a site-specific quantitative BRA are likely to be much lower than the risk levels calculated using these screening criteria. A maximum chemical concentration that exceeds a screening-level SSL does not mean that a health risk exists because the maximum concentration detected is not the concentration to which people would routinely be exposed, and the exposure assumptions used to derive the SSLs are not site-specific.

For a carcinogen, the soil SSL is the concentration of a chemical in soil that is estimated to result in an excess cancer risk of 1×10^{-5} for carcinogens, assuming long-term (30-year) daily exposures. A range of 1×10^{-6} to 1×10^{-4} (1 in 1,000,000 to 1 in 10,000) is USEPA's target excess cancer risk range for cleanup under both the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA) (USEPA 1991). Therefore, SSLs based on a target risk of 1×10^{-5} are conservative (protective) values, and exceedances of these SSLs do not necessarily mean that a health risk is present. However, exceeding the SSLs does mean that further evaluation of chemical concentrations, exposure assumptions, and carcinogenicity may be warranted.

For noncarcinogens, SSLs are the concentrations in soil estimated to result in a "hazard quotient" (HQ) of 1.0. A hazard quotient is the ratio of the estimated daily dose from the assumed exposure to a reference dose (RfD), established by NMED, which is considered safe for a lifetime of daily exposure. A hazard quotient of 1.0 means that no toxic effects are likely to occur, even to sensitive individuals exposed for a lifetime. An HQ above 1.0 does not mean that toxic effects will necessarily occur, but that further evaluation of exposures and chemical toxicity may be warranted. It should be noted that unlike the risks for multiple carcinogens, the HQs for multiple noncarcinogens could not simply be added together to account for the additive risks associated with chemical mixtures. To account for noncarcinogenic additivity, SSLs were divided by 10 as part of the screening-level human health risk evaluation.

NMED SSLs for soil exposures are based on the ingestion, inhalation, and dermal exposure routes. Soil SSLs are available for industrial and residential scenarios. AOCs A and B are located in industrialized areas of the Base; therefore, industrial SSLs were used for screening at these sites. AOC C is located near the residential housing areas; therefore, residential SSLs were used for this area.

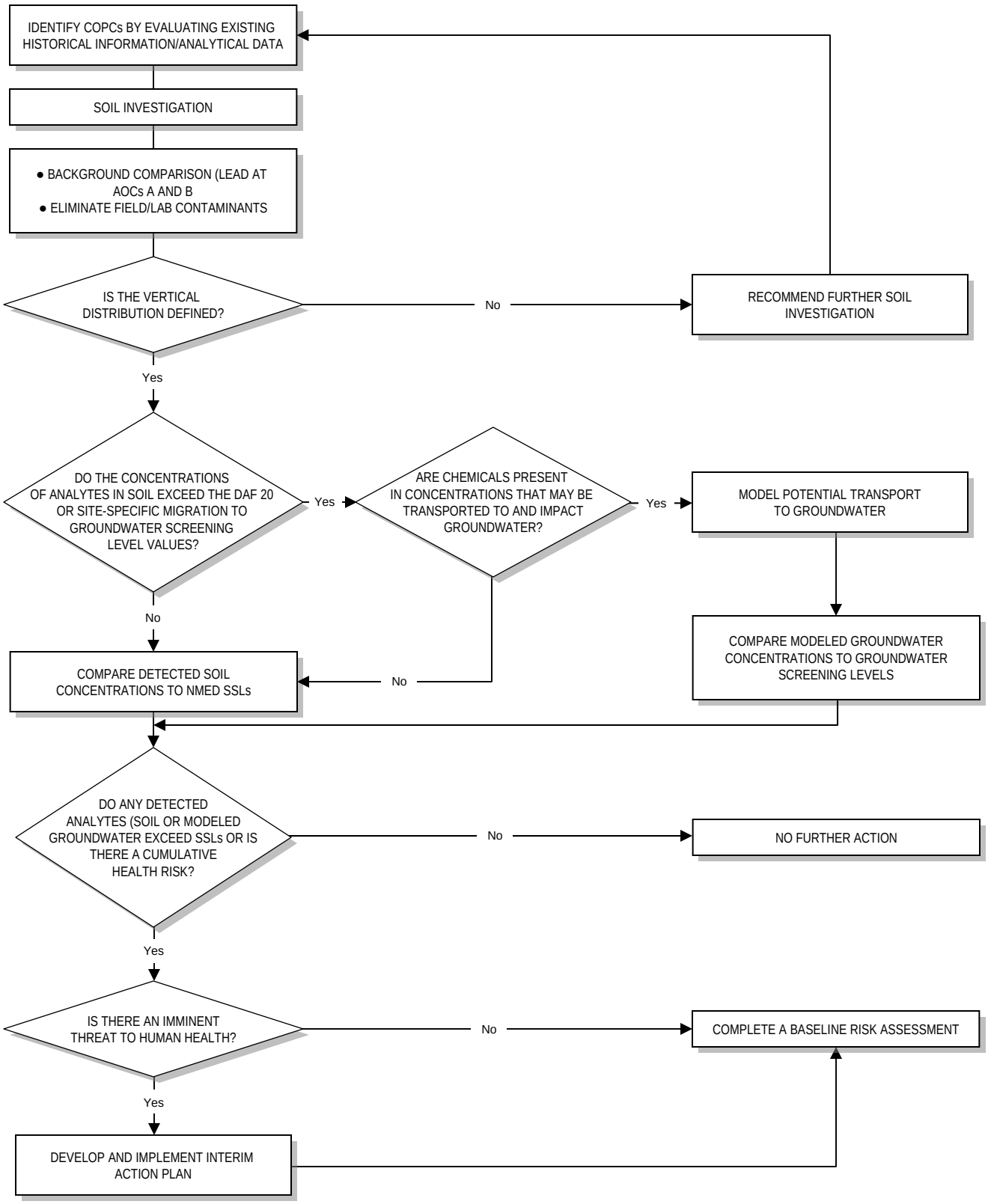
It is important to note that SSLs are not cleanup goals. Cleanup goals are determined on a site-specific basis. Instead, comparing soil concentrations to SSLs has been adopted as a means of determining whether the chemicals in soils could pose a threat to human health. If the SSLs were not exceeded, NFA was recommended. If the SSLs were exceeded, further evaluation of potential risks would have been completed.

SSLs for Lead in Soil

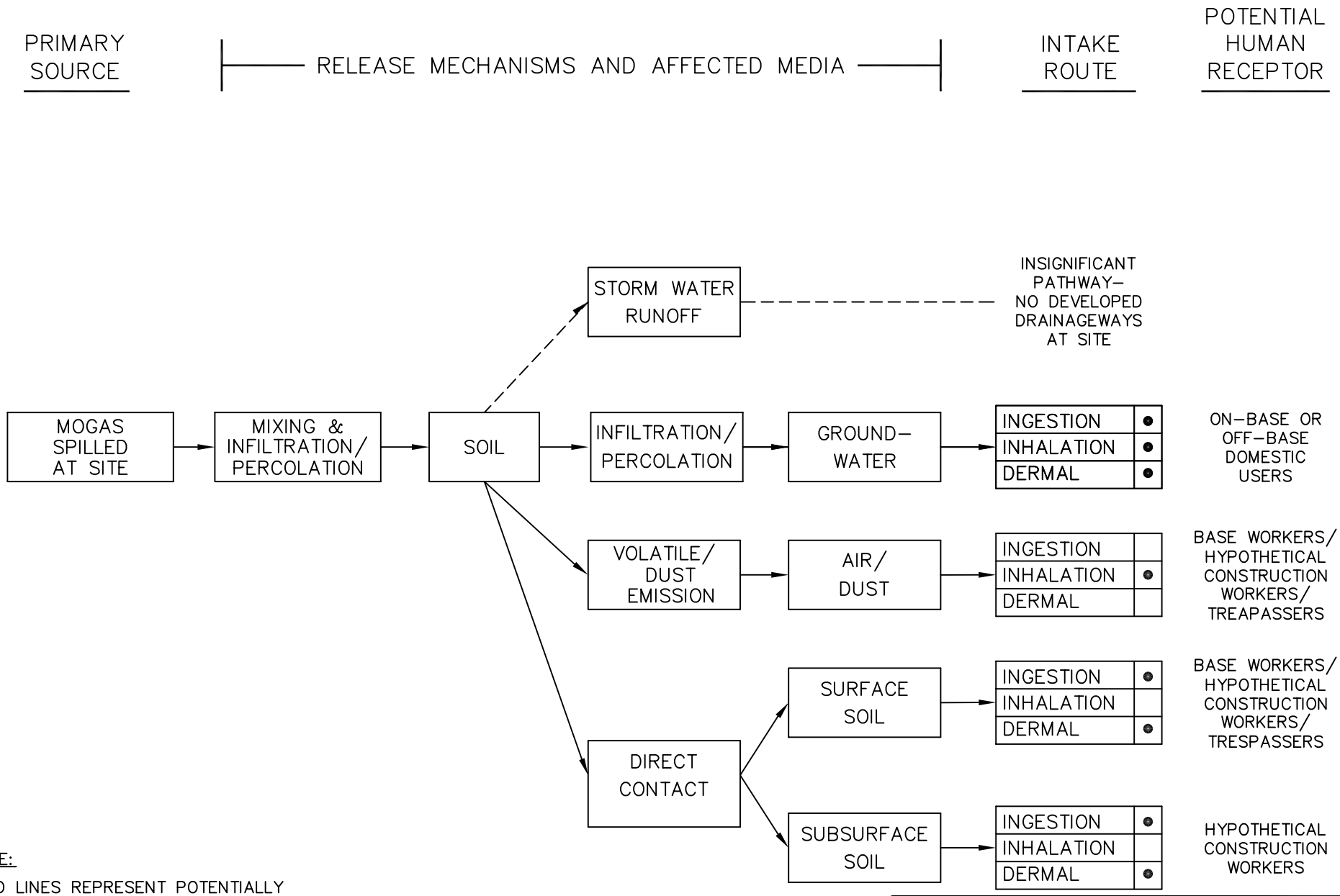
USEPA withdrew the toxicity factor (i.e., the RfD) for lead in 1989, primarily due to the lack of a discernible threshold dose and because of the numerous sources of lead in the environment. However, USEPA guidance (USEPA 1994b) recommends an interim soil lead concentration of 400 mg/kg for residential scenarios at CERCLA and RCRA corrective action sites. This level is supported by USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model (USEPA 1994b), which predicts that exposures of children ages 0 to 6 years to soils with approximately these levels will not result in blood lead levels that exceed a level of concern (10 micrograms per deciliter [µg/dL]) established by the Centers for Disease Control. The interim soil lead concentration is the level above which there is sufficient concern that a site-specific study of risks should be conducted if exposure to children is expected at the site. Based on their adoption of 400 mg/kg as the residential SSL for lead, NMED set the industrial soil SSL for lead at 750 mg/kg.

FIGURE 3-1

CANNON AIR FORCE BASE
DECISION DIAGRAM FOR SUPPLEMENTAL ASSESSMENT AT AOCs A, B, AND C



Q:\1616\9869\CANNON_SA\AOC A,B,C_SA Fig3-1.ppt



NOTE:

SOLID LINES REPRESENT POTENTIALLY COMPLETE PATHWAYS

DASHED LINES REPRESENT INCOMPLETE OR INSIGNIFICANT PATHWAYS

SITE CONCEPTUAL EXPOSURE MODEL
AOC A – HUMAN EXPOSURES
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 01/06/05	PROJECT NO. 16169869	FIG. NO. 3–2
CHK'D. BY: JLV	DATE: 07/07/05		

December 08, 2005 2:43:33 p.m.
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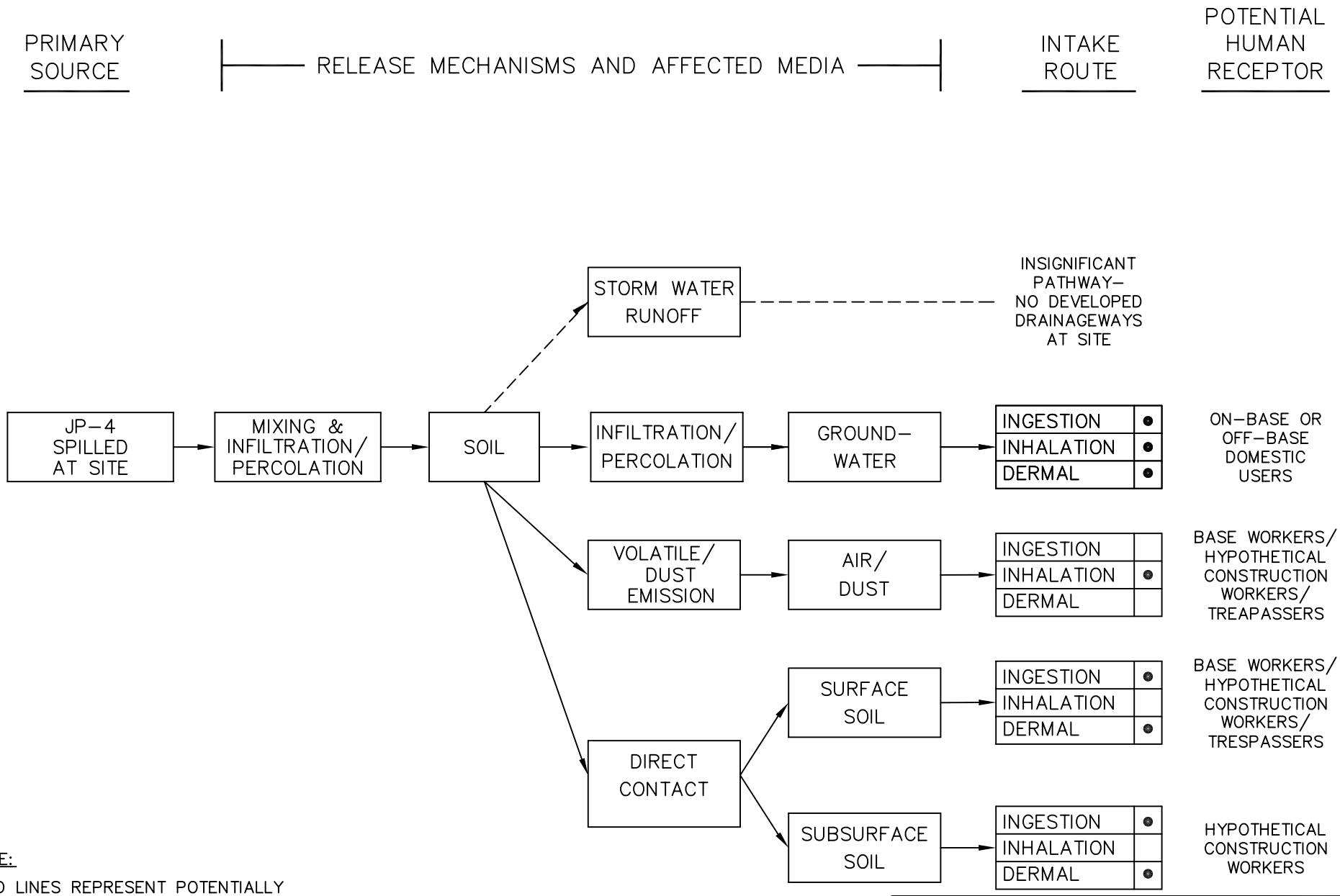

NOTE:

SOLID LINES REPRESENT POTENTIALLY COMPLETE PATHWAYS

DASHED LINES REPRESENT INCOMPLETE OR INSIGNIFICANT PATHWAYS

SITE CONCEPTUAL EXPOSURE MODEL
AOC B – HUMAN EXPOSURES
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 01/06/05	PROJECT NO. 16169869	FIG. NO. 3-3
CHK'D. BY: JLV	DATE: 07/07/05		

December 08, 2005 2:44:11 p.m.
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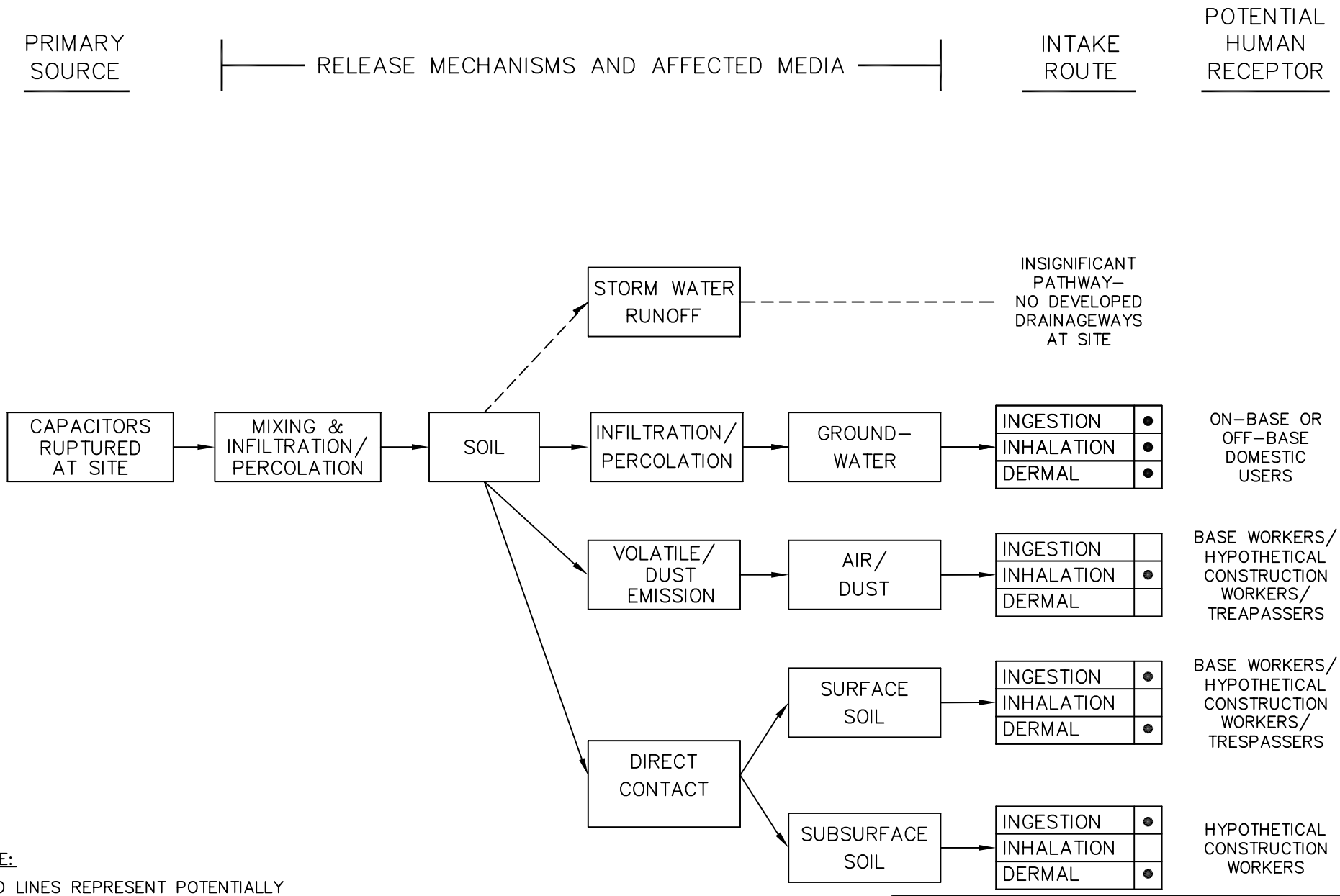

NOTE:

SOLID LINES REPRESENT POTENTIALLY COMPLETE PATHWAYS

DASHED LINES REPRESENT INCOMPLETE OR INSIGNIFICANT PATHWAYS

SITE CONCEPTUAL EXPOSURE MODEL
AOC C – HUMAN EXPOSURES
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 01/06/05	PROJECT NO. 16169869	FIG. NO. 3–4
CHK'D. BY: JLV	DATE: 07/07/05		

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Drawing: T:\CANNON\16169869\2\fig3–4.dwg

According to the applicable standard operating procedures (SOPs), soil sampling was completed using a truck-mounted Mobile B-61 drill rig and stainless-steel, split-spoon samplers. Soil boring locations were finalized based on utility clearances and drill rig access, and were agreed upon by Cannon AFB personnel prior to drilling. Sample designation, sampling equipment and procedures, and sample handling, documentation, and analysis are also presented in this section.

4.1 SAMPLING EQUIPMENT AND PROCEDURES

The sampling equipment and procedures used to collect samples are described in the SOPs contained in Appendix C of the Work Plan (URS 2005). These SOPs are consistent with procedures identified and described by the USEPA.

The Field Manager was responsible for ensuring that samples were collected with properly decontaminated equipment and containerized as required by the site-specific sampling procedures. Specific responsibilities included:

- Sampling locations, equipment, and requirements
- Number and type of samples
- Sample identification
- Preservation requirements
- Analytical parameters
- Equipment decontamination procedures
- COC requirements

Decontamination procedures were performed in accordance with SOP No. 11 and in a manner consistent with the most recent USEPA guidelines, and included steam cleaning, Alconox or equivalent wash, followed by a tap water rinse, and two deionized water rinses.

4.2 SAMPLE HANDLING, DOCUMENTATION, AND ANALYSIS

The labeling, preservation, handling, shipping, documentation, and tracking procedures for all samples collected at Cannon AFB were performed in accordance with SOP No. 13, Sample Handling, Documentation, and Tracking.

All sample labels were completed using waterproof ink and numbered. Soil sample labels were supplied by URS. Sample containers were placed in plastic storage bags (double bagged in zipper-lock bags) and wrapped in protective packing material (i.e., foam liners, bubble packing). Samples were then placed in a cooler with ice (double bagged using 1-gallon zipper-lock bags) for overnight express carrier shipment to the laboratory. A completed and signed COC was placed in each cooler being shipped. Samples were shipped to APPL by an overnight courier on a daily basis. Following collection, samples remained on site for less than 24 hours.

Documentation of observations and data acquired in the field provided information on the acquisition of samples and created a permanent record of field activities. The observations and data were recorded in a permanently bound weatherproof field book with consecutively numbered pages.

To supplement the information in the field book, SCFSs and Architect-Engineer (A-E) DQCRs were also completed, and maintained in URS records for every sample location. All analyses were specified on the COC.

The contact information for the analytical chemistry laboratory used for the supplemental assessment of AOCs A, B, and C is listed below:

Agriculture & Priority Pollutants Laboratories, Inc. (APPL)
Point of Contact: Sharon Dehmlow
4203 West Swift
Fresno, California 93722
Tel: 559-275-2175
Fax: 559-275-4422
Email: sdehmlow@applinc.com

APPL has National Environmental Laboratory Accreditation Program (NELAP) accreditation for all environmental analytes that expires on 31 January 2006.

The following section provides a description of AOC A. The location of this AOC is shown on Figures 1-1 and 5-1. This section describes AOC A, the previous sampling results, the existing conditions at this AOC, and the supplemental assessment activities and results.

5.1 SITE BACKGROUND

AOC A is the site of two spills of MOGAS from overturned fuel trucks. The site measures approximately 400 by 200 feet. The site is relatively flat and much of it is asphalt-paved with a small drainage swale running to the southeast through a grassy area in the southern portion of the site. Both spills occurred in the early 1960s at the present location of Argentia Avenue, across from the refueling area of Facility No.379, and southeast of the gymnasium (Building 444) in the north-central region of the Base. The total quantity of MOGAS spilled is estimated to be 2,000 to 3,000 gallons. The physical features of the site were changed in 1977 during the construction of Building 444; as shown on Figure 5-1, a portion of the spill site is now under Argentia Avenue (Radian 1986).

In 1985, two soil borings were each drilled to 60 feet below ground surface (bgs) and sampled as part of a Phase II, Stage 1 investigation conducted by Radian Corp. at AOC A. Three soil samples from each boring were analyzed for oil and grease, lead, and purgeable aromatics. Lead and one purgeable organic compound (1,2-dichloroethene, detected in a duplicate but not in the associated sample) were present in relatively low concentrations (i.e., all concentrations are below the current NMED residential SSLs). No oil and grease was detected in any of the samples (HARZA 1997). Following an NFA proposal (URS 2000), AOC A was listed as a site that did not yet qualify for NFA approval based on the previous investigation results (NMED 2004).

5.2 FIELD INVESTIGATION AND DATA COLLECTION

Four soil borings were drilled to depths of 9.8, 23.4, 23.2, and 24.5 feet bgs in the vicinity of the former spill site (see Figure 5-1) using hollow-stem augers and split spoons. Soil samples were collected at approximately five-foot intervals beginning at about 1 foot bgs.

Samples were screened in the field using headspace analysis in accordance with SOP No. 15, and results were recorded in the boring logs and in a field logbook. Samples were selected for analysis based on volatile organic compound (VOC) headspace readings and field observations (e.g., color and odor). Since field screening and observations did not indicate fuel contamination, then the two deepest samples from each boring were submitted for analysis. Two samples from each boring were submitted for laboratory analysis for individual fuel constituents (i.e., VOCs and semivolatile organic compounds [SVOCs]) and lead. Samples for VOC analysis were collected using EnCore® samplers in accordance with SOP No. 19.

The samples were analyzed as follows:

- Target Compound List (TCL) VOCs by USEPA Method 8260B
- TCL SVOCs by USEPA Method 8270C
- Lead by USEPA Method 6010B

The samples collected are summarized in Table 5-1.

5.3 DATA REVIEW AND VALIDATION

Eight analytical and two field duplicate soil samples were submitted for chemical analysis. The soil samples were analyzed for VOCs, SVOCs and lead. All chemical data were reviewed following procedures identified in the Cannon AFB Supplemental Assessment QAPP (URS 2005), USEPA National Functional Guidelines for Low Concentration Organic (USEPA 2001) and Inorganic (USEPA 2004) Data Review. No analytical data were rejected. Select analytical data from the AOC A samples collected during the supplemental assessment were qualified estimated (**J/UJ**) based on laboratory control sample (LCS), internal standard (IS), surrogate, initial calibration and calibration verification data outside evaluation criteria. Additionally, acetone, 2-butanone, methylene chloride, bis(2-ethylhexyl)phthalate and di-n-butyl phthalate were qualified nondetect (**U**) based on the presence of the compounds in the method blank samples or based on professional judgment (e.g., common laboratory contaminants). A tabular list of qualified data, including quality control (QC) parameters for which qualifications were made, and a summary of data reviews and validations is presented in Appendix B.

Acceptable levels of accuracy and precision were achieved for the AOC A supplemental assessment sample data. The analytical data from the AOC A samples were determined to be acceptable for their intended use, including estimated (**J/UJ**) data.

5.4 INVESTIGATION RESULTS

5.4.1 Geology

Borings CAA-SB01 and CAA-SB02 were drilled in parking areas and encountered asphalt pavement followed by gravel fill to about 1 foot bgs. Borings CAA-SB03 and CAA-SB04 were drilled in grassy areas. All four borings encountered about 2 to 3 feet of fill material near the surface. This fill material consisted of silty clays (USCS symbol CL) and sandy silts to silty sands (ML-SM) with 0.3 feet of clayey sand (SC) present in one boring (CAA-SB04).

All four borings encountered native silts (ML) and silty sands (SM) described as medium stiff to very stiff and medium dense to very dense, moist to very dry, pinkish tan to reddish brown, low plastic or fine grained, generally calcareous material containing cemented nodules, which in general became denser, drier, and contained a larger number of more strongly cemented nodules with depth. The boring logs are included in Appendix A.

5.4.2 Chemical Results

Eight soil samples were collected and analyzed from the three borings drilled at AOC A. Eleven VOCs were detected in the eight samples collected at AOC A. Ten of the 11 compounds were present only in concentrations below or just slightly above the reporting limits. The exception, toluene, was present at maximum concentration of 47 µg/kg, which is well below the NMED residential screening level (248,000 µg/kg). Despite being present in concentrations near the reporting limits, seven of the eight chloroform concentrations identified in samples from AOC A exceeded the generic NMED SSL for the migration to groundwater pathway. Based on this, a site-specific SSL for the migration to groundwater pathway was developed (see Section 5.4.3).

No SVOCs were detected in any of the eight samples collected at AOC A.

Lead was detected in all eight samples collected at AOC A. The maximum lead concentration (5.9 mg/kg) is well below the NMED residential screening level for lead (400 mg/kg) and below the background Upper Tolerance Limit (UTL) for lead in subsurface soil (8.7 mg/kg, W-C 1997).

Based on these results and on previous sampling results, where all concentrations were below current NMED residential SSLs, no further risk screening is warranted for AOC A.

A summary of the analytical results for AOC A is presented in Table 5-2, and a summary of the analytical data screening results for AOC A is presented in Table 5-3. The complete set of analytical results is included in Appendix C.

5.4.3 Development of a Site-Specific Chloroform SSL for the Migration to Groundwater Pathway

NMED guidance allows for the development of site-specific SSLs for the migration to groundwater pathway (NMED 2005). As noted in the NMED guidance, the NMED soil-water partition equation is most responsive to changes in the DAF than to changes in other parameters. Therefore, a site-specific DAF was calculated for AOC A and this was multiplied by the generic chloroform SSL for a DAF of 1 (provided in NMED 2005, see Appendix D) to produce a site-specific chloroform SSL for the migration to groundwater pathway.

To calculate a site-specific DAF for AOC A, NMED Equation 17 (NMED 2005) was used:

$$DAF = 1 + \left(\frac{K \times i \times D}{I \times L} \right)$$

Where:

$$D = \left(0.0112 \times L^2\right)^{0.5} + D_a \left(1 - \exp\left[\frac{-L \times I}{K \times i \times D_a} \right] \right)$$

Parameter	Definition (units)	Site-Specific Value (basis)
DAF	Dilution/attenuation factor (unitless)	Calculated
K	Aquifer Hydraulic conductivity (m/yr)	3,200 (Section 3.5)
i	Hydraulic gradient (m/m)	0.0032 (Figure 2-2)
D	Mixing zone depth (m)	Calculated
I	Infiltration rate (m/yr)	0.038 (URS 1999)
L	Length of source parallel to groundwater flow (m)	64 (Figure 5-1)
D_a	Aquifer thickness (m)	36.6 (Section 3.5)

Inserting the site-specific values used for each parameter, results in a calculated, site-specific DAF for AOC A of 30.2. Multiplying this site-specific DAF by the generic chloroform migration to groundwater SSL for a DAF of 1 (0.414 µg/kg, NMED 2005) produces a site-specific migration to groundwater SSL for chloroform at AOC A of 12.5 µg/kg which is above

the maximum chloroform concentration identified at the site (12 µg/kg). Based on this, no further assessment of chloroform is warranted at AOC A.

TABLE 5-1
SUMMARY OF SAMPLES FOR CHEMICAL ANALYSIS
AOC A (MOGAS SPILL SITE)
CANNON AFB, NEW MEXICO

Sampling Location	Sample Identification	Depth Interval (feet bgs)	Sample Date	Matrix	TCL VOCs (8260B)	TCL SVOCs (8270C)	Lead (6010B)	Note(s)
CAA-SB01	CAA-SB01-005	3.0-5.0	2/16/2005	soil	x	x	x	
	CAA-SB02-010	8.0-9.6	2/16/2005	soil	x	x	x	
CAA-SB02	CAA-SB02-020	18.0-20.0	2/17/2005	soil	x	x	x	Field Duplicate (CAA-SB02-220)
	CAA-SB02-023	23.0-23.4	2/17/2005	soil	x	x	x	
CAA-SB03	CAA-SB03-015	13.0-14.7	2/17/2005	soil	x	x	x	
	CAA-SB03-019	18.0-18.4	2/17/2005	soil	x	x	x	
CAA-SB04	CAA-SB04-020	18.0-20.0	2/17/2005	soil	x	x	x	MS/MSD, Field Duplicate (CAA-SB04-120)
	CAA-SB04-025	23-24.5	2/17/2005	soil	x	x	x	

Notes:

bgs = below ground surface

MS = matrix spike

MSD = matrix spike duplicate

TCL = Target Compound List

SVOC = semivolatile organic compound

VOC = volatile organic compound

TABLE 5-2
SUMMARY OF ANALYTICAL DATA
AOC A (MOGAS SPILL SITE)
CANNON AFB, NEW MEXICO

FIELD ID			CAA-SB01-005			CAA-SB01-010			CAA-SB02-020			CAA-SB02-023			CAA-SB03-015		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																	
Benzene	0.9 J	3 / 8	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	0.8	5.5	J
Bromomethane	2.2 J	1 / 8	<	12	U	<	11	U	2.2	12	J	<	12	UJ	<	11	U
Chloroform	12	7 / 8	9.2	5.9		<	5.6	U	9.8	5.9		12	5.9		12	5.5	
Cyclohexane	3.5 J	7 / 8	2.3	5.9	J	<	5.6	U	2.4	5.9	J	3.2	5.9	J	3.1	5.5	J
Dibromochloromethane	6	7 / 8	2.6	5.9	J	<	5.6	U	3.1	5.9	J	5.8	5.9	J	6.0	5.5	
Ethylbenzene	1.1 J	3 / 8	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	1.0	5.5	J
m,p-Xylene (sum of isomers)	3.9 J	6 / 8	1.2	5.9	J	<	5.6	U	1.8	5.9	J	3.3	5.9	J	<	5.5	U
Methylcyclohexane	13 J	7 / 8	6	24	J	<	23	U	6.8	24	J	11	24	J	12	22	J
Methyl Acetate	8.8 J	5 / 8	<	12	U	2.7	11	J	1.8	12	J	<	12	U	4.9	11	J
o-Xylene (1,2-Dimethylbenzene)	0.7 J	3 / 8	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	0.7	5.5	J
Toluene	47	8 / 8	19	5.9		1.5	5.6	J	25	5.9		46	5.9		44	5.5	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																	
All SVOCs reported non-detect	ND	0 / 8															
METALS (mg/kg)																	
Lead	5.9	8 / 8	0.54	0.6	J	0.71	0.6		3	0.6		1.4	0.6		5.9	0.6	

Notes:

< = not detected
µg/kg = microgram per kilogram
J = estimated
mg/kg = milligram per kilogram
Qual = qualifier
RL = reporting limit
SVOC = semivolatile organic compound
U = nondetect
UJ = estimated nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 5-2
SUMMARY OF ANALYTICAL DATA
AOC A (MOGAS SPILL SITE)
CANNON AFB, NEW MEXICO

FIELD ID			CAA-SB03-019			CAA-SB04-020			CAA-SB04-025		
DATE COLLECTED			February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)											
Benzene	0.9 J	3 / 8	0.9	5.7	J	<	5.8	U	0.8	5.6	J
Bromomethane	2.2 J	1 / 8	<	11	U	<	12	U	<	11	U
Chloroform	12	7 / 8	11	5.7		10	5.8		12	5.6	
Cyclohexane	3.5 J	7 / 8	3	5.7	J	2.9	5.8	J	3.5	5.6	J
Dibromochloromethane	6	7 / 8	4.7	5.7	J	3.3	5.8	J	5.4	5.6	J
Ethylbenzene	1.1 J	3 / 8	0.9	5.7	J	<	5.8	U	1.1	5.6	J
m,p-Xylene (sum of isomers)	3.9 J	6 / 8	3	5.7	J	2.3	5.8	J	3.9	5.6	J
Methylcyclohexane	13 J	7 / 8	9.3	23	J	9.1	23	J	13	22	J
Methyl Acetate	8.8 J	5 / 8	8.8	11	J	5.2	12	J	<	11	U
o-Xylene (1,2-Dimethylbenzene)	0.7 J	3 / 8	0.7	5.7	J	<	5.8	U	0.7	5.6	J
Toluene	47	8 / 8	37	5.7		30	5.8		47	5.6	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)											
All SVOCs reported non-detect	ND	0 / 8									
METALS (mg/kg)											
Lead	5.9	8 / 8	1.7	0.6		1.4	0.6		4.4	0.6	

Notes:

< = not detected
µg/kg = microgram per kilogram
J = estimated
mg/kg = milligram per kilogram
Qual = qualifier
RL = reporting limit
SVOC = semivolatile organic compound
U = nondetect
UJ = estimated nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 5-3
ANALYTICAL DATA SCREENING RESULTS
AOC A (MOGAS SPILL SITE)
CANNON AFB, NEW MEXICO

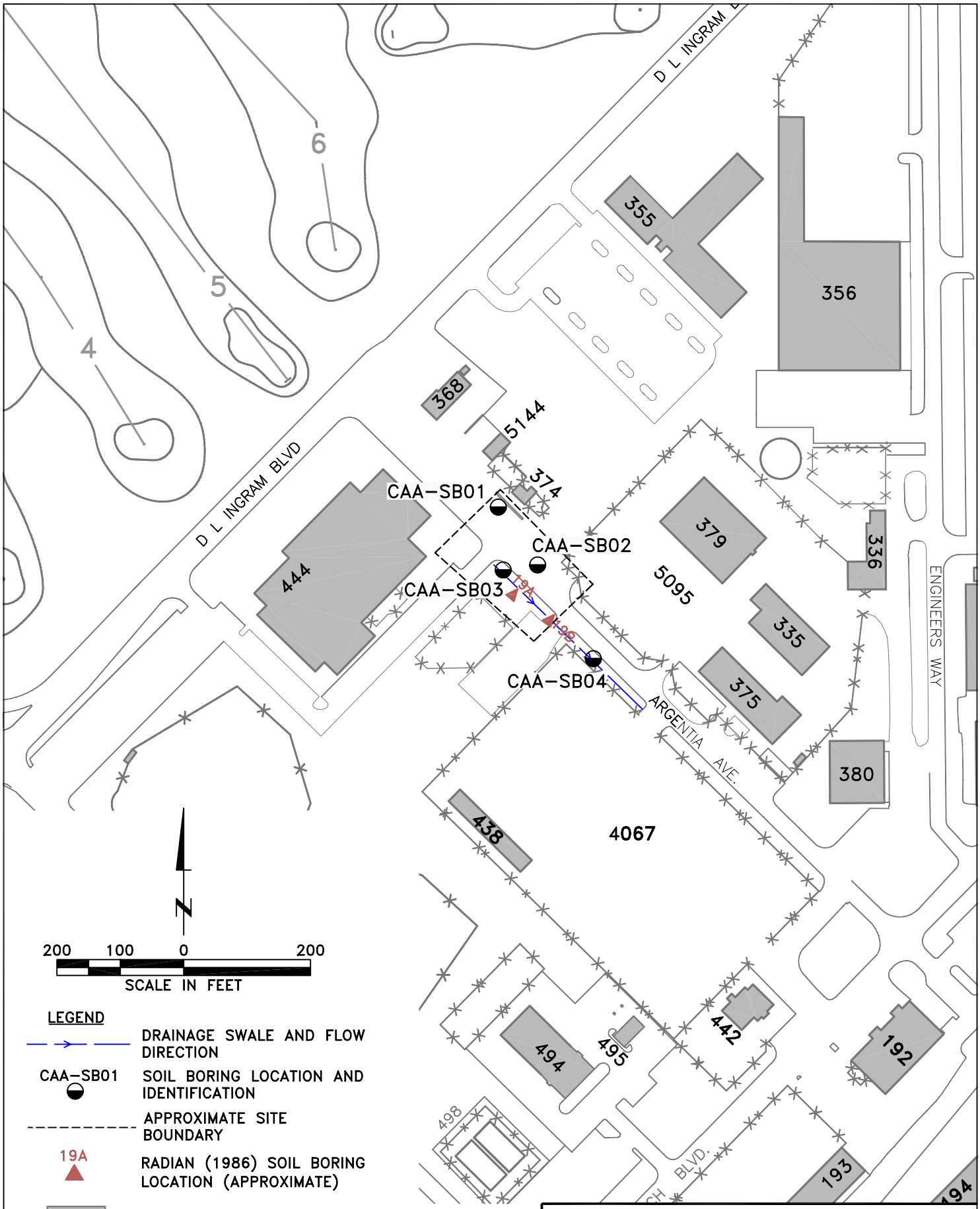
FIELD ID			NMED SSLs		CAA-SB01-005			CAA-SB01-010			CAA-SB02-020			CAA-SB02-023		
DATE COLLECTED			Residential	Migration to GW	February 16, 2005			February 16, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Soil	(DAF 20)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/kg)																
Benzene	0.9 J	3 / 8	3,320	20.2	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U
Bromomethane	2.2 J	1 / 8	2,730	37.7	<	12	U	<	11	U	2.2	12	J	<	12	UJ
Chloroform	12	7 / 8	1,210	8.28	**9.2**	5.9		<	5.6	U	**9.8**	5.9		**12**	5.9	
Cyclohexane	3.5 J	7 / 8	NE	NE	2.3	5.9	J	<	5.6	U	2.4	5.9	J	3.2	5.9	J
Dibromochloromethane	6	7 / 8	4,420	23.2	2.6	5.9	J	<	5.6	U	3.1	5.9	J	5.8	5.9	J
Ethylbenzene	1.1 J	3 / 8	128,000	20,300	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U
Methylcyclohexane	13 J	7 / 8	7,890	589,000	6	24	J	<	23	U	6.8	24	J	11	24	J
Methyl Acetate	8.8 J	5 / 8	19,400,000	21,500	<	12	U	2.7	11	J	1.8	12	J	<	12	U
Toluene	47	8 / 8	252,000	6,930	19	5.9		1.5	5.6	J	25	5.9		46	5.9	
m,p-Xylene (sum of isomers)	3.9 J	6 / 8	102,000	3,340	1.2	5.9	J	<	5.6	U	1.8	5.9	J	3.3	5.9	J
o-Xylene	0.7 J	3 / 8	132,000	109,000	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs) (µg/kg)																
All SVOCs reported non-detect	ND	0 / 8														
METALS (mg/kg)																
Lead	5.9	8 / 8	400	NE	0.54	0.6	J	0.71	0.6		3.2	0.6		1.4	0.6	

Notes:
µg/kg = microgram per kilogram
DAF = Dilution Attenuation Factor
GW = Groundwater
J = Estimated
mg/kg = milligram per kilogram
ND = Not Detected
NE = Not Established
NMED = New Mexico Environment Department
Qual = Qualifier
RL = Reporting Limit
SSL = Soil Screening Level (NMED 2005)
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.
Results that exceed the corresponding generic SSL appear in **boldface** and are underlined.

TABLE 5-3
ANALYTICAL DATA SCREENING RESULTS
AOC A (MOGAS SPILL SITE)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		CAA-SB03-015			CAA-SB03-019			CAA-SB04-020			CAA-SB04-025		
DATE COLLECTED			Residential	Migration to GW	February 17, 2005			February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Soil	(DAF 20)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/kg)																
Benzene	0.9 J	3 / 8	3,320	20.2	0.8	5.5	J	0.9	5.7	J	<	5.8	U	0.8	5.6	J
Bromomethane	2.2 J	1 / 8	2,730	37.7	<	11	U	<	11	U	<	12	U	<	11	U
Chloroform	12	7 / 8	1,210	8.28	**12**	5.5		**11**	5.7		**10**	5.8		**12**	5.6	
Cyclohexane	3.5 J	7 / 8	NE	NE	3.1	5.5	J	3	5.7	J	2.9	5.8	J	3.5	5.6	J
Dibromochloromethane	6	7 / 8	4,420	23.2	6	5.5		4.7	5.7	J	3.3	5.8	J	5.4	5.6	J
Ethylbenzene	1.1 J	3 / 8	128,000	20,300	1	5.5	J	0.9	5.7	J	<	5.8	U	1.1	5.6	J
Methylcyclohexane	13 J	7 / 8	7,890	589,000	12	22	J	9.3	23	J	9.1	23	J	13	22	J
Methyl Acetate	8.8 J	5 / 8	19,400,000	21,500	4.9	11	J	8.8	11	J	5.2	12	J	<	11	U
Toluene	47	8 / 8	252,000	6,930	44	5.5		37	5.7		30	5.8		47	5.6	
m,p-Xylene (sum of isomers)	3.9 J	6 / 8	102,000	3,340	<	5.5	U	3	5.7	J	2.3	5.8	J	3.9	5.6	J
o-Xylene	0.7 J	3 / 8	132,000	109,000	0.7	5.5	J	0.7	5.7	J	<	5.8	U	0.7	5.6	J
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs) (µg/kg)																
All SVOCs reported non-detect	ND	0 / 8														
METALS (mg/kg)																
Lead	5.9	8 / 8	400	NE	5.9	0.6		1.7	0.6		1.4	0.6		4.4	0.6	

Notes:
µg/kg = microgram per kilogram
DAF = Dilution Attenuation Factor
GW = Groundwater
J = Estimated
mg/kg = milligram per kilogram
ND = Not Detected
NE = Not Established
NMED = New Mexico Environment Department
Qual = Qualifier
RL = Reporting Limit
SSL = Soil Screening Level (NMED 2005)
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.
Results that exceed the corresponding generic SSL appear in **boldface** and are underlined.



SITE PLAN AND SAMPLING LOCATIONS FOR
AOC A
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 01/07/05	PROJECT NO. 16169869	FIG. NO. 5-1
CHK'D. BY: JLV	DATE: 07/07/05		

December 08, 2005 2:45:33 p.m.
Drawing: T:\CANNON\16169869\2\fig5-1.dwg

The following section provides a description of AOC B. The location of this AOC is shown on Figures 1-1 and 6-1. This section describes AOC B, the previous sampling results, the existing conditions at this AOC, and the supplemental assessment activities and results.

6.1 SITE BACKGROUND

AOC B is the site of a JP-4 spill from an aircraft fuel tank onto a concrete parking apron as a result of a broken fuel line coupling. The spill occurred in 1980 in the west-central portion of the Base. The total quantity of JP-4 spilled is estimated to be 400 gallons. A minor amount of fuel may have infiltrated soil through cracks and joints in the concrete apron, but most of the fuel likely evaporated from atop the apron (HARZA 1997). The site was located on the south parking apron, southwest of the former location of Building 120 (CH2M Hill 1983). Since the time of the spill, Building 120 has been moved to a new location and a new facility (Building 133) has been constructed near the site. The site is flat and paved with concrete.

As part of the preparations for construction of a new hangar, 13 soil borings were drilled and sampled within 600 feet of AOC B by Radian Corp. in 1992. One of these borings (BH-7) was completed within 100 feet of AOC B. Samples from these borings were analyzed for total recoverable petroleum hydrocarbons (TRPH), total petroleum hydrocarbons (TPH) purgeables, TPH extractables, and VOCs. None of the analytes were detected in BH-7 and no significant concentrations of analytes were present in samples from any of the 13 borings (i.e., all concentrations are below the current NMED residential SSLs) (HARZA 1997). Following an NFA proposal (URS 2000), AOC B was listed as a site that did not yet qualify for NFA approval based on the previous investigation results (NMED 2004).

6.2 FIELD INVESTIGATION AND DATA COLLECTION

Two soil borings were drilled to depths of 23.9 and 23.4 feet bgs in the vicinity of the former spill site (see Figure 6-1) using hollow-stem augers and split spoons. Soil samples were collected at approximately five-foot intervals beginning at about 1 foot bgs.

Samples were screened in the field for VOCs using headspace analysis in accordance with SOP No. 15, and results were recorded in the boring logs and in a field logbook. Samples were selected for analysis based on headspace readings and field observations (e.g., color and odor). Since field screening and observations did not indicate fuel contamination, then the two deepest samples from each boring were submitted for analysis. Two samples from each boring were submitted for laboratory analysis for individual fuel constituents (i.e., VOCs and SVOCs) and lead. Samples for VOC analysis were collected using EnCore® samplers in accordance with SOP No. 19.

The samples were analyzed as follows:

- TCL VOCs by USEPA Method 8260B
- TCL SVOCs by USEPA Method 8270C
- Lead by USEPA Method 6010B

The samples collected are summarized in Table 6-1.

6.3 DATA REVIEW AND VALIDATION

Four analytical soil samples were submitted for chemical analysis. The soil samples were analyzed for VOCs, SVOCs and lead. All chemical data were reviewed following procedures identified in the Cannon AFB Supplemental Assessment QAPP (URS 2005), USEPA National Functional Guidelines for Low Concentration Organic (USEPA 2001) and Inorganic (USEPA 2004) Data Review. No analytical data were rejected. Select analytical data from the AOC B samples collected during the supplemental assessment were qualified estimated (**J/UJ**) based on LCS data outside evaluation criteria. Additionally, acetone, methylene chloride, bis(2-ethylhexyl)phthalate and di-n-butyl phthalate were qualified nondetect (**U**) based on the presence of the compounds in the method blank samples or based on professional judgment (i.e. common laboratory contaminants). A tabular list of qualified data, including QC parameters for which qualifications were made, and a summary of data reviews and validations is presented in Appendix B.

Acceptable levels of accuracy and precision were achieved for the AOC B supplemental assessment sample data. The analytical data from the AOC B samples were determined to be acceptable for their intended use, including estimated (**J/UJ**) data.

6.4 INVESTIGATION RESULTS

6.4.1 Geology

Borings CAB-SB01 and CAB-SB02 were drilled in a parking apron along the flightline and encountered about 1.4 feet of concrete pavement, followed by about 0.5 feet of sand (SP) fill with crushed rock. Next was a layer of medium stiff, low plastic, silty clay (CL) or clayey silt (ML) fill, followed by a layer of medium dense, moist, silty sand (SP) or clayey sand (SC) fill to depths of 8.7 feet bgs (CAB-SB01) and 9.3 feet bgs (CAB-SB02).

Both borings then encountered native silts (ML) described as very stiff to hard, moist to dry, pinkish tan, low plastic calcareous material containing cemented nodules, which in general became denser, drier, and contained a larger number of more strongly cemented nodules with depth. At about 23 feet bgs the material encountered in Boring CAB-SB02 transitioned to very dense, dry, light tan, fine-grained silty sand (SM) that was calcareous and well cemented, before refusal was met at 23.4 feet bgs. The boring logs are included in Appendix A.

6.4.2 Chemical Results

Eight VOCs were detected in the four samples collected and analyzed from AOC B. Seven of the eight compounds were present only in concentrations below or just slightly above the reporting limits. The exception, toluene, was present at maximum concentration of 40 µg/kg, which is well below the NMED residential screening level (248,000 µg/kg). Despite being present in concentrations near the reporting limits, two of the four chloroform concentrations identified in samples from AOC B exceeded the generic NMED SSL for the migration to groundwater pathway. Based on this, a site-specific SSL for the migration to groundwater pathway was developed (see Section 5.4.3).

No SVOCs were detected in any of the four samples collected at AOC B.

Lead was detected in all four samples collected at AOC B. The maximum lead concentration (3.1 mg/kg) is well below the NMED residential screening level (400 mg/kg) and below the background UTL for lead in subsurface soil (8.7 mg/kg, W-C 1997).

Based on these results and on previous sampling results, where all concentrations were below current NMED residential SSLs, no further risk screening is warranted for AOC B.

A summary of the analytical results for AOC B is presented in Table 6-2, and a summary of the analytical data screening results for AOC B is presented in Table 6-3. The complete set of analytical results is included in Appendix C.

6.4.3 Development of a Site-Specific Chloroform SSL for the Migration to Groundwater Pathway

As for AOC A, a site-specific chloroform SSL for the migration to groundwater pathway was developed for AOC B. This site-specific SSL was developed by first calculating a site-specific DAF for AOC A using NMED Equation 17 (NMED 2005). The only parameter that differs from those used in the DAF calculation for AOC A is the length of source parallel to groundwater flow (L), which at AOC B is 61 m (see Figure 6-1), rather than 64 m at AOC A. The slight change in dimension had very little effect on the calculation of the site-specific DAF (i.e., it is also 30.2 for AOC B). Thus, multiplying this site-specific DAF by the generic chloroform migration to groundwater SSL for a DAF of 1 (0.414 µg/kg, NMED 2005) also results in a site-specific migration to groundwater SSL for chloroform at AOC B of 12.5 µg/kg which again is above the maximum chloroform concentration identified at the site (12 µg/kg). Based on this, no further assessment of chloroform is warranted at AOC B.

TABLE 6-1
SUMMARY OF SAMPLES FOR CHEMICAL ANALYSIS
AOC B (JP-4 FUEL SPILL SITE)
CANNON AFB, NEW MEXICO

Sampling Location	Sample Identification	Depth Interval (feet bgs)	Sample Date	Matrix	TCL VOCs (8260B)	TCL SVOCs (8270C)	Lead (6010B)	Note(s)
CAB-SB01	CAB-SB01-020	18.0-20.0	2/16/2005	soil	x	x	x	
	CAB-SB01-024	23.0-23.6	2/16/2005	soil	x	x	x	
CAB-SB02	CAB-SB02-019	18.0-19.2	2/16/2005	soil	x	x	x	
	CAB-SB02-024	23-23.5	2/16/2005	soil	x	x	x	

Notes:

bgs = below ground surface

TCL = Target Compound List

SVOC = semivolatile organic compound

VOC = volatile organic compound

TABLE 6-2
SUMMARY OF ANALYTICAL DATA
AOC B (JP-4 FUEL SPILL SITE)
CANNON AFB, NEW MEXICO

FIELD ID			CAB-SB01-020			CAB-SB01-024			CAB-SB02-019			CAB-SB02-024		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 16, 2005			February 16, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)														
Bromomethane	2.6 J	2 / 4	2.6	11	J	2.0	11	J	<	11	U	<	11	U
Chloroform	12	2 / 4	12	5.7		<	5.6	U	<	5.7	U	11	5.7	
Cyclohexane	3.5 J	2 / 4	3.5	5.7	J	<	5.6	U	<	5.7	U	2.9	5.7	J
Dibromochloromethane	5.4 J	2 / 4	5.4	5.7	J	<	5.6	U	<	5.7	U	4.5	5.7	J
m,p-Xylene (sum of isomers)	2.9 J	2 / 4	2.9	5.7	J	<	5.6	U	<	5.7	U	2.1	5.7	J
Methylcyclohexane	11 J	2 / 4	11	23	J	<	23	U	<	23	U	9.1	23	J
Methyl Acetate	1.3 J	1 / 4	<	11	U	1.3	11	J	<	11	U	<	11	U
Toluene	40	4 / 4	40	5.7		4.7	5.6	J	1.5	5.7	J	33	5.7	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)														
All SVOCs reported non-detect	ND	0 / 4												
METALS (mg/kg)														
Lead	3.1	4 / 4	3.1	0.6		0.79	0.6		0.21	0.6	J	0.75	0.6	

Notes:

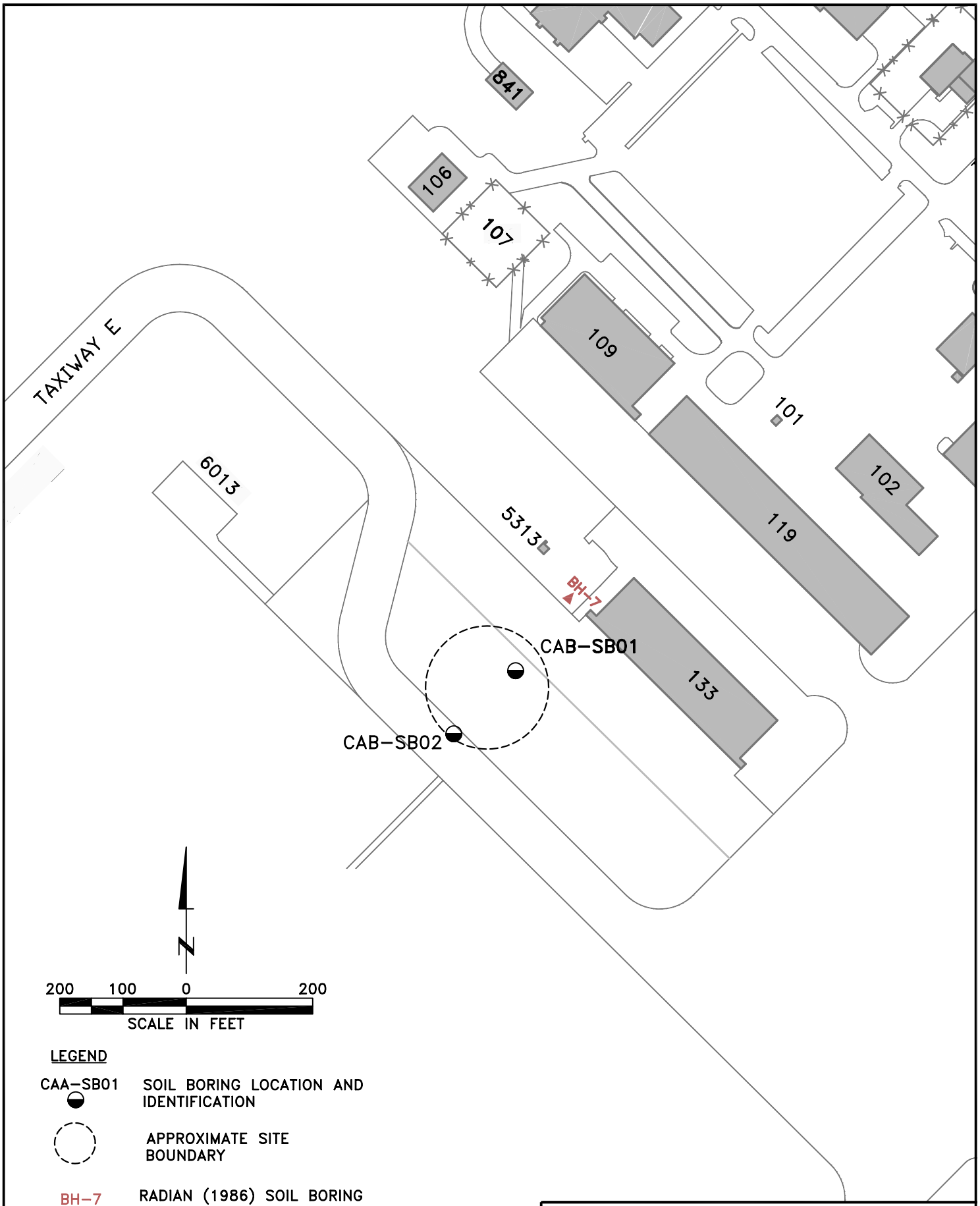
< = not detected
µg/kg = microgram per kilogram
J = estimated
mg/kg = milligram per kilogram
Qual = qualifier
RL = reporting limit
SVOC = semivolatile organic compound
U = nondetect
UJ = estimated nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 6-3
ANALYTICAL DATA SCREENING RESULTS
AOC B (JP-4 FUEL SPILL SITE)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		CAB-SB01-020			CAB-SB01-024			CAB-SB02-019			CAB-SB02-024		
DATE COLLECTED			Residential	Migration to GW	February 16, 2005			February 16, 2005			February 16, 2005			February 16, 2005		
	Maximum	Frequency	Soil	(DAF 20)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/kg)																
Bromomethane	2.2 J	2 / 4	2,730	37.7	2.6	11	J	2	11	J	<	11	U	<	11	U
Chloroform	12	2 / 4	1,210	8.28	**12**	5.7		<	5.6	U	<	5.7	U	**11**	5.7	
Cyclohexane	3.5 J	2 / 4	NE	NE	3.5	5.7	J	<	5.6	U	<	5.7	U	2.9	5.7	J
Dibromochloromethane	6	2 / 4	4,420	23.2	5.4	5.7	J	<	5.6	U	<	5.7	U	4.5	5.7	J
Methylcyclohexane	13 J	2 / 4	7,890	589,000	11	23	J	<	23	U	<	23	U	9.1	23	J
Methyl Acetate	8.8 J	1 / 4	19,400,000	21,500	<	11	U	1.3	11	J	<	11	U	<	11	U
Toluene	47	4 / 4	252,000	6,930	40	5.7		4.7	5.6	J	1.5	5.7	J	33	5.7	
m,p-Xylene (sum of isomers)	3.9 J	2 / 4	102,000	3,340	2.9	5.7	J	<	5.6	U	<	5.7	U	2.1	5.7	J
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs) (µg/kg)																
All SVOCs reported non-detect	ND	0 / 4														
METALS (mg/kg)																
Lead	5.9	4 / 4	400	NE	3.1	0.6		0.79	0.6		0.21	0.6	J	0.75	0.6	

Notes:
µg/kg = microgram per kilogram
DAF = Dilution Attenuation Factor
GW = Groundwater
J = Estimated
mg/kg = milligram per kilogram
ND = Not Detected
NE = Not Established
NMED = New Mexico Environment Department
Qual = Qualifier
RL = Reporting Limit
SSL = Soil Screening Level (NMED 2005)
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.
Results that exceed the corresponding generic SSL appear in **boldface** and are underlined.



LEGEND

CAA-SB01 SOIL BORING LOCATION AND IDENTIFICATION

APPROXIMATE SITE BOUNDARY

BH-7 RADIAN (1986) SOIL BORING LOCATION (APPROXIMATE)

BUILDING

December 08, 2005 3:58:29 p.m.
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SITE PLAN AND SAMPLING LOCATIONS FOR
AOC B
CANNON AIR FORCE BASE NEW, MEXICO

DRN. BY: DPG	DATE: 01/07/05	PROJECT NO. 16169869	FIG. NO. 6-1
CHK'D. BY: JLV	DATE: 07/07/05		

The following section provides a description of AOC C. The location of this AOC is shown on Figures 1-1 and 7-1. This section describes AOC C, the previous sampling results, the existing conditions at this AOC, and the supplemental assessment activities and results.

7.1 SITE BACKGROUND

AOC C includes the area where three pole-mounted electrical capacitors ruptured. The incident occurred in 1978 when lightning struck the pole, which housed a total of six capacitors. The site is located near the northwest corner of the Base near the fairway of Hole No. 13 on the golf course. This grass-covered site slopes slightly to the south. Approximately 6 gallons of dielectric oil, believed to contain PCBs, spilled onto the ground.

The residual oil and contaminated soil were excavated and drummed immediately following the incident. The contaminated soil was excavated, placed in 55-gallon drums, and sent off site for disposal by the Defense Property Disposal Office (DPDO). The drummed soil was disposed of off Base in a permitted disposal facility. No visible evidence of the spill was observed during an April 1992 site visit. Following an NFA proposal (URS 2000), AOC A was listed as a site that did not yet qualify for NFA approval (NMED 2004).

7.2 FIELD INVESTIGATION AND DATA COLLECTION

Three soil borings were drilled to depths of 15, 10, and 10 feet bgs (respectively) in the vicinity of the power pole that once supported the capacitors (see Figure 7-1) using hollow-stem augers and split spoons. Soil samples were collected at approximately five-foot intervals beginning at the ground surface.

All samples, three samples collected from each of the 10-foot borings and four samples collected from the 15-foot boring (ten total), were analyzed for TCL PCBs using USEPA Method 8082.

The samples collected are summarized in Table 7-1.

7.3 DATA REVIEW AND VALIDATION

Ten analytical and two field duplicate soil samples were submitted for chemical analysis. The soil samples were analyzed for PCBs. All chemical data were reviewed following procedures identified in the Cannon AFB Supplemental Assessment QAPP (URS 2005), and USEPA National Functional Guidelines for Low Concentration Organic (USEPA 2001) Data Review. No analytical data were rejected. Select analytical data from the AOC C samples collected during the supplemental assessment were qualified estimated (**J/UJ**) based on analytical holding times outside evaluation criteria. A tabular list of qualified data, including QC parameters for which qualifications were made, and a summary of data reviews and validations is presented in Appendix B.

Acceptable levels of accuracy and precision were achieved for the AOC C supplemental assessment sample data. The analytical data from the AOC C samples were determined to be acceptable for their intended use, including estimated (**J/UJ**) data.

7.4 INVESTIGATION RESULTS

7.4.1 Geology

All three borings were drilled in a grassy area and encountered about 1.8 to 3.3 feet of fill, which included a 0.8- to 2.3-foot layer of loose, moist, red to reddish brown, find grained, calcareous, silty sand (SM) fill, followed by a 0.3- to 1.6-foot layer of soft to stiff, moist, reddish-brown to dark brown low plastic, silty clay (CL) fill.

All three borings then encountered native silty sands (SM) and sandy silts (ML) described as loose to very dense or very stiff, moist to dry, light tan to reddish-brown, fine grained or low plastic calcareous material, which in general became denser, drier, and more strongly cemented with depth. This calcareous material was identified in Boring CAC-SB01 as caliche at about 7 feet bgs; however, the boring was drilled to full planned depth of 15 feet bgs. In contrast, Borings CAC-SB02 and CAC-SB03 both met refusal at approximately 10 feet bgs. The boring logs are included in Appendix A.

7.4.2 Chemical Results

No PCBs were detected in any of the ten samples collected at AOC C.

Based on these results, no further risk screening is warranted for AOC C.

A summary of the analytical results for AOC C is presented in Table 7-2, and a summary of the analytical data screening results for AOC C is presented in Table 7-3. The complete set of analytical results is included in Appendix C.

TABLE 7-1
SUMMARY OF SAMPLES FOR CHEMICAL ANALYSIS
AOC C (BLOWN CAPACITOR SITE, OT-10)
CANNON AFB, NEW MEXICO

Sampling Location	Sample Identification	Depth Interval (feet bgs)	Sample Date	Matrix	TCL PCBs (8082)	Note(s)
CAC-SB01	CAC-SB01-000	0.0-0.5	2/15/2005	soil	x	
	CAC-SB01-005	3.0-5.0	2/15/2005	soil	x	
	CAC-SB01-010	8.0-9.7	2/15/2005	soil	x	
	CAC-SB01-015	13.0-14.7	2/15/2005	soil	x	MS/MSD, Field Duplicate (CAC-SB01-115)
CAC-SB02	CAC-SB02-000	0.0-0.5	2/15/2005	soil	x	Field Duplicate (CAC-SB02-100)
	CAC-SB02-005	3.0-5.0	2/15/2005	soil	x	
	CAC-SB02-010	8.0-9.9	2/15/2005	soil	x	
CAC-SB03	CAC-SB03-000	0.0-0.5	2/15/2005	soil	x	
	CAC-SB03-005	3.0-4.8	2/15/2005	soil	x	
	CAC-SB03-010	8.0-10.0	2/15/2005	soil	x	

Notes:

bgs = below ground surface

MS = matrix spike

MSD = matrix spike duplicate

TCL = Target Compound List

PCB = polychlorinated biphenyl

TABLE 7-2
SUMMARY OF ANALYTICAL DATA
AOC C (BLOWN CAPACITOR SITE, OT-10)
CANNON AFB, NEW MEXICO

FIELD ID			CAC-SB01-000			CAC-SB01-005			CAC-SB01-010			CAC-SB01-015			CAC-SB02-000		
DATE COLLECTED			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																	
All PCBs reported non-detect	ND	0 / 10															

Notes:

µg/kg = microgram per kilogram
PCB = polychlorinated biphenyl
Qual = Qualifier
RL = reporting limit
The calculation of detection frequency does not include results from reanalyzed

TABLE 7-2
SUMMARY OF ANALYTICAL DATA
AOC C (BLOWN CAPACITOR SITE, OT-10)
CANNON AFB, NEW MEXICO

FIELD ID			CAC-SB02-005			CAC-SB02-010			CAC-SB03-000			CAC-SB03-005			CAC-SB03-010		
DATE COLLECTED			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																	
All PCBs reported non-detect	ND	0 / 10															

Notes:

µg/kg = microgram per kilogram
PCB = polychlorinated biphenyl
Qual = Qualifier
RL = reporting limit
The calculation of detection frequency does not include results from reanalyzed

TABLE 7-3
ANALYTICAL DATA SCREENING RESULTS
AOC C (BLOWN CAPACITOR SITE)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		CAC-SB01-000			CAC-SB01-005			CAC-SB01-010			CAC-SB01-015		
DATE COLLECTED			Residential	Migration to GW	February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Soil	(DAF 20)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCBs) (µg/kg)																
All PCBs reported non-detect	ND	0 / 10														

Notes:
µg/kg = microgram per kilogram
DAF = Dilution Attenuation Factor
GW = Groundwater
J = Estimated
mg/kg = milligram per kilogram
ND = Not Detected
NMED = New Mexico Environment Department
Qual = Qualifier
RL = Reporting Limit
SSL = Soil Screening Level (NMED 2005)
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 7-3
ANALYTICAL DATA SCREENING RESULTS
AOC C (BLOWN CAPACITOR SITE)
CANNON AFB, NEW MEXICO

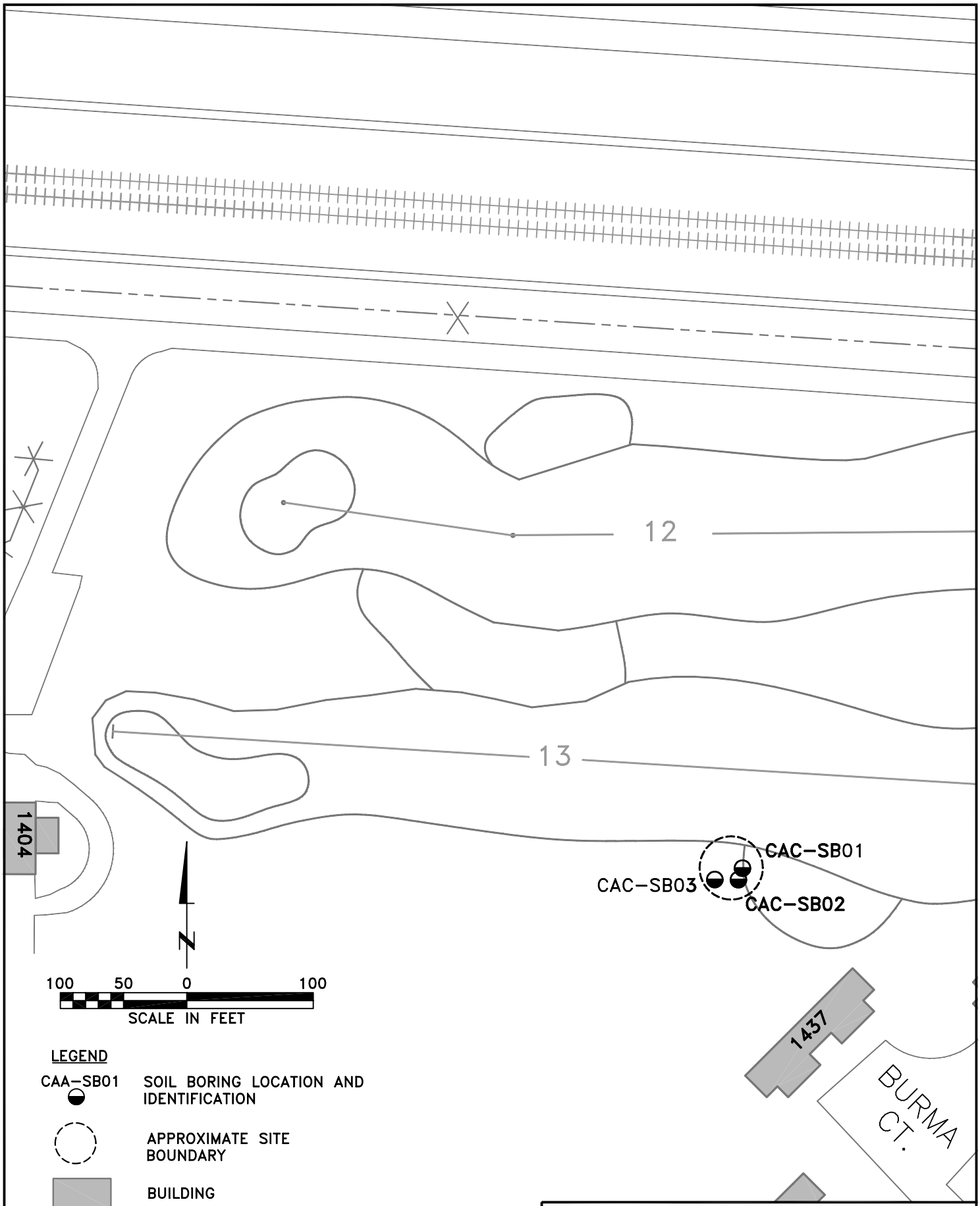
FIELD ID			NMED SSLs		CAC-SB02-000			CAC-SB02-005			CAC-SB02-010			CAC-SB03-000		
DATE COLLECTED			Residential	Migration to GW	February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Soil	(DAF 20)	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCBs) (µg/kg)																
All PCBs reported non-detect	ND	0 / 10														

Notes:
µg/kg = microgram per kilogram
DAF = Dilution Attenuation Factor
GW = Groundwater
J = Estimated
mg/kg = milligram per kilogram
ND = Not Detected
NMED = New Mexico Environment Department
Qual = Qualifier
RL = Reporting Limit
SSL = Soil Screening Level (NMED 2005)
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 7-3
ANALYTICAL DATA SCREENING RESULTS
AOC C (BLOWN CAPACITOR SITE)
CANNON AFB, NEW MEXICO

FIELD ID			NMED SSLs		CAC-SB03-005			CAC-SB03-010		
DATE COLLECTED			Residential	Migration to GW	February 15, 2005			February 15, 2005		
	Maximum	Frequency	Soil	(DAF 20)	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCBs) (µg/kg)										
All PCBs reported non-detect	ND	0 / 10								

Notes:
µg/kg = microgram per kilogram
DAF = Dilution Attenuation Factor
GW = Groundwater
J = Estimated
mg/kg = milligram per kilogram
ND = Not Detected
NMED = New Mexico Environment Department
Qual = Qualifier
RL = Reporting Limit
SSL = Soil Screening Level (NMED 2005)
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.



LEGEND

CAA-SB01 SOIL BORING LOCATION AND IDENTIFICATION

APPROXIMATE SITE BOUNDARY

BUILDING

RAILROAD TRACKS

SITE PLAN AND SAMPLING LOCATIONS
AOC C
CANNON AIR FORCE BASE NEW MEXICO

DRN. BY: DPG	DATE: 01/07/05	PROJECT NO. 16169869	FIG. NO. 7-1
CHK'D. BY: JLV	DATE: 07/07/05		

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Drawing: T:\CANNON\16169869\2\fig5-1.dwg

8.1 SUMMARY OF FINDINGS FOR AOC A

8.1.1 Physical Characteristics

- AOC A is the site of two MOGAS spills from overturned fuel trucks. The site, located southeast of the gymnasium (Building 444) in the north-central region of the Base, measures approximately 400 by 200 feet.
- The area of AOC A is relatively flat and much of it is asphalt-paved with a small drainage swale running to the southeast through a grassy area in the southern portion of the site.

8.1.2 Previous Investigation

- Two soil borings were drilled and sampled as part of a Phase II, Stage 1 investigation of AOC A. Six samples were analyzed for oil and grease, lead, and purgeable aromatics. Lead and 1,2-dichloroethene were detected below current NMED residential SSLs. No oil and grease was detected in any of the samples.
- Following an NFA proposal (URS 2000), AOC A was listed as a site that did not yet qualify for NFA approval based on the previous investigation results (NMED 2004).

8.1.3 Supplemental Assessment

- As part of the supplemental assessment of AOC A, four soil borings were drilled to depths ranging from 9.8 to 24.5 feet bgs and soil samples were collected at approximately five-foot intervals.
- Samples were field screened and two samples from each boring (eight total) were analyzed for VOCs, SVOCs, and lead.
- The analytical data from the AOC A samples were reviewed and validated. The data were determined to be acceptable for their intended use.
- All four borings encountered native silts (ML) and silty sands (SM) described as medium stiff to very stiff and medium dense to very dense, moist to very dry, pinkish tan to reddish brown, low plastic or fine grained, generally calcareous material containing cemented nodules, which in general became denser, drier, and contained a larger number of more strongly cemented nodules with depth.

8.1.4 Contamination Assessment

- Ten of 11 VOCs detected in samples from AOC A were present only in concentrations below or just slightly above the reporting limits. The exception, toluene, was present at maximum concentration that is well below the NMED residential screening level. However, concentrations of chloroform identified at the site exceed the generic migration to groundwater SSL using a default DAF of 20. Therefore, a site-specific migration to groundwater SSL for chloroform at AOC A was developed by calculating a site-specific DAF in accordance with NMED guidance (NMED 2005). This site-specific DAF (30.2) results in a site-specific migration to groundwater SSL for chloroform (12.5 µg/kg) above the

maximum concentration identified at AOC A (12 µg/kg). Based on this, no further assessment of chloroform is warranted at AOC A.

- No SVOCs were detected in any of the eight samples collected at AOC A.
- Lead was detected in all eight samples collected at AOC A. The maximum lead concentration is below the NMED residential screening level for lead the background UTL for lead in subsurface soil.
- Based on the supplemental assessment results and on previous sampling results, where all concentrations were below current NMED residential SSLs, no further risk screening is warranted for AOC A.

8.2 SUMMARY OF FINDINGS FOR AOC B

8.2.1 Physical Characteristics

- AOC B is the site of a JP-4 spill from an aircraft fuel tank onto a concrete parking apron as a result of a broken fuel line coupling. The spill occurred in the west- central portion of the Base, southwest of the current location of Building 133.
- The site is flat and paved with concrete.

8.2.2 Previous Investigation

- In 1992, as part of the preparations for construction of a new hangar, 13 soil borings were drilled and sampled within 600 feet of AOC B. Samples were analyzed for TRPH, TPH purgeables, TPH extractables, and VOCs. All analytes were non-detect in the nearest boring and all concentrations in the other borings are below the current NMED residential SSLs.
- Following an NFA proposal (URS 2000), AOC B was listed as a site that did not yet qualify for NFA approval based on the previous investigation results (NMED 2004).

8.2.3 Supplemental Assessment

- As part of the supplemental assessment of AOC B, two soil borings were drilled to depths of 23.9 and 23.4 feet bgs and soil samples were collected at approximately five-foot intervals.
- Samples were field screened and two samples from each boring (four total) were analyzed for VOCs, SVOCs, and lead.
- The analytical data from the AOC B samples were reviewed and validated. The data were determined to be acceptable for their intended use.
- Both borings then encountered native silts (ML) described as very stiff to hard, moist to dry, pinkish tan, low plastic calcareous material containing cemented nodules, which in general became denser, drier, and contained a larger number of more strongly cemented nodules with depth. The material in one boring became well cemented at about 23 feet bgs before refusal was encountered at 23.4 feet bgs.

8.2.4 Contamination Assessment

- Seven of eight VOCs detected in samples from AOC B were present only in concentrations below or just slightly above the reporting limits. The exception, toluene, was present at maximum concentration that is well below the NMED residential screening level. However, concentrations of chloroform identified at the site exceed the generic migration to groundwater SSL using a default DAF of 20. Therefore, a site-specific migration to groundwater SSL for chloroform at AOC B was developed by calculating a site-specific DAF in accordance with NMED guidance (NMED 2005). As with AOC A, this site-specific DAF (30.2) results in a site-specific migration to groundwater SSL for chloroform (12.5 µg/kg) above the maximum concentration identified at AOC B (12 µg/kg). Based on this, no further assessment of chloroform is warranted at AOC B.
- No SVOCs were detected in any of the four samples collected at AOC B.
- Lead was detected in all four samples collected at AOC B. The maximum lead concentration is below the NMED residential screening level for lead the background UTL for lead in subsurface soil.
- Based on the supplemental assessment results and on previous sampling results, where all concentrations were below current NMED residential SSLs, no further risk screening is warranted for AOC B.

8.3 SUMMARY OF FINDINGS FOR AOC C

8.3.1 Physical Characteristics

- AOC C includes the area where three pole-mounted electrical capacitors ruptured when lightning struck a pole, which housed a total of six capacitors. The site is located near the northwest corner of the Base, near the fairway of Hole No. 13 on the golf course.
- This grass-covered site slopes slightly to the south.

8.3.2 Previous Activity

- The residual oil and contaminated soil was excavated and drummed immediately following the incident. The excavated materials were disposed of off Base in a permitted disposal facility.
- Following an NFA proposal (URS 2000), AOC C was listed as a site that did not yet qualify for NFA approval based on the previous investigation results (NMED 2004).

8.3.3 Supplemental Assessment

- As part of the supplemental assessment at AOC C, three soil borings were drilled to depths of 10 or 15 feet bgs and soil samples were collected at approximately five-foot intervals.
- All samples, three or four samples from each boring (ten total), were analyzed for PCBs.
- The analytical data from the AOC C samples were reviewed and validated. The data were determined to be acceptable for their intended use.

- All three borings then encountered native silty sands (SM) and sandy silts (ML) described as loose to very dense or very stiff, moist to dry, light tan to reddish-brown, fine grained or low plastic calcareous material, which in general became denser, drier, and more strongly cemented with depth.

8.3.4 Contamination Assessment

- No PCBs were detected in any of the ten samples collected at AOC C.
- Based on these results, no further risk screening is warranted for AOC C.

8.4 RECOMMENDATIONS

Based on the results of the supplemental assessment of AOCs A, B, and C, NFA is warranted for all three AOCs.

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DAILY QUALITY CONTROL REPORT

Supplemental Assessment AOCs A, B, & C
Cannon AFB

Date 2/14 /05

Day	S	M	T	W	TH	F	S
		X					

USACE Project Manager	Steve Cox
Project	Cannon AFB
Project No.	16169869.00002
Contract No.	W9128F-04-0001

Weather	Bright Sun	Clear	Overcast X	Rain	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate X	High	Report No.	
Humidity	Dry X	Moderate	Humid	1	

Subcontractors on Site:
None

Equipment on Site:
None

Visitors on Site:
Pete Zamir - Cannon AFB

URS Personnel on Site: M. Sonderman, L. Todd

Field Work Performed (including sampling):
Travelled to site; obtained passes; visited drilling locations, met with Base Ops for flightline procedures; identified potable water supply and equipment staging Area; drove route to Fed Ex and purchased supplies.

Quality Control Activities (including field calibration):
None

Health and Safety and Activities:
None

Observations/Problems Encountered/Corrective Action Taken:
Base is on exercise; had some delays meeting with Base Ops

By *M. Sonderman* Title Geologist

DAILY QUALITY CONTROL REPORT

Supplemental Assessment AOCs A, B, & C
Cannon AFB

Date 2/15/05

Day	S	M	T	W	TH	F	S
			X				

USACE Project Manager	Steve Cox
Project	Cannon AFB
Project No.	16169869.00002
Contract No.	W9128F-04-0001

Weather	Bright Sun	Clear	Overcast X	Rain	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate	High X	Report No.	
Humidity	Dry X	Moderate	Humid	2	

Subcontractors on Site:
Roy Wedell, Gabe Perez, Rick Lucas, Bill Luces – Peterson Drilling

Equipment on Site:
Mobile B61 drill rig; two support trucks, steam cleaner, decon tub, supply trailer, skidsteer, water tank

Visitors on Site:
Pete Zamie

URS Personnel on Site: M. Sonderman, L. Todd

Field Work Performed (including sampling):
obtained security passes for drilling; obtained flightline passes from Base Ops; Drilled 3 borings at AOC-C (golf course), cored both holes at AOC-B; concrete ~16.5 inches both holes.

Quality Control Activities (including field calibration):
calibrated PID to 100 ppm Isobutylene; collected MS/MSD for sample CAC-SB01-015

Health and Safety and Activities:
Held Health + Safety Briefing before initiating drilling. Sgt. McCullum drove us to boring locations on flightline.

Observations/Problems Encountered/Corrective Action Taken:
Increased travel time on base due to exercises. No solution. Extreme wear on drill bit teeth; cracked auger sub. Will weld in morning. Driller not instructed to have grout pump; sent Bill Lucas to get one for tomorrow.

By M. Sonderman Title Geologist

DAILY QUALITY CONTROL REPORT

Supplemental Assessment AOCs A, B, & C
Cannon AFB

Date 2/16/05

Day	S	M	T	W	TH	F	S
				X			

USACE Project Manager	Steve Cox
Project	Cannon AFB
Project No.	16169869.00002
Contract No.	W9128F-04-0001

Weather	Bright Sun	Clear	Overcast X	Rain	Snow
Temp	To 32	32-50 X	50-70	70-85	85 up
Wind	Still	Moderate X	High	**Report No.** 3	
Humidity	Dry	Moderate	Humid		

Subcontractors on Site:
Peterson Drilling; Ray Wedell, Gabe Perez, Bill Lucas, Rick Lucas

Equipment on Site:
Same as 2-15-05

Visitors on Site:
Pete Zamie - Cannon AFB

URS Personnel on Site: M. Sonderman, L. Todd

Field Work Performed (including sampling):
Drilled both borings at AOC-B and one boring at AOC-A. Pete Zamie provided contact for obtaining concrete to patch runway. Grouted boreholes from 2-15-05 and those drilled today. Pete identified drum staging area; will get me a key.

Quality Control Activities (including field calibration):
Calibrated PID to 100ppm Isobutylene;

Health and Safety and Activities:
None

Observations/Problems Encountered/Corrective Action Taken:
Had to take drillers off base to weld auger sub; faster than getting a hot work/welding permit. More delays due to exercise.

By *M. Sonderman* Title Geologist

DAILY QUALITY CONTROL REPORT

Supplemental Assessment AOCs A, B, & C
Cannon AFB

Date 2/17/05

Day	S	M	T	W	TH	F	S
					X		

USACE Project Manager	Steve Cox
Project	Cannon AFB
Project No.	16169869.00002
Contract No.	W9128F-04-0001

Weather	Bright Sun	Clear	Overcast X	Rain	Snow
Temp	To 32	32-50 X	50-70	70-85	85 up
Wind	Still	Moderate X	High	Report No.	
Humidity	Dry	Moderate	Humid X	4	

Subcontractors on Site:
Peterson Drilling - Roy Wedell, Gabe Perez, Bill Lucas, Rick Lucas

Equipment on Site:
Same as 2-15-05

Visitors on Site:
Pete Zunie

URS Personnel on Site: M. Sonderman, L. Todd

Field Work Performed (including sampling):
Drilled 3 remaining borings at AOC-A; grouted holes, staged drums at LF-25; patched asphalt and holes completed in grassy areas, completed & verified drum log.

Quality Control Activities (including field calibration):
Calibrated PID & collected Duplicate & MS/MSD samples.

Health and Safety and Activities:
None

Observations/Problems Encountered/Corrective Action Taken:
More Delays due to base exercises; Drillers were jacked up by security. Someone saw them staging drums at LF-25 and called security & said they were dumping the drums. Cleared up situation with security. ~~Hit~~ shallow refusal at CAA-SB03. Had utilities rechecked.

By M. Sonderman Title Geologist

HTRW DRILLING LOG

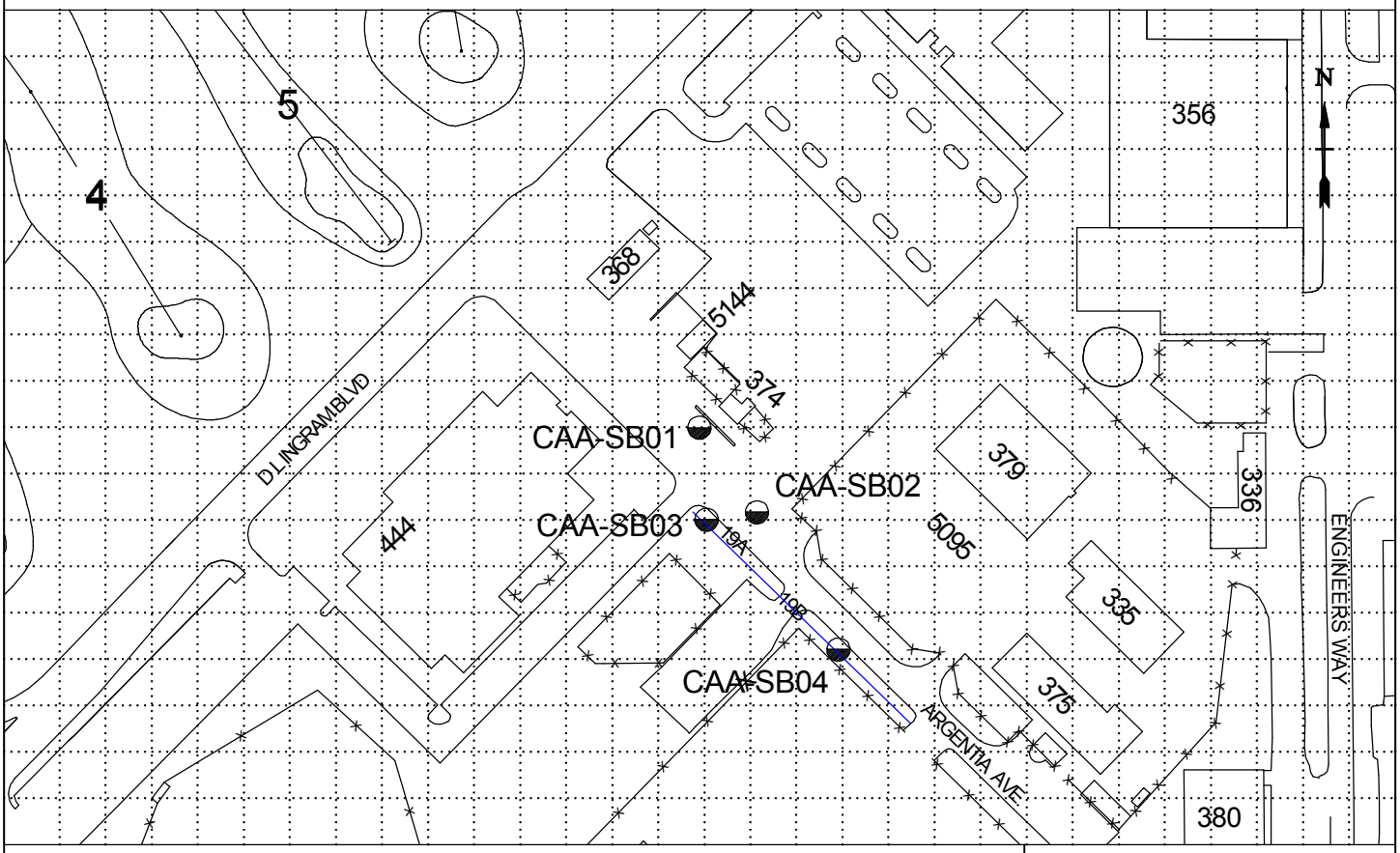
DISTRICT: OMAHA		HOLE NUMBER: CAA-SB01
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF SHEETS 2
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3" stainless steel split spoon	8. HOLE LOCATION: 1,237,457.60N 805,477.00E SW of Bldg. 374	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/16/05	11. DATE COMPLETED: 2/16/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 9.8' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2	X	Lead	SVOCs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 200'



PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAA-SB01

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAA-SB01	2 OF	2

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	Asphalt pavement	Background PID=0				Asphalt
		Silty Gravel (GM) - Medium dense, dry, gray, fine to coarse, with fine-grained sand					Subgrade
	1	Silty CLAY (CL) - Medium stiff, moist, brown, low plastic				5	Fill
			BZ=ND HS=ND			4	
	2					7	
		SILT (ML) - Stiff, dry, pinkish-tan, low plastic, calcareous, with cemented nodules				7	Native soil
	3					S3	R=2.0/2.0 T=1402
					CAA-SB01-005	10	Driller noted hard drilling
			BZ=ND HS=ND			11	
	4					17	
		Becomes moderately well-cemented				16	
	5					S3	R=2.0/2.0 T=1512
	6						
	7						
	8				CAA-SB01-010	19	
		Becomes well-cemented, with trace fine-grained sand	BZ=ND HS=ND			29	
	9					30	
						50+	No apparant slough, sample expanded
						S3	R=2.0/1.8 T=1522
	10	B.O.B. @ 9.8' bgs					Refusal @ 9.8' bgs

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB01

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

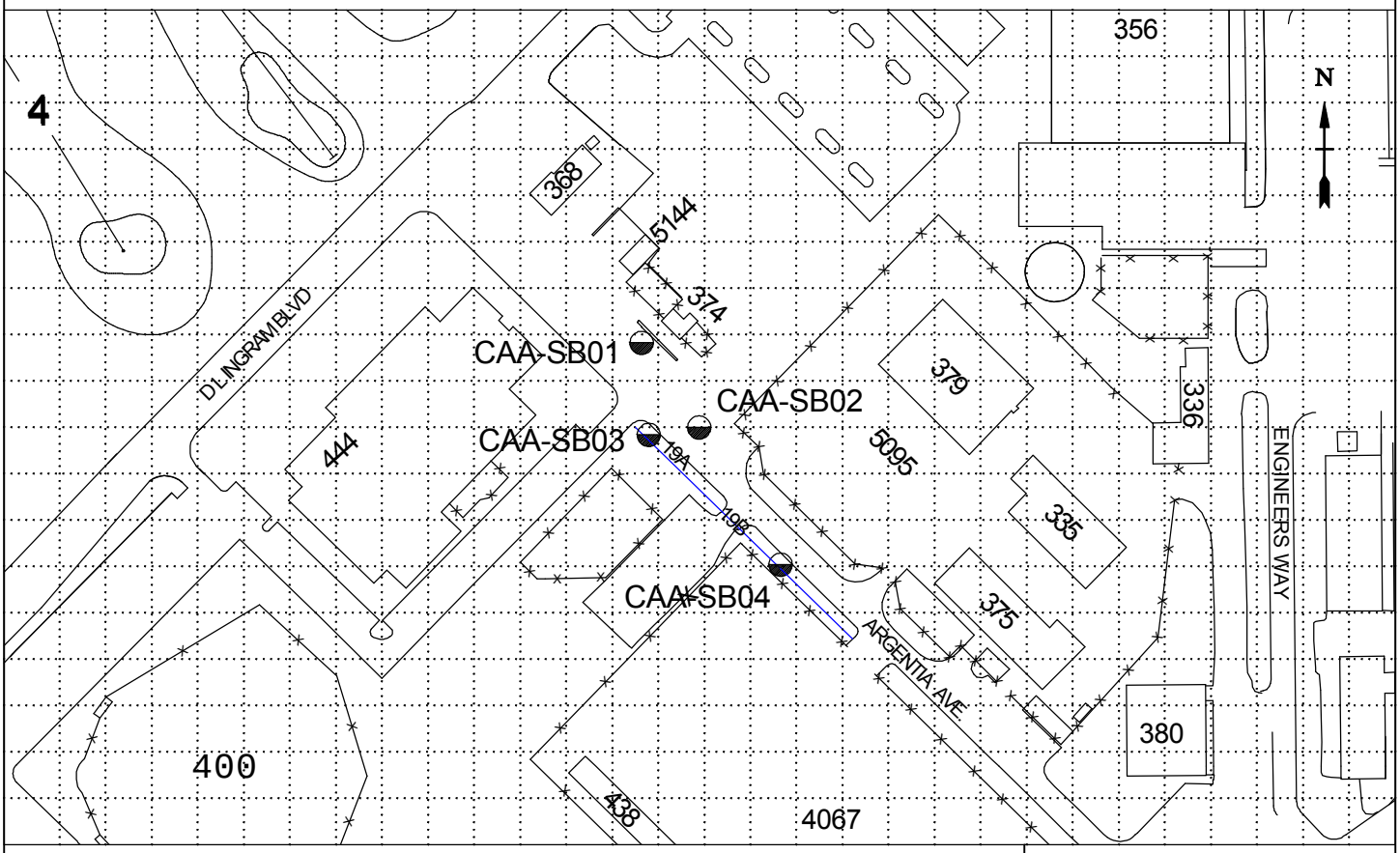
DISTRICT: OMAHA		HOLE NUMBER: CAA-SB02
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF SHEETS 4
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3"; stainless steel split spoon	8. HOLE LOCATION: 1,237,366.10N 805,539.30E SE of Bldg. 374	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/17/05	11. DATE COMPLETED: 2/17/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 23.4' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2	X	Lead	SVOCs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 200'



PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAA-SB02

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAA-SB02	2 OF	4

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	Asphalt pavement	Background PID=0				Asphalt
		Silty Gravel (GM) - Medium dense, dry, grayish-brown, fine to coarse, with fine- to coarse-grained sand and silt					Subgrade
	1	Silty CLAY (CL) - Medium stiff, moist, brown and reddish-brown, low plastic	BZ=ND HS=ND			5 6	Fill
	2	Sandy SILT to Silty SAND (ML-SM) - Stiff to medium dense, moist, reddish-brown, low plastic, fine-grained				7 7	Fill
	3					S3	R=2.0/2.0 T=0756
		Silty SAND (SM) - Medium dense, moist, light reddish-brown, fine-grained, calcareous, with some weakly-cemented nodules	BZ=ND HS=ND			4 10 4 5	Native soil
	4						
	5					S3	R=2.0/2.0 T=0802
	6						
	7						
	8	SILT (ML) - Very stiff, moist, low plastic, calcareous, with well-cemented nodules	BZ=ND HS=ND			20	Native soil
						50+ S3	R=1.5/0.8 T=0821
	9	Caliche zone					
		Silty SAND (SM) - Dense, moist, reddish-brown, fine-grained, calcareous, with 3" dia. nodules					Driller noted easier drilling from ~ 9' to 13' Native soil
	10						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB02

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: CAA-SB02

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

SHEET 3 OF 4 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 COUNT (g)	REMARKS (h)
	10	SAME: Silty SAND (SM) - Dense, moist, reddish-brown, fine-grained, calcareous, with 3" dia. nodules					Native soil
	11						
	12						
	13		BZ=ND HS=ND			4 10 23 19	Driller noted easier drilling from ~ 9' to 13'
	14						
	15					S3	R=2.0/2.0 T=0829
	16						
	17						
	18	Becomes dry, with numerous well-cemented nodules	BZ=ND HS=ND		CAA-SB02-020 and CAA-SB02-220 (duplicate)	16 30 41 48	
	19						
	20					S3	R=2.0/2.0 T=0839

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB02

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAA-SB02	4 OF	4

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	20	SAME: Silty SAND (SM) - Very dense, dry, reddish-brown, fine-grained, calcareous, with well-cemented nodules					Native soil
	21						
	22						
	23		BZ=ND HS=ND		CAA-SB02-023	50+ S3	Driller noted harder drilling R=0.4/0.4 T=0857
		B.O.B. @ 23.4' bgs					Refusal @ 23.4' bgs
	24						
	25						
	26						
	27						
	28						
	29						
	30						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB02

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

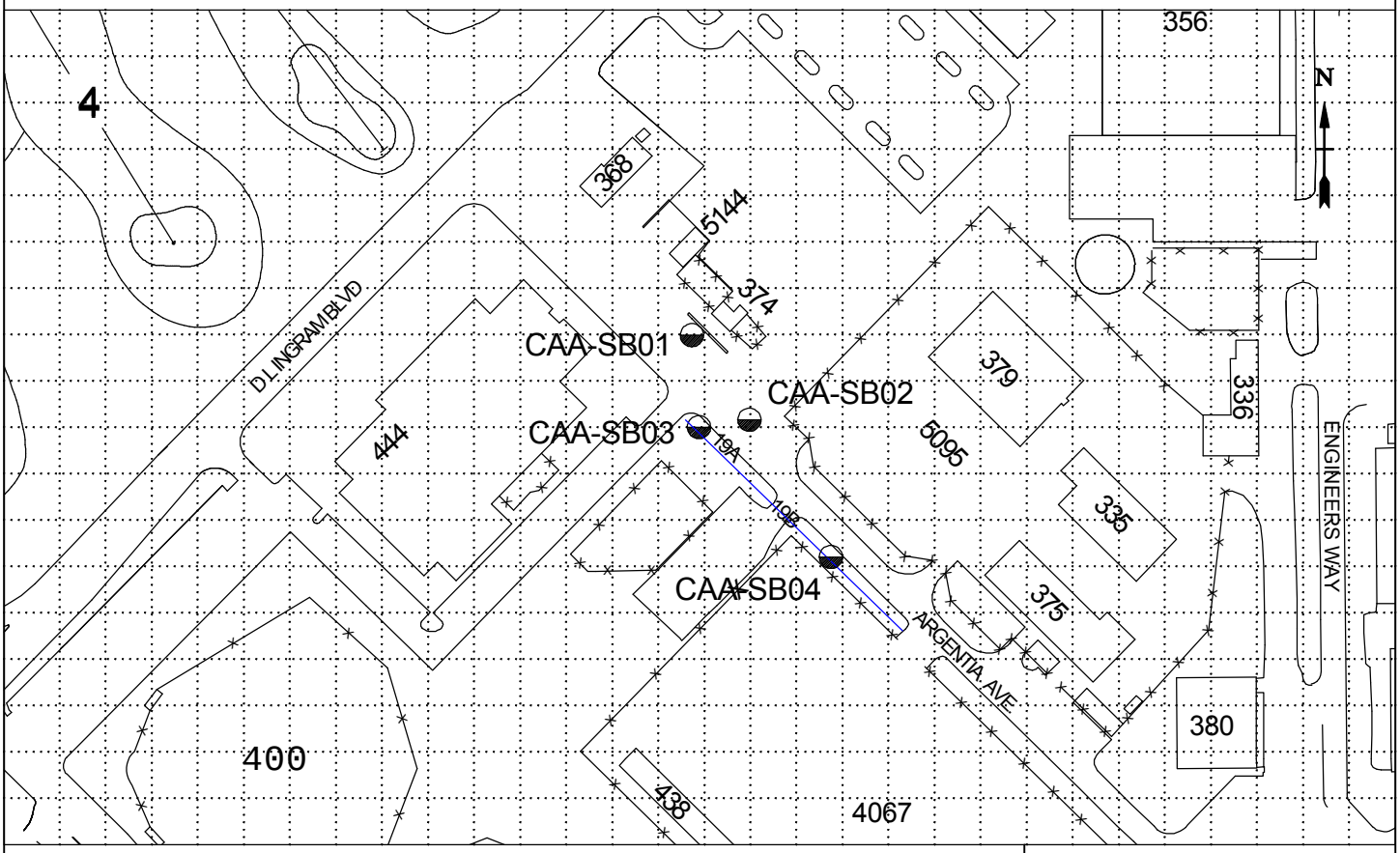
DISTRICT: OMAHA		HOLE NUMBER: CAA-SB03
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF SHEETS 4
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3" stainless steel split spoon	8. HOLE LOCATION: 1,237,357.80N 805,485.10E E of Bldg. 444	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/17/05	11. DATE COMPLETED: 2/17/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 23.2' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2	X	Lead	SVOCs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 200'



PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAA-SB03

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	PROJECT	INSPECTOR	SHEET	SHEETS
CAA-SB03	CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	M. Sonderman	2 OF	4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	Silty CLAY (CL) - Soft, moist, brown , low plastic, with organics	Background PID=0			1	Fill
						3	
	1	With gravel				S3	R=1.0/1.0 T=1005
		Silty CLAY (CL) - Medium stiff, moist, brown, low plastic, with gravel	BZ=ND HS=ND				Fill Pavement encountered at 1.0' bgs on first try. Offset 2.0' south.
	2						
	3	Silty SAND (SM) - Medium dense, moist, light reddish-brown, fine-grained, calcareous, with weakly-cemented nodules				6	Native soil
			BZ=ND HS=ND			7	
	4					7	
						7	
	5					S3	R=1.7/2.0 T=1041
	6						
	7						
	8		BZ=ND HS=ND			6	
						7	
	9					6	
		Sandy SILT (ML) - Stiff, moist, light reddish-tan, with weakly-cemented nodules				8	Native soil
	10					S3	R=2.0/2.0 T=1050

PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAA-SB03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAA-SB03	3 OF	4

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C, CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	10	SAME: Sandy SILT (ML) - Stiff, moist, light reddish-tan, with weakly-cemented nodules					Native soil
	11						
	12						
	13				CAA-SB03-015	7	
		Silty SAND (SM) - Dense, moist, reddish-brown, fine-grained	BZ=ND HS=ND			30	Native soil
	14	Sandy SILT (ML) - Hard, dry, pinkish-tan, low plastic, calcareous, with strongly-cemented nodules and trace clay				46	Native soil
						50+	Driller noted hard drilling from ~14' to 17'
						S3	R=1.7/1.7 T=1058
	15						
	16						
	17						Driller noted easier drilling
	18	Silty SAND (SM) - Very dense, dry, light pinkish-tan, fine-grained, with coarse gravel-sized cemented nodules	BZ=ND HS=ND		CAA-SB03-019	50+	Native soil
						50+ S3	R=0.4/0.6 T=1111
	19						
	20						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB03

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAA-SB03	4 OF	4

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	20	SAME: Silty SAND (SM) - Very dense, dry, light pinkish-tan, fine-grained, with coarse gravel-sized cemented nodules					Native soil
	21						
	22						Driller noted harder drilling
							Augers screeching
	23					50+ S3	R=0/0.2
		B.O.B. @ 23.2' bgs					Refusal @ 23.2' bgs
	24						
	25						
	26						
	27						
	28						
	29						
	30						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB03

HTRW DRILLING LOG

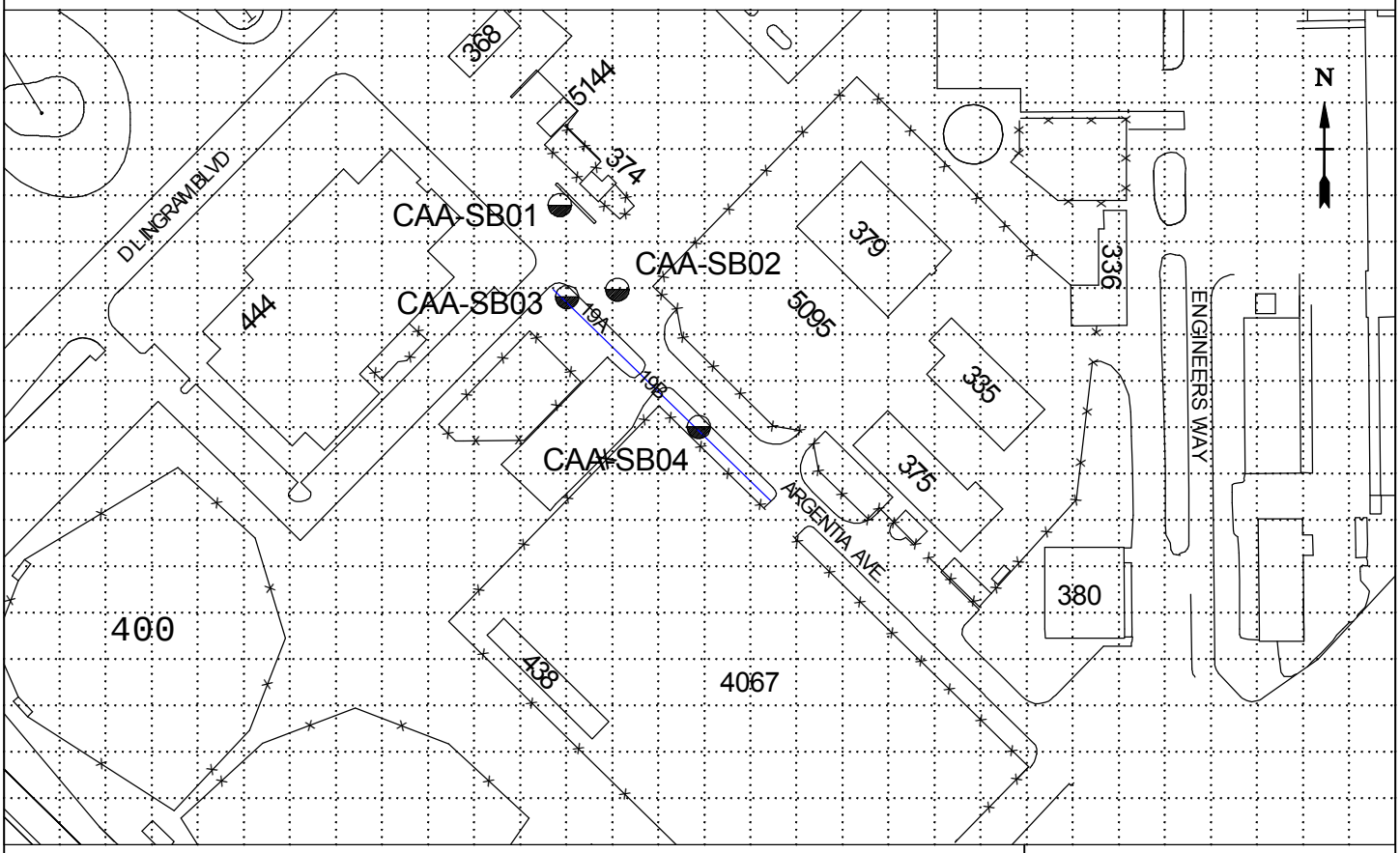
DISTRICT: OMAHA		HOLE NUMBER: CAA-SB04
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF SHEETS 4
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3"; stainless steel split spoon	8. HOLE LOCATION: 1,237,217.60N 805,627.40E W of Bldg. 375	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/17/05	11. DATE COMPLETED: 2/17/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 24.5' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2	X	Lead	SVOCs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 200'



PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAA-SB04

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: CAA-SB04

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

SHEET 2 OF 4 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 COUNT (g)	REMARKS (h)
	0	Silty CLAY (CL) - Stiff, moist, brown, low plastic, with organics and some fine-grained sand	Background PID=0			5	Fill
						5	
		Clayey SAND (SC) - Medium dense, moist, reddish-brown, fine-grained					Fill
	1	Silty CLAY (CL) - Stiff, moist, reddish-brown, low plastic, with fine-grained sand	BZ=ND HS=ND			8	Fill
						10	
	2					S3	R=2.0/2.0 T=1302
	3	Sandy SILT to Silty SAND (ML-SM) - Stiff to medium dense, moist, light brown, low plastic, fine-grained, with some calcareous, weakly-cemented nodules				4	Native soil
						5	
	4		BZ=ND HS=ND			6	
						4	
	5					S3	R=2.0/2.0 T=1311
	6						
	7	Sandy SILT (ML) - Medium stiff becoming hard, moist, light pinkish-brown, with strongly-cemented nodules				7	Native soil Driller noted hard drilling from ~7' to 8'
						31	Hit spoon refusal at 8.3', no recovery. Offset 10' to SE and drilled to 7', then drove spoon. Driller noted hard drilling from ~7.5' to 10.5'
	8		BZ=ND HS=ND			19	
						20	
	9					S3	R=2.0/2.0 T=1348
	10						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB04

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: CAA-SB04

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

SHEET 3 OF 4 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 COUNT (g)	REMARKS (h)
	10	SAME: Sandy SILT (ML) - Medium stiff to hard, moist, light pinkish-brown, fine-grained, with strongly-cemented nodules					Native soil
	11						
	12						Driller noted hard drilling from ~12' to 13'
	13	Large cemented nodules				13	
			BZ=ND HS=ND			31	
	14					8	
						8	
	15					S3	R=2.0/2.0 T=1402
	16						
	17						
	18		BZ=ND HS=ND		CAA-SB04-020	13	
		Becoming reddish-brown, with increasing sand				22	
	19	Silty SAND (SM) - Dense, dry, reddish-brown, fine-grained, with well-cemented nodules				21	Native soil
						20	
	20					S3	R=2.0/2.0 T=1418

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB04

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAA-SB04	4 OF	4

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	20	SAME: Silty SAND (SM) - Dense, dry, reddish-brown, fine-grained, with well-cemented nodules					Native soil
	21						
	22						
	23				CAA-SB04-025	15	
			BZ=ND HS=ND			35	
	24					30 S3	R=1.7/1.5 T=1430
		B.O.B. @ 24.5' bgs					
	25						
	26						
	27						
	28						
	29						
	30						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAA-SB04

HTRW DRILLING LOG

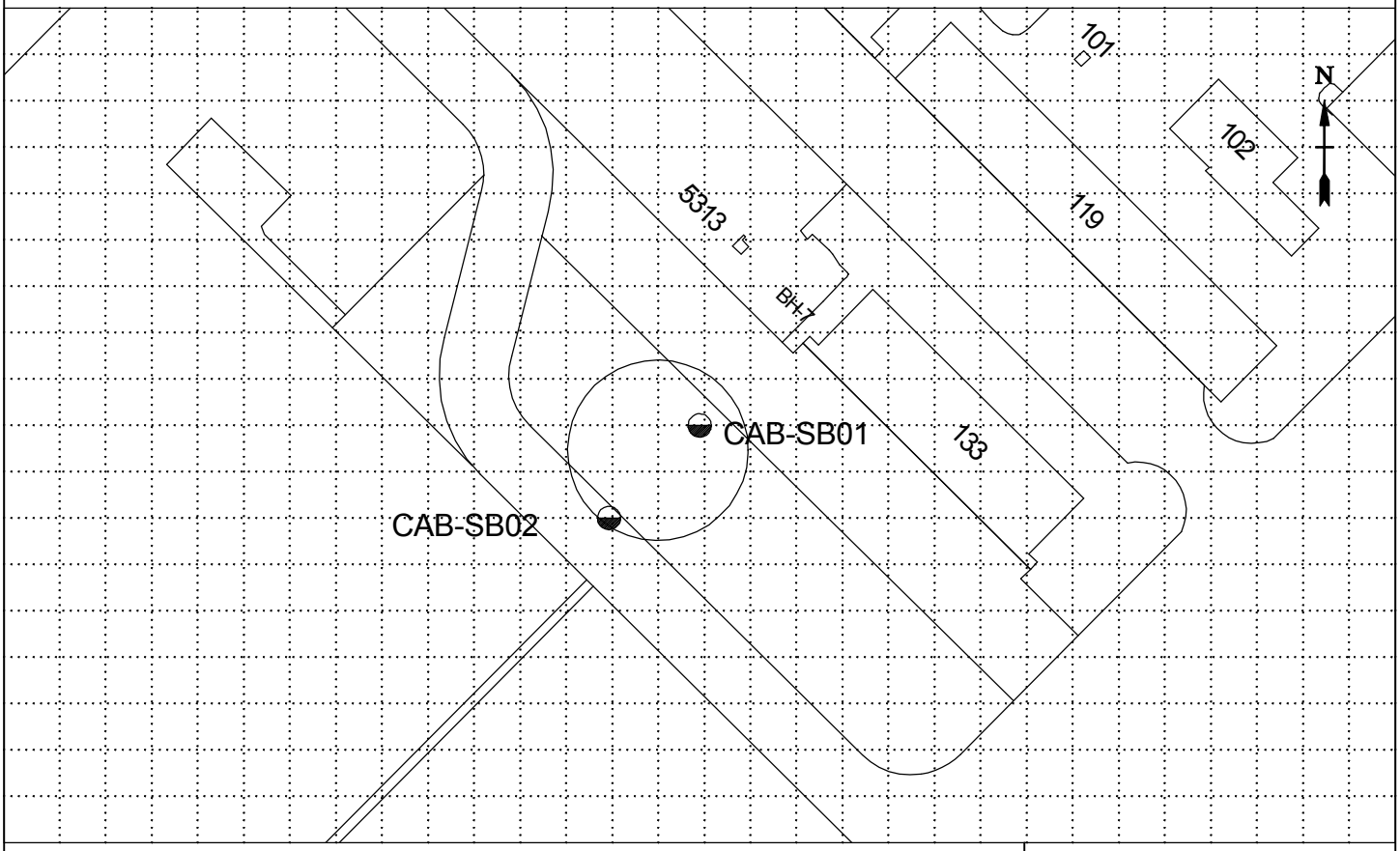
DISTRICT: OMAHA		HOLE NUMBER: CAB-SB01
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF SHEETS 4
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3" stainless steel split spoon	8. HOLE LOCATION: 1,233,451.50N 802,911.40E ~100' SW of Bldg. 133	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/16/05	11. DATE COMPLETED: 2/16/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 23.9' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2	X	Lead	SVOCs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 200'



PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAB-SB01

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAB-SB01	2 OF	4

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	Concrete	Background PID=0				Concrete Cored with 10" concrete coring bit
	1						
		SAND (SP) - Dense, moist, grayish-brown, medium-grained, with gravel	BZ=ND HS=ND			14	Fill
	2	Silty CLAY (CL) - Medium stiff, moist, brown , low plastic, with fine- to medium-grained sand				6	Fill
						S3	R=1.0/1.0 T=1043
	3		BZ=ND HS=ND			5	
						6	
		Silty SAND (SM) - Medium dense, moist, reddish-brown, medium-grained					Fill
	4					7	
						7	
	5					S3	R=1.9/2.0 T=1052
	6						
	7						
	8	Silty CLAY (CL) - Very stiff, moist, reddish-brown, low plastic, with trace medium-grained sand	BZ=ND HS=ND			10	pp = 4 ksf
						7	
		SILT (ML) - Very stiff, moist, pinkish-tan, low plastic, calcareous, with some cemented nodules, trace fine-grained sand and clay					Native soil
	9					10	
						13	
							pp = 6 ksf
	10					S3	R=2.0/2.0 T=1104

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAB-SB01

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAB-SB01	3 OF	4

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	10	SAME: SILT (ML) - Very stiff, moist, pinkish-tan, low plastic, calcareous, with some cemented nodules, trace fine-grained sand and clay					Native soil
	11						
	12						
	13	Becomes stiff, dry, with strongly-cemented nodules	BZ=ND			5	pp = 2.5 ksf
						6	
	14					4	
						4	
	15		HS=ND			S3	R=1.7/2.0 T=1120
	16						
	17						
	18				CAB-SB01-020	6	
		Becomes very stiff, reddish-brown, with some fine-grained sand	BZ=ND HS=ND			7	
	19	Becomes pinkish-tan				12	Native soil
						14	
	20					S3	R=2.0/2.0 T=1132

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAB-SB01

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	PROJECT	INSPECTOR	SHEET	SHEETS
CAB-SB01	CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	M. Sonderman	4	OF 4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	20	SAME: SILT (ML) - Very stiff, dry, pinkish-tan, low plastic, with fine-grained sand and strongly-cemented nodules					Native soil
	21						
	22						Driller noted hard drilling at 22'
	23		BZ=ND		CAB-SB01-024	48 50+ S3	pp = 7 ksf R=0.6/0.9 T=1152
	24	B.O.B. @ 23.9' bgs					Refusal @ 23.9' bgs
	25						
	26						
	27						
	28						
	29						
	30						

PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAB-SB01

HTRW DRILLING LOG

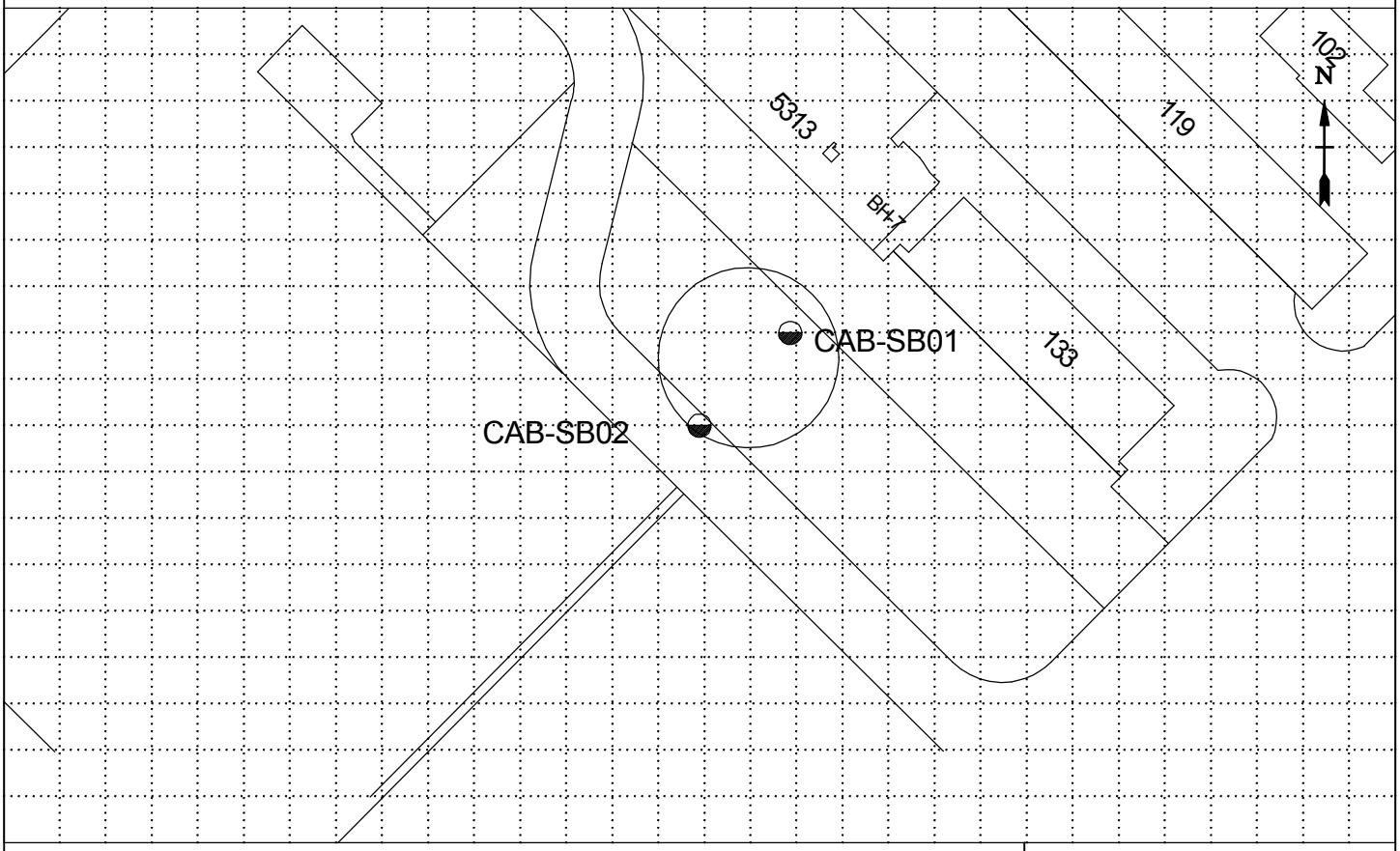
DISTRICT: OMAHA		HOLE NUMBER: CAB-SB02
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF SHEETS 4
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3"; stainless steel split spoon	8. HOLE LOCATION: 1,233,351.80N 802,813.80E ~265' SW of Bldg. 133	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/16/05	11. DATE COMPLETED: 2/16/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 23.4' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2	X	Lead	SVOCs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 200'



PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAB-SB02

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: CAB-SB02

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

SHEET 2 OF 4 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 COUNT (g)	REMARKS (h)
	0	Concrete	Background PID=0				Concrete Cored with 10" concrete coring bit
	1						
		SAND (SP) - Loose, moist, brown, medium-grained, with crushed rock				8	Fill
	2	Clayey SILT (ML) - Medium stiff, dry, reddish-brown , low plastic	BZ=ND HS=ND			9 S3	Fill R=1.0/1.0 T=1310
	3						
		Clayey SAND (SC) - Medium dense, moist, reddish-brown to red, fine- to medium-grained	BZ=ND HS=ND			4 5 9 13 S3	Fill R=2.0/2.0 T=1315
	4						
	5						
	6						
	7						
	8	With decreasing sand, increasing silt	BZ=ND HS=ND			8 9 17	
	9						
		SILT (ML) - Hard, dry, pinkish-tan, low plastic, well-cemented				19 S3	Native soil R=2.0/2.0 T=1323
	10						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAB-SB02

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	PROJECT	INSPECTOR	SHEET	SHEETS
CAB-SB02	CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	M. Sonderman	3 OF	4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	10	SAME: SILT (ML) - Hard, dry, pinkish-tan, low plastic, well-cemented, with fine-grained sand					Native soil
	11						
	12						
	13		BZ=ND			7	
						17	
	14					25	Cemented nodule blocked shoe of spoon; driller noted hard drilling from ~14' to 18'.
						33	
	15					S3	R=0.5/2.0 T=1334
	16						
	17						
	18		BZ=ND HS=ND		CAB-SB02-019	25	
		With large (> 2.5"), well-cemented nodules					
						35	
	19					50+ S3	R=1.2/1.4 T=1345
	20						

PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAB-SB02

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: CAB-SB02

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

SHEET 4 OF 4 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 COUNT (g)	REMARKS (h)
	20	SAME: SILT (ML) - Hard, dry, pinkish-tan, low plastic, with well-cemented nodules					Native soil Driller noted very hard drilling
	21						
	22						
	23	Silty SAND (SM) - Very dense, dry, light tan, fine-grained, calcareous, well-cemented	BZ=ND HS=ND		CAB-SB02-024	50+ S3	Native soil R=0.5/0.4 T=1407
		B.O.B. @ 23.4' bgs					Refusal @ 23.4' bgs
	24						
	25						
	26						
	27						
	28						
	29						
	30						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAB-SB02

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

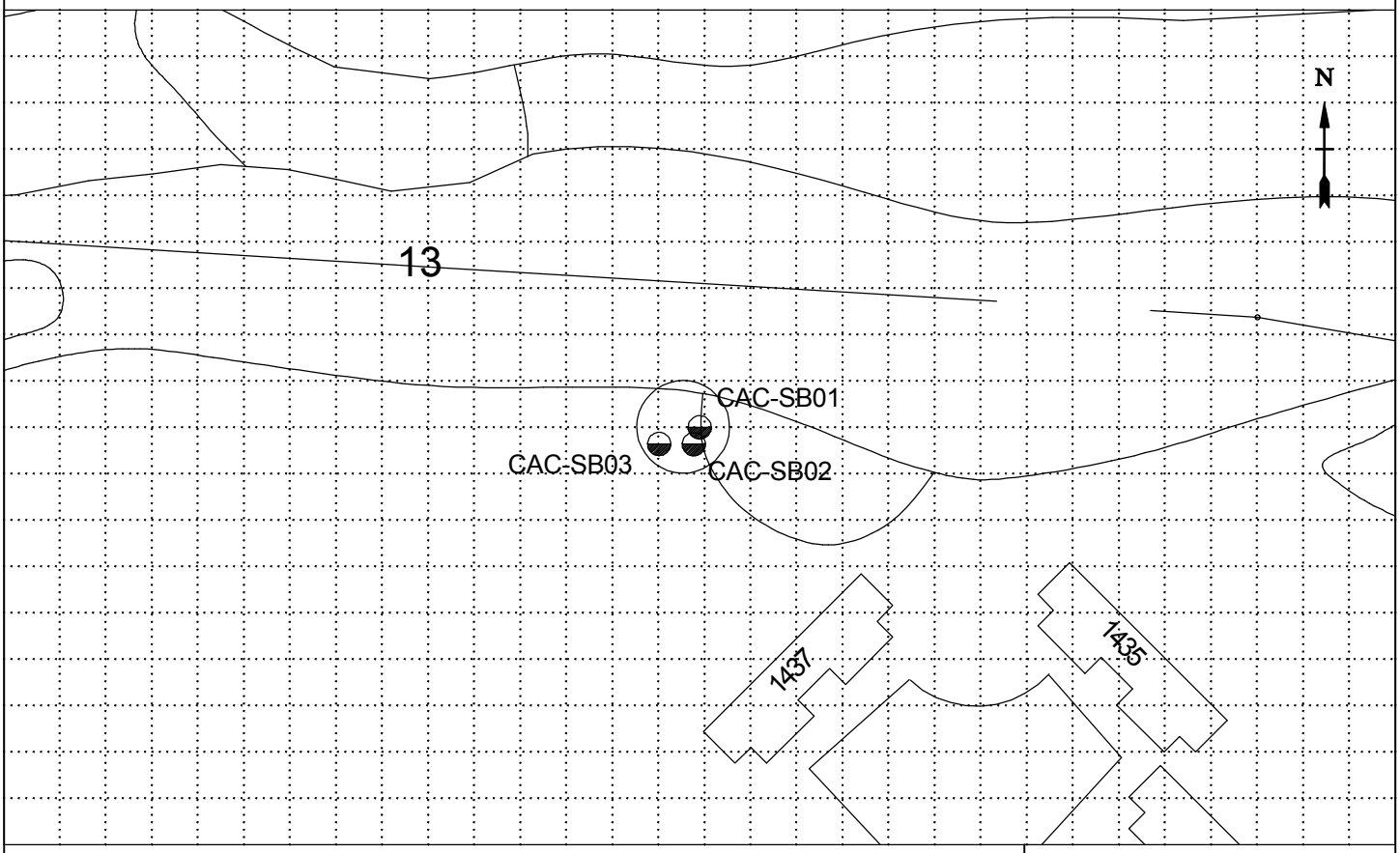
DISTRICT: OMAHA		HOLE NUMBER: CAC-SB01
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF SHEETS 3
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3"; stainless steel split spoon	8. HOLE LOCATION: 1,239,804.40N 802,454.50E ~10' SW of SW corner of transformer	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/15/05	11. DATE COMPLETED: 2/15/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4			PCBs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 100'



PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAC-SB01

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	PROJECT	INSPECTOR	SHEET	SHEETS
CAC-SB01	CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	M. Sonderman	2 OF	3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	Silty SAND (SM) - Loose, moist, red, fine-grained, with gravel and organics	Background PID=0		CAC-SB01-000	4	Fill
			BZ=ND FS=ND			4	
	1	With calcium carbonate				5	
						3	
	2					S3	R=2.0/2.0 T=1416
	3	Silty CLAY (CL) - Soft, moist, dark brown, low plastic			CAC-SB01-005	4	Fill
		Sandy SILT to Silty SAND (ML-SM) - Very stiff to medium dense, dry, calcareous, fine-grained, trace organics	BZ=ND FS=ND			14	Native soil
	4					14	
						18	
	5					S3	R=2.0/2.0 T=1428
	6						
	7	Caliche					Driller noted very hard drilling
	8	Silty SAND (SM) - Medium dense, dry, pinkish-tan, fine-grained			CAC-SB01-010	3	Native soil Drilling easier
			BZ=ND FS=ND			10	
	9					13	
						15	
	10					S3	R=1.7/2.0 T=1445

PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAC-SB01

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAC-SB01	3 OF	3

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	10	SAME: Silty SAND (SM) - Medium dense to very dense, dry, light pinkish-tan, calcareous, well-cemented					Native soil From cuttings and previous interval, very hard drilling from ~10' to 13'
	11						
	12						
	13				CAC-SB01-015 & MS/MSD	13	
		With lenses of reddish sand and fine to coarse cemented gravel nodules	BZ=ND FS=ND			15	
	14					14	
						17	
	15					S3	R=1.7/2.0 T=1505
		B.O.B. @ 15.0' bgs					
	16						
	17						
	18						
	19						
	20						

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAC-SB01

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

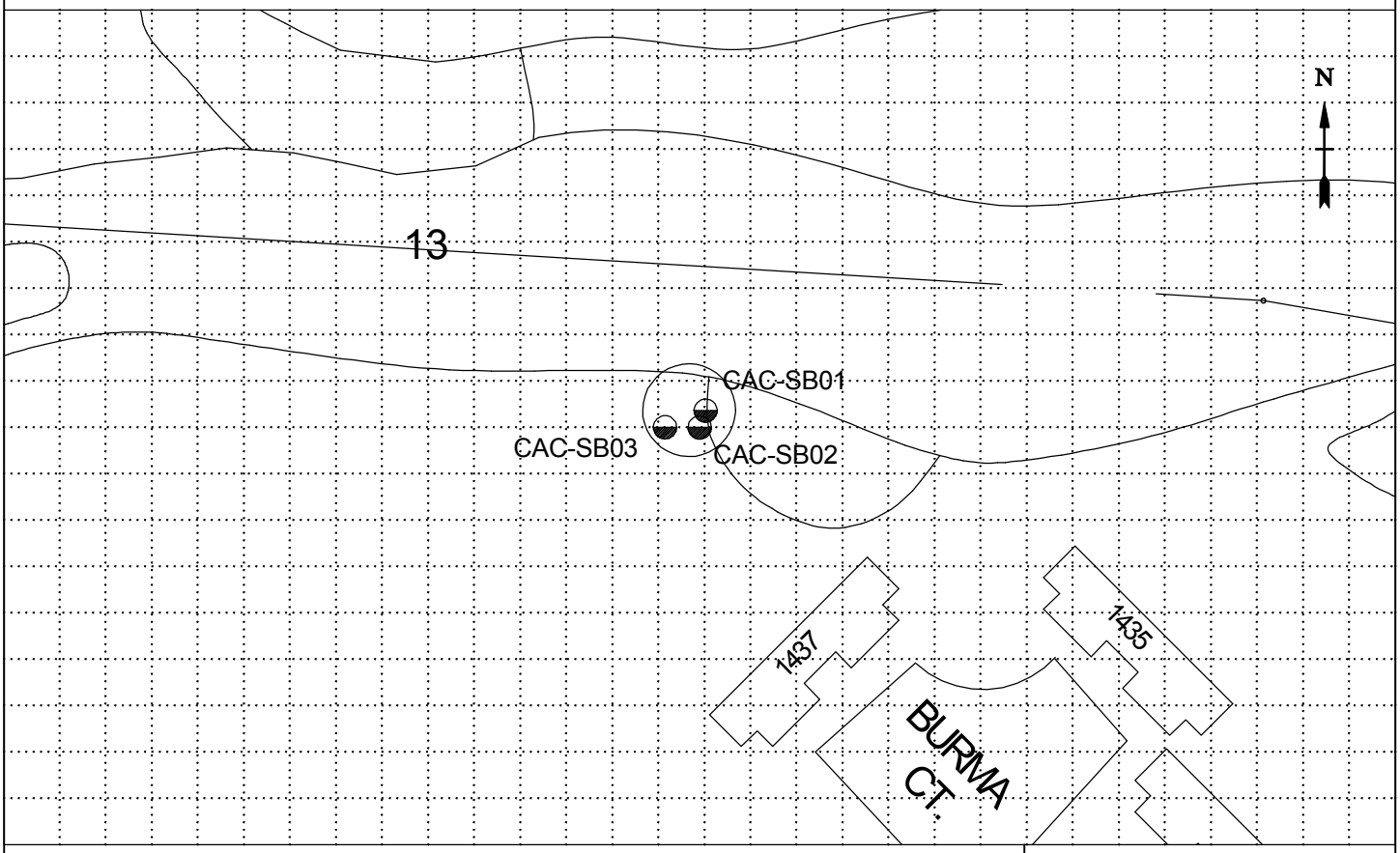
DISTRICT: OMAHA		HOLE NUMBER: CAC-SB02
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF SHEETS 2
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3"; stainless steel split spoon	8. HOLE LOCATION: 1,239,795.40N 802,451.30E ~10' SE of SE corner of transformer	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/15/05	11. DATE COMPLETED: 2/15/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3			PCBs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 100'



PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAC-SB02

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	SHEET	SHEETS
CAC-SB02	2 OF	2

PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C
CANNON AFB, NEW MEXICO

INSPECTOR: M. Sonderman

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	Silty SAND (SM) - Loose, moist, light reddish-brown, fine-grained, calcareous, weakly-cemented, with organics	Background PID=0		CAC-SB02-000 & CAC-SB02-100 (duplicate)	3	Fill
			BZ=ND FS=ND			4	
	1	Silty CLAY (CL) - Stiff, moist, reddish-brown, low plastic, with fine-grained sand				5	Fill
						5	
	2	Silty SAND (SM) - Medium dense, moist, reddish-brown, calcareous, weakly-cemented				S3	R=1.8/2.0 T=1538
							Native soil
	3	Becomes dry, light brown			CAC-SB02-005	3	
			BZ=ND FS=ND			7	
	4	Becomes light pinkish-tan, moderately well-cemented				8	
						10	
	5					S3	R=2.0/2.0 T=1547
	6						
	7						
	8				CAC-SB02-010	6	
		Becomes reddish-brown	BZ=ND FS=ND			6	
	9					5	
						6	
							Refusal @ 10.0' bgs
	10	B.O.B. @ 10.0' bgs				S3	R=1.9/2.0 T=1558

PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAC-SB02

HTRW DRILLING LOG

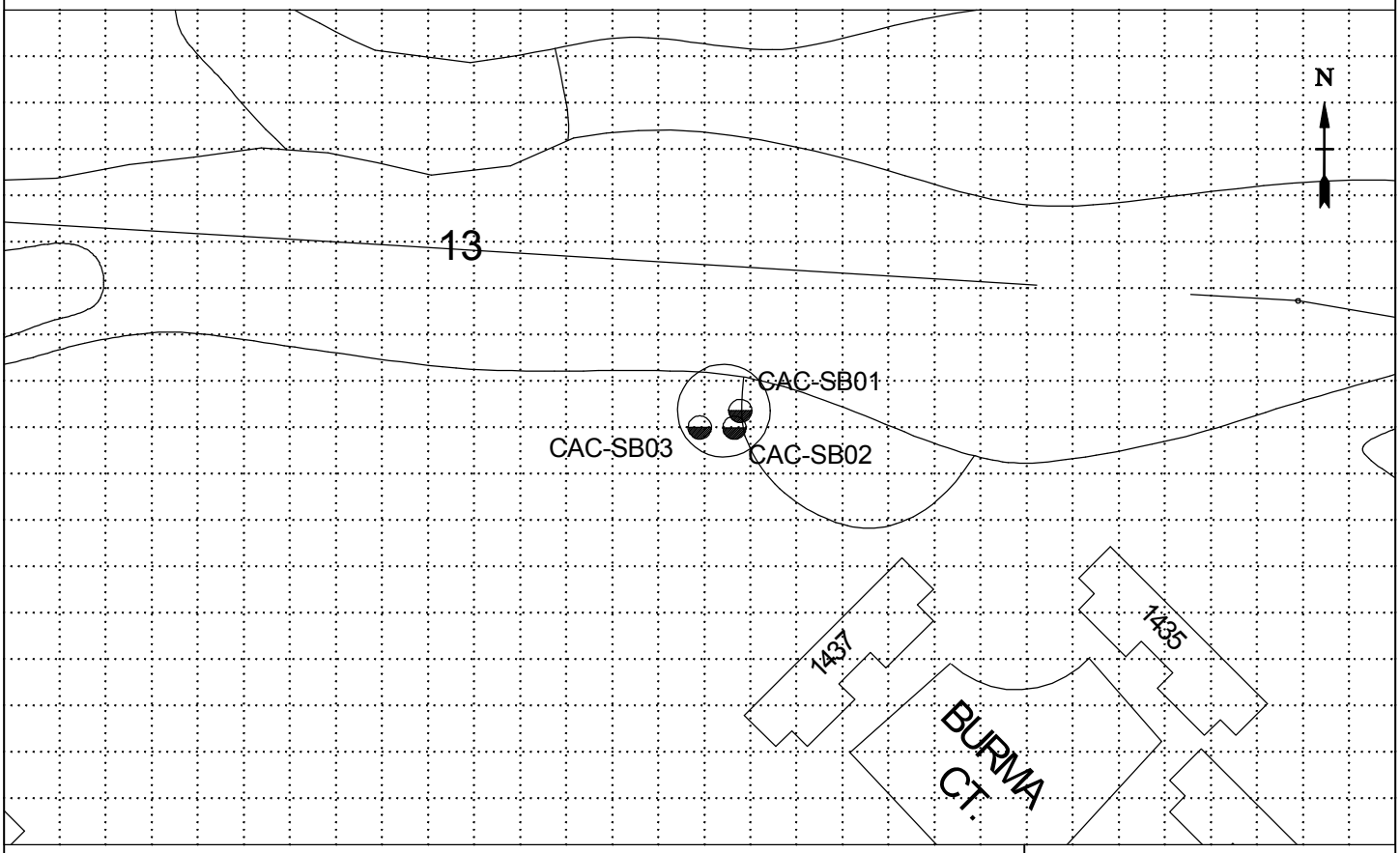
DISTRICT: OMAHA		HOLE NUMBER: CAC-SB03
1. COMPANY NAME: ***URS GROUP, INC.***	2. DRILLING CONTRACTOR: Peterson Drilling and Testing Inc.	SHEET 1 OF 2 SHEETS
3. PROJECT: CANNON AFB - Supplemental Assessment AOCs A, B, & C	4. LOCATION: CANNON AFB, NEW MEXICO	
5. NAME OF DRILLER: Gabe Perez	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.75" ID x 8.12" OD HSAs, 2' x 3"; stainless steel split spoon	8. HOLE LOCATION: 1,239,795.50N 802,432.60E ~10' E of NE corner of transformer	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 2/15/05	11. DATE COMPLETED: 2/15/05
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10' bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES (TESTED)	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
0			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3			PCBs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement/bentonite grout	X			M. Sonderman

LOCATION SKETCH/COMMENTS SCALE: 1" = 100'



PROJECT CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO

HOLE NO. CAC-SB03

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER	PROJECT	INSPECTOR	SHEET	SHEETS
CAC-SB03	CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	M. Sonderman	2 OF	2

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	Silty SAND (SM) - Loose, moist, reddish-brown, fine-grained, calcareous, with organics	Background PID=0		CAC-SB03-000	3	Fill
			BZ=ND FS=ND			3	
	1	With clay				5	
		Silty CLAY (CL) - Medium stiff, moist, reddish-brown, low plastic				5	Native soil
	2	Becomes pinkish-tan				S3	R=1.8/2.0 T=1716
	3	Silty SAND (SM) - Loose, moist, light tan, fine-grained, calcareous, weakly-cemented			CAC-SB03-005	5	Native soil
			BZ=ND FS=ND			6	
	4					8	
						10	
	5					S3	R=1.8/2.0 T=1724
	6						
	7						
	8	Becomes dry			CAC-SB03-010	8	
			BZ=ND FS=ND			10	
	9					14	
						14	Refusal @ 10.0' bgs
	10	B.O.B. @ 10.0' bgs				S3	R=2.0/2.0 T=1736

PROJECT	HOLE NO.
CANNON AFB - Supplemental Assessment AOCs A, B, & C CANNON AFB, NEW MEXICO	CAC-SB03

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAA-SB01-005

BORING NO. CAA-SB01

DATE/TIME COLLECTED: 2/16/05 1512

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 3.0-5.0' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SPLIT SAMPLE NO. —

SAMPLE QC DUPLICATE: YES NO

DUPLICATE SAMPLE NO. —

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 3.0'-5.0'

DESCRIPTION: SILT (ML) - Stiff, dry, pinkish-tan, low plastic Calcareous, moderately well cemented (native soil)

GENERAL COMMENTS

VOCs sampled from middle of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAA-SB01-010

BORING NO. CAA-SB01

DATE/TIME COLLECTED: 2/16/05 1522

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 8.0-9.6' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 8.0'-9.6'

DESCRIPTION: SILT (ML) - Stiff, dry, pinkish tan, low plastic, calcareous, with trace fine-grained sand, well cemented

GENERAL COMMENTS

VOCs sampled from middle of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAA-SB02-Q20

BORING NO. CAA-SB02

DATE/TIME COLLECTED: 2/17/05 0839

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 18'-20.0' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES (NO)

SPLIT SAMPLE NO.

SAMPLE QC DUPLICATE: (YES) NO

DUPLICATE SAMPLE NO. CAA-SB02-220 T=0730

MS/MSD REQUESTED: YES (NO)

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 18.0'-20.0'

DESCRIPTION: Silty SAND (SM) Dense, dry, reddish-brown, fine-grained, with well cemented nodules

GENERAL COMMENTS

VOCs sampled from middle of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAA-SB02-023

BORING NO. CAA-SB02

DATE/TIME COLLECTED: 2/17/05 0857

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 23.0'-23.4' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 23.0-23.4'

DESCRIPTION: Silty SAND (SM) very dense, dry, reddish-brown, fine-grained, with well cemented nodules

GENERAL COMMENTS

VOC's sampled from middle of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CA4-SB03-015

BORING NO. CA4-SB03

DATE/TIME COLLECTED: 2/17/05 1058

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 13.0'-14.7' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES [NO]

SAMPLE QC DUPLICATE: YES [NO]

MS/MSD REQUESTED: YES [NO]

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 13.0 - ~~14.7~~ 13.2 not

DESCRIPTION: Sandy SILT (ML) stiff, moist, M, reddish-brown, low plastic, weakly cemented nodules

13.2'-13.8' silty SAND (SM) dense, moist, reddish-brown, fine grained

13.8'-14.7' sandy SILT (ML) Hard, dry, pinkish-tan, low plastic, calcareous, trace clay, with well cemented nodules

GENERAL COMMENTS

VOCs from middle of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAA-SB03-019

BORING NO. CAA-SB03

DATE/TIME COLLECTED: 2/17/05 ~~1035~~ LT 1111

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 18.0'-18.4' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES [NO]

SPLIT SAMPLE NO. —

SAMPLE QC DUPLICATE: YES [NO]

DUPLICATE SAMPLE NO. —

MS/MSD REQUESTED: YES [NO]

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	~~ND~~ NO sample due to low recovery

SAMPLE DESCRIPTION

DEPTH: 18.0'-18.4' DESCRIPTION: Silty SAND (SM) very dense, dry, lt. pinkish-tan, fine-grained, with well cemented nodules

GENERAL COMMENTS

VOCs from center of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAA-SB04-020

BORING NO. CAA-SB04

DATE/TIME COLLECTED: 2/17/05 1418

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 18.0'-20.0' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES (NO)

SPLIT SAMPLE NO. —

SAMPLE QC DUPLICATE: YES (NO)

DUPLICATE SAMPLE NO. —

MS/MSD REQUESTED: (YES) NO

CAA-SB04-120

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 18.0'-18.8' DESCRIPTION: SILT (ML) med, Stiff to hard, Hst moist, lt. pinkish-brown, low plastic, with fine sand, well cemented nodules

18.8'-20.0' Silty SAND (SM) Dense, dry, reddish-brown, fine-grained with well cemented nodules

GENERAL COMMENTS

VOCs from center of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAA-SB04-025

BORING NO. CAA-SB04

DATE/TIME COLLECTED: 2/17/05 1430

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 23.0'-24.5' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 23 - 24.5'

DESCRIPTION: Silty SAND (SM) Dense, dry, reddish-brown, fine-grained, with well cemented nodules

GENERAL COMMENTS

VOCs from center of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAB - ~~SB01~~ SB01 LT - 020

BORING NO. CAB -SB01

DATE/TIME COLLECTED: 2/16/05 1132

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 18.0-20.0' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SPLIT SAMPLE NO. —

SAMPLE QC DUPLICATE: YES NO

DUPLICATE SAMPLE NO. —

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 18.0'-20.0' DESCRIPTION: SILT (ML) - Stiff, moist, reddish-brown, low plastic, with some fine sand

19.0' becomes pinkish-tan

GENERAL COMMENTS

VOCs sampled from middle of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CA6-SB01-024

BORING NO. CA6-SB01

DATE/TIME COLLECTED: 2/16/05 1152

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 23.0-23.6 bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SPLIT SAMPLE NO. —

SAMPLE QC DUPLICATE: YES NO

DUPLICATE SAMPLE NO. —

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 23.0-23.6' DESCRIPTION: SILT (ML) - Stiff, moist, ~~reddish-brown~~ Pinkish-tan LT, low plastic, with some fine SAND

GENERAL COMMENTS

VOCs sampled from middle of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CA6 - SB02 - 019

BORING NO. CA6-SB02

DATE/TIME COLLECTED: 2/16/05 1345

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 18-19.2' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 18-19.2'

DESCRIPTION: SILT (ML) - Hard, Dry, pinkish-tan, low plastic, well cemented, with fine Sand

GENERAL COMMENTS

VOCs sampled from middle interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CA8 - SB02 - 024

BORING NO. CA8 -SB02

DATE/TIME COLLECTED: 2/16/05 1407

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 23-23.5' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 5g EnCore Samplers	4 degrees C	TCL VOC's (8260B)
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL SVOC's (8270C)
		Lead (6010B)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	ND

SAMPLE DESCRIPTION

DEPTH: 23.0-23.5'

DESCRIPTION: Silty SAND (SM) - Very dense, dry, light tan, fine grained, calcareous, well cemented

GENERAL COMMENTS

VOCs sampled from middle of interval

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB01 - 000

BORING NO. CAC - SB01

DATE/TIME COLLECTED: 2/15/05 1416

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 0.0-0.5' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 0.0-0.5

DESCRIPTION: Silty SAND (SM) - Loose, moist, red, fine-grained, with few pieces of gravel, grass roots

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB0 / - 005

BORING NO. CAC - SB0 /

DATE/TIME COLLECTED: 2/15/05 1428

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 3.0-5.0' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO.

DUPLICATE SAMPLE NO.

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 3.0-5.0'

DESCRIPTION: Sandy SILT to Silty SAND (ML-SM) - Very Stiff to med. dense, dry, calcareous, fine grained Sand, root traces

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB0 1 - ~~00~~ 010 LT

BORING NO. CAC - SB0 1

DATE/TIME COLLECTED: 2/15/05 1445

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 8.0-9.7' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SPLIT SAMPLE NO. —

SAMPLE QC DUPLICATE: YES NO

DUPLICATE SAMPLE NO. —

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 8.0-9.7'

DESCRIPTION: Silty SAND (SM) - Med. dense, dry, pinkish-tan fine grained

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB01 - 015

BORING NO. CAC - SB01

DATE/TIME COLLECTED: 2/15/05 1505

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 13.0-14.7 bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SPLIT SAMPLE NO. —

SAMPLE QC DUPLICATE: YES NO

DUPLICATE SAMPLE NO. —

MS/MSD REQUESTED: YES NO

MS/MSD = CAC-SB01-115

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 13.0 - 14.7'

DESCRIPTION: Silty SAND (SM) - Med. dense to Very dense, dry light pinkish-tan, Fine grained, calcareous, well cemented, with lenses of reddish SAND

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB02-000

BORING NO. CAC - SB02

DATE/TIME COLLECTED: 2/15/05 1538

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 0.0-0.5 bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES (NO)

SPLIT SAMPLE NO. —

SAMPLE QC DUPLICATE: (YES) NO

DUPLICATE SAMPLE NO. CAC-SB02-100 T=0838

MS/MSD REQUESTED: YES (NO)

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 0.0-0.5'

DESCRIPTION: Silty SAND (SM) - Loose, moist, light reddish-brown fine grained, calcareous, weakly cemented, w/roots

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB02-005

BORING NO. CAC - SB02

DATE/TIME COLLECTED: 2/15/05 1547

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 3.0-5.0' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SPLIT SAMPLE NO.

SAMPLE QC DUPLICATE: YES NO

DUPLICATE SAMPLE NO.

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 3.0-5.0'

DESCRIPTION: Silty SAND (SM) - med dense, dry, light brown, Fine Grained, Calcareous, weakly cemented

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB02- 010

BORING NO. CAC - SB02

DATE/TIME COLLECTED: 2/15/05 1558

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 8.0 - 9.9'

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 8.0-9.9

DESCRIPTION: Silty SAND (SM) - med. dense, Dry, reddish brown, Fine grained Calcareous, weakly cemented

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB03-000

BORING NO. CAC - SB03

DATE/TIME COLLECTED: 2/15/05 1716

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 0.0-0.5' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SPLIT SAMPLE NO.

SAMPLE QC DUPLICATE: YES NO

DUPLICATE SAMPLE NO.

MS/MSD REQUESTED: YES NO

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 0.0-0.5'

DESCRIPTION: silty SAND (SM) Loose, moist, reddish-brown, fine grained, calcareous, with roots

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB03 - 005

BORING NO. CAC - SB03

DATE/TIME COLLECTED: 2/15/05 1724

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 3.0-4.8' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 3.0-4.8'

DESCRIPTION: Silty SAND (SM) Loose, moist, lt. tan, fine-grained, calcareous, weakly cemented.

GENERAL COMMENTS

SOIL SAMPLE COLLECTION FIELD SHEET

GENERAL INFORMATION

SITE NAME: Cannon AFB: AOC

PROJECT NO. 16169869.00002

SAMPLE NO. CAC - SB03 - 010

BORING NO. CAC - SB03

DATE/TIME COLLECTED: 2/15/05 1736

PERSONNEL: M. Sonderman, L. Todd

SAMPLE METHOD / DEPTH: Stainless Steel Split Spoon/ 8.0-10.0' bgs

SAMPLE MEDIA: SOIL

SAMPLE QA SPLIT: YES NO

SAMPLE QC DUPLICATE: YES NO

MS/MSD REQUESTED: YES NO

SPLIT SAMPLE NO. —

DUPLICATE SAMPLE NO. —

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
1 - 4 oz. glass jar, Teflon lined lid	4 degrees C	TCL PCB's (8082)

PID MEASUREMENTS

	(ppm)
Background	ND
Breathing zone	ND
Boring	ND
Headspace	—

SAMPLE DESCRIPTION

DEPTH: 8.0-10.0'

DESCRIPTION: Silty SAND (SM) loose, dry, lt. tan, fine-grained, calcareous, weakly cemented

GENERAL COMMENTS

Cannon AFB Data Review

Laboratory SDG: 46626

Reviewer: Jeff Aust

Date Reviewed: 3/17/2005

Guidance: USEPA National Functional Guidelines for (Low Concentration Organic (2001) and Inorganic (2004) Data Review)

Applicable QAPP: Cannon AFB QAPP (URS, 2005)

Sample Identification #	Sample Identification #
CAC-SB01-000	CAC-SB03-000
CAC-SB01-005	CAC-SB03-005
CAC-SB01-010	CAC-SB03-010
CAC-SB01-115	CAB-SB01-020
CAC-SB01-015	CAB-SB01-024
CAC-SB02-000	CAB-SB02-019
CAC-SB02-100	CAB-SB02-024
CAC-SB02-005	CAA-SB01-005
CAC-SB02-010	CAA-SB01-010

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative \ Cooler Receipt Form

Were problems noted in the laboratory case narrative or cooler receipt form?

Yes

The laboratory case narrative indicated some SVOC LCS recoveries were outside evaluation criteria. Di-n-butylphthalate was detected above the RL and bis(2-ethylhexyl)phthalate was detected above the MDL in the SVOC method blank. One PCB sample was extracted 2 days outside holding time. Some PCB LCS and MS/MSD recoveries were outside evaluation criteria. These issues are addressed further in the appropriate sections below.

The cooler receipt form indicated no discrepancies.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

No, PCB sample CAC-SB02-010 was extracted 2 days outside holding time

Field ID	Parameter	Analyte	Qualification
CAC-SB02-010	PCBs	All PCBs	**UJ**

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes

Blank ID	Parameter	Analyte	Concentration	Units
84405	SVOCs	Di-n-butylphthalate	17000	ug/kg
84405	SVOCs	bis(2-ethylhexyl)phthalate	290	ug/kg

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Parameter	Analyte	New RL	Qualification
CAB-SB01-020	SVOCs	Di-n-butylphthalate	2600	**U**
CAB-SB01-020	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAB-SB01-024	SVOCs	Di-n-butylphthalate	-	**U**
CAB-SB01-024	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAB-SB02-019	SVOCs	Di-n-butylphthalate	-	**U**
CAB-SB02-019	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAB-SB02-024	SVOCs	Di-n-butylphthalate	-	**U**
CAB-SB02-024	SVOCs	bis(2-ethylhexyl)phthalate	390	**U**
CAA-SB01-005	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB01-005	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB01-010	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB01-010	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No

LCS ID	Parameter	Analyte	LCS/LCSD Recovery	RPD	LCS/LCSD/RPD Criteria
84405	SVOCs	Hexachlorocyclopentadiene	**12**	NA	25-151
84392	PCBs	Aroclor 1016	**125**	NA	64-110
84396	PCBs	Aroclor 1016	**127**	NA	64-110

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Parameter	Analyte	Qualification
CAB-SB01-020	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAB-SB01-024	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAB-SB02-019	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAB-SB02-024	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB01-005	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB01-010	SVOCs	Hexachlorocyclopentadiene	**UJ**

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes

Field ID	Parameter	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Parameter	Analyte	Qualification
N/A			

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples collected as part of this SDG?

Yes, sample CAC-SB01-115 was spiked for PCBs.

Were MS/MSD recoveries within evaluation criteria?

No

MS/MSD ID	Parameter	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Criteria
CAC-SB01-115	PCBs	Aroclor 1016	**129/126**	2	64-110/30

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification. USEPA National Functional Guidelines for Low Concentration Organic Data Review indicates that organic data should not be qualified based on MS/MSD data alone and LCS recoveries were within evaluation criteria, therefore no qualification of the data was required.

Field ID	Parameter	Analyte	Qualification
N/A			

8.0 Laboratory Duplicate Results

Were laboratory duplicate samples analyzed as part of this SDG?

No

Were laboratory duplicate sample RPDs within criteria?

N/A

Field ID	Parameter	Analyte	RPD	Criteria
N/A				

Data qualified due to outlying laboratory duplicate recoveries are identified below:

Field ID	Parameter	Analyte	Qualification
N/A			

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes

Field ID	Field Duplicate ID
CAC-SB01-015	CAC-SB01-115
CAC-SB02-000	CAC-SB02-100

Were field duplicates within evaluation criteria?

Yes

Field ID	Field Duplicate ID	Parameter	Analyte	RPD	Qualification

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

Yes

The following table identifies the analyses which were reported as nondetect, diluted, and an undiluted run ***was not*** reported:

Field ID	Parameter	Dilution Factor
N/A		

11.0 Additional Qualifications

Were additional qualifications applied?

Yes

Professional judgment was used to qualify the common laboratory contaminants acetone and methylene chloride reported at concentrations less than two times (2X) the RL. Additionally, USEPA Method 5035A states that acidification of certain soils with sodium bisulfate may produce a false positive acetone artifact of 100-200 ppb, or more. Acetone reported at concentrations less than 200 ppb (ug/kg) were qualified.

Field ID	Analyte	New RL	Qualification	Comments
CAB-SB01-020	Acetone	-	**U**	Professional Judgment

Field ID	Analyte	New RL	Qualification	Comments
CAB-SB01-020	Methylene chloride	60	**U**	Professional Judgment
CAB-SB01-024	Acetone	-	**U**	Professional Judgment
CAB-SB01-024	Methylene chloride	-	**U**	Professional Judgment
CAB-SB02-019	Acetone	-	**U**	Professional Judgment
CAB-SB02-024	Acetone	-	**U**	Professional Judgment
CAB-SB02-024	Methylene chloride	-	**U**	Professional Judgment
CAA-SB01-005	Acetone	-	**U**	Professional Judgment
CAA-SB01-005	Methylene chloride	-	**U**	Professional Judgment
CAA-SB01-010	Acetone	-	**U**	Professional Judgment

1.0 FULL VALIDATION OF PCB DATA - SDG 46626

This section describes the full validation for eight soil samples which were prepared by USEPA SW-846 Method 3540C and analyzed for polychlorinated biphenyls (PCBs) by USEPA SW-846 Method 8082. The samples were analyzed by the Agricultural and Priority Pollutant Laboratory (APPL), Inc., of Fresno, California, and submitted as part of sample delivery group (SDG) 46626. Samples included as part of this validation are listed below:

Sample Identification	Sample Identification
CAC-SB01-000	CAC-SB01-015
CAC-SB01-005	CAC-SB02-000
CAC-SB01-010	CAC-SB02-100
CAC-SB01-115	CAC-SB02-005

The validation followed USEPA National Functional Guidelines for Low Concentration Organic Data Review (2001), where applicable to USEPA Method 8082. The evaluation criteria used during the validation were a combination of those criteria presented in the analytical method and the laboratory criteria based on historical data.

Criteria evaluated included the following method performance criteria:

- Data package completeness
- Laboratory case narrative/cooler receipt form
- Sample preservation and holding times
- Initial calibration
- Calibration verification
- Blank samples
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) samples
- Laboratory control samples (LCS)
- Target compound identification and quantification
- Overall assessment of data

1.1 Data Package Completeness

The data package was reviewed to make certain that it contained the data contractually required in the deliverable. This included checking the data package for the results of each analyte requested for each field sample submitted in the analytical batch, along with requested QC documentation for the respective methods. The data package was considered complete for SDG 46626.

1.2 Laboratory Case Narrative/Cooler Receipt Form

The case narrative indicated the spiking compound, PCB 1016, had recoveries for the MS/MSD and LCS outside evaluation criteria. These issues are discussed below in the appropriate sections. No additional problems were noted in laboratory the case narrative.

1.3 Sample Preservation and Holding Times

Review of the sample collection and analysis dates involved comparing the chains-of-custody, the summary forms, the raw data forms, and the chromatograms for accuracy, consistency, and holding time compliance. The samples were received and maintained at $4^{o}C \pm 2^{o}C$. All samples were extracted within 14 days of collection for soil and all samples were analyzed within 40 days of sample extraction. No qualifications of data were required based on sample preservation and holding time requirements.

1.4 Initial Calibration

Initial calibration (ICAL) criteria were established to assess whether the instrument was capable of producing acceptable qualitative and quantitative data for PCB analyses. The ICAL for PCBs was done on two analytical columns using a mixture of Aroclors 1016 and 1260 at six concentrations, and Aroclors 1221, 1232, 1242, 1248 and 1254 at a single concentration as outlined in Method 8082. The %RSD for the CF of each of the five major Aroclor 1016 and 1260 peaks was less than the method criteria of 20 percent. Therefore, no qualifications to the PCB data were necessary based on the ICAL.

The CFs and %RSD for three of the five major peaks from Aroclors 1016 and 1260 were recalculated, for both analytical columns, and no transcription or calculation errors were noted.

1.5 Calibration Verification

Continuing calibration verifications (CV) were performed at the required frequency of every 12 hours for PCB analysis. All peaks eluted within the specified retention time windows and the CFs average percent difference (%D) was within the evaluation criteria (15%) for Aroclors 1016 and 1260 for each CV. No qualifications to the data were required.

The %Ds for three major peaks from Aroclors 1016 and 1260, from each applicable CV, were recalculated from the raw data, for both columns, and no transcription or calculation errors were noted.

1.6 Blank Samples

The purpose of the method blank samples is to evaluate the existence and magnitude of contamination problems emanating from laboratory activities. Method blank samples were analyzed with each analytical batch as required by Method 8082. All target compounds were reported as non-detect the method blank. Review of chromatograms indicated that no peaks were present. No data qualifications were required based on blank samples.

1.7 Surrogate Spike Recoveries

Surrogate compounds were used to evaluate the overall laboratory sample preparation efficiency on a per sample basis. All surrogate recoveries were within evaluation criteria. A minimum of ten percent of the recoveries was recalculated, and the summary forms versus the raw data were verified. No calculation or transcription errors were noted.

1.8 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

Sample CAC-SB01-115 was analyzed as a MS/MSD sample to assess accuracy and precision for the analyses. The MS/MSD recoveries outside evaluation criteria are listed in the following table.

MS/MSD ID	Parameter	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Criteria
CAC-SB01-115	PCBs	Aroclor 1016	**129/126**	2	64-110/30

USEPA National Functional Guidelines for Low Concentration Organic Data Review indicates that organic data should not be qualified based on MS/MSD data alone. A minimum of 10% of the MS/MSD recoveries and RPDs were recalculated from the raw data and verified against the values presented on the QC summary form. No calculation or transcription errors were noted.

1.9 Laboratory Control Samples (LCS)

A laboratory control sample (LCS) was analyzed to assess accuracy as required by Method 8082. The LCS recoveries outside evaluation criteria are listed in the following table.

LCS ID	Parameter	Analyte	LCS Recovery	LCS Criteria
84392	PCBs	Aroclor 1016	**125**	64-110

Analytical data associated with elevated LCS recovery were reported as nondetect did not require qualification. A minimum of 10% percent of the LCS recoveries was recalculated and no calculation or transcription errors were noted.

1.10 Target Compound Identification and Quantification

For the validation of the compound identification, chromatograms were reviewed to verify the major peaks were identified properly and the spectra of the identified compounds were verified against the retention time of the associated standard curve or CV. The retention times of identified compounds and surrogates were within the calculated retention time windows on both columns. Approximately 10 percent of the sample results were recalculated and no calculations or transcription errors were noted.

1.11 Overall Data Assessment

Based on the criteria outlined, it is recommended that the results reported for these analyses be accepted for their intended use. MS/MSD, LCS and surrogate recoveries demonstrated that acceptable levels of accuracy and precision were achieved, with the noted exceptions. In addition completeness defined to be the percentage of analytical results that are judged to be valid, including estimated values (**J**), was 100 percent for this SDG.

Cannon AFB Data Review

Laboratory SDG: 46638

Reviewer: Jeff Aust

Date Reviewed: 3/21/2005

Guidance: USEPA National Functional Guidelines for (Low Concentration Organic (2001) and Inorganic (2004) Data Review)

Applicable QAPP: Cannon AFB QAPP (URS, 2005)

Sample Identification #	Sample Identification #
CAA-SB02-020	CAA-SB03-019
CAA-SB02-220	CAA-SB04-020
CAA-SB02-023	CAA-SB04-120
CAA-SB03-015	CAA-SB04-025

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative \ Cooler Receipt Form

Were problems noted in the laboratory case narrative or cooler receipt form?

Yes

The laboratory case narrative indicated some SVOC MS/MSD and LCS recoveries were outside evaluation criteria. Di-n-butylphthalate was detected above the RL and bis(2-ethylhexyl)phthalate was detected above the MDL in the SVOC method blank. Some VOC LCS and surrogate recoveries were outside evaluation criteria. These issues are addressed further in the appropriate sections below.

The cooler receipt form indicated no discrepancies.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes

Field ID	Parameter	Analyte	Qualification
N/A			

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes

Blank ID	Parameter	Analyte	Concentration	Units
84405	SVOCs	bis(2-ethylhexyl)phthalate	290	ug/kg
84405	SVOCs	Di-n-butylphthalate	17000	ug/kg

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Parameter	Analyte	New RL	Qualification
CAA-SB02-020	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB02-020	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB02-220	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB02-220	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB02-023	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB02-023	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB03-015	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB03-015	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB03-019	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB03-019	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB04-020	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB04-020	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB04-120	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB04-120	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB04-025	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB04-025	SVOCs	Di-n-butylphthalate	-	**U**

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No

LCS ID	Parameter	Analyte	LCS/LCSD Recovery	RPD	LCS/LCSD/RPD Criteria
84405	SVOCs	Hexachlorocyclopentadiene	**12**	NA	25-151
84335	VOCs	Benzyl chloride	**166**	NA	72-126
84357	VOCs	Benzyl chloride	**166**	NA	72-126

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Parameter	Analyte	Qualification
CAA-SB02-020	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB02-220	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB02-023	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB03-015	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB03-019	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB04-020	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB04-120	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB04-025	SVOCs	Hexachlorocyclopentadiene	**UJ**

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

No

Field ID	Parameter	Surrogate	Recovery	Criteria
CAA-SB03-015RE	VOCs	Bromofluorobenzene	**78**	82-130
CAA-SB03-019RE	VOCs	Bromofluorobenzene	**78**	82-130
CAA-SB04-020RE	VOCs	Bromofluorobenzene	**79**	82-130
CAA-SB04-025RE	VOCs	Bromofluorobenzene	**77**	82-130

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Parameter	Analyte	Qualification
CAA-SB03-015RE	VOCs	Acetone	**UJ**
CAA-SB03-015RE	VOCs	Methylene chloride	**UJ**
CAA-SB03-019RE	VOCs	Acetone	**UJ**
CAA-SB03-019RE	VOCs	Methylene chloride	**UJ**
CAA-SB04-020RE	VOCs	Acetone	**UJ**
CAA-SB04-020RE	VOCs	Methylene chloride	**UJ**
CAA-SB04-025RE	VOCs	Acetone	**UJ**
CAA-SB04-025RE	VOCs	Methylene chloride	**UJ**

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples collected as part of this SDG?

Yes, sample CAA-SB04-120 was collected for SVOCs and lead and sample CAB-SB02-020 was collected for lead

Were MS/MSD recoveries within evaluation criteria?

No

MS/MSD ID	Parameter	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Criteria
CAA-SB04-120	SVOCs	4-Chloroaniline	30/55	**60**	10-100/30

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification. USEPA National Functional Guidelines for Low Concentration Organic Data Review indicates that organic data should not be qualified based on MS/MSD data alone and LCS recoveries were within evaluation criteria, therefore no qualification of the data was required.

Field ID	Parameter	Analyte	Qualification
N/A			

8.0 Laboratory Duplicate Results

Were laboratory duplicate samples analyzed as part of this SDG?

Yes, sample CAA-SB02-020 was duplicated for lead

Were laboratory duplicate sample RPDs within criteria?

Yes

Field ID	Parameter	Analyte	RPD	Criteria
N/A				

Data qualified due to outlying laboratory duplicate recoveries are identified below:

Field ID	Parameter	Analyte	Qualification
N/A			

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes

Field ID	Field Duplicate ID
CAA-SB02-020	CAA-SB02-220
CAA-SB04-020	CAA-SB04-120

Were field duplicates within evaluation criteria?

Yes

Field ID	Field Duplicate ID	Parameter	Analyte	RPD	Qualification
N/A					

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

Yes

The following table identifies the analyses which were reported as nondetect, diluted,

and an undiluted run ***was not*** reported:

Field ID	Parameter	Dilution Factor
N/A		

11.0 Additional Qualifications

Were additional qualifications applied?

Yes

Professional judgment was used to qualify the common laboratory contaminants acetone, methylene chloride and 2-butanone reported at concentrations less than two times (2X) the RL. Additionally, USEPA Method 5035A states that acidification of certain soils with sodium bisulfate may produce a false positive acetone artifact of 100-200 ppb, or more. Acetone reported at concentrations less than 200 ppb (ug/kg) were qualified.

Field ID	Analyte	New RL	Qualification	Comments
CAA-SB02-020	Acetone	-	**U**	Professional Judgment
CAA-SB02-020	Methylene chloride	75	**U**	Professional Judgment
CAA-SB02-020	2-Butanone	-	**U**	Professional Judgment
CAA-SB02-220	Acetone	-	**U**	Professional Judgment
CAA-SB02-220	Methylene chloride	79	**U**	Professional Judgment
CAA-SB02-220	2-Butanone	-	**U**	Professional Judgment
CAA-SB02-023	Acetone	-	**U**	Professional Judgment
CAA-SB02-023	Methylene chloride	69	**U**	Professional Judgment
CAA-SB02-023	2-Butanone	-	**U**	Professional Judgment
CAA-SB03-015	Acetone	-	**U**	Professional Judgment
CAA-SB03-015	Methylene chloride	-	**U**	Professional Judgment
CAA-SB03-019	Acetone	76	**U**	Professional Judgment
CAA-SB03-019	Methylene chloride	-	**U**	Professional Judgment
CAA-SB03-019	2-Butanone	60	**U**	Professional Judgment
CAA-SB04-020	Acetone	-	**U**	Professional Judgment
CAA-SB04-020	Methylene chloride	-	**U**	Professional Judgment
CAA-SB04-020	2-Butanone	-	**U**	Professional Judgment
CAA-SB04-120	Acetone	-	**U**	Professional Judgment
CAA-SB04-120	Methylene chloride	-	**U**	Professional Judgment
CAA-SB04-120	2-Butanone	-	**U**	Professional Judgment
CAA-SB04-025	Acetone	-	**U**	Professional Judgment
CAA-SB04-025	Methylene chloride	-	**U**	Professional Judgment

1.0 FULL VALIDATION OF VOC DATA - SDG 46638

This section describes the full validation for three soil samples which were prepared by USEPA SW-846 Method 5035 and analyzed for volatile organic compounds (VOCs) by USEPA SW-846 Method 8260B. Samples were analyzed by Agriculture and Priority Pollutant Laboratories, Inc. (APPL) of Fresno, California and submitted as part of the sample delivery group (SDG) 46638. Samples included as part of this validation are listed below:

Sample Identification
CAA-SB02-020
CAA-SB02-220
CAA-SB02-023

QA/QC criteria are identified in the QAPP (URS, 2003) and USEPA SW-846 Method 8260B. Evaluation of the analytical data followed procedures outlined in the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review (USEPA, 2001) where applicable to USEPA SW-846 Method 8260B.

Criteria evaluated included the following method performance criteria:

- Data package completeness
- Laboratory case narrative\cooler receipt form
- Holding times and sample preservation
- Instrument performance
- Initial calibration
- Calibration verification
- Method blank
- Surrogate recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) samples
- Internal standards and retention times
- Laboratory control sample (LCS)
- Target compound identification and quantitation
- Overall data assessment

1.1 Data Package Completeness

The data package was reviewed to make certain that it contained the data contractually required in the deliverable. This included checking the data package for the results of each analyte requested for each field sample submitted in the analytical batch, along with requested QC documentation for the respective methods. The data package was complete.

1.2 Laboratory Case Narrative\Cooler Receipt Form

The laboratory case narrative\cooler receipt form indicated that the benzyl chloride LCS recovery was outside evaluation criteria. The initial calibration %RSD was outside evaluation criteria for acetone. Some internal standard areas were below evaluation criteria. These issues are addressed in the appropriate section below. No further problems or discrepancies were noted.

1.3 Holding Times and Sample Preservation

Review of the sample collection and analysis dates involved comparing the chains-of-custody, the summary forms, the raw data forms, and the chromatograms for accuracy, consistency, and holding time compliance. The samples were received and maintained at $4^{o}C \pm 2^{o}$. The samples were chemically preserved within 48 hours of sampling using sodium bisulfate and analyzed within 14 days of the sampling date.

1.4 Instrument Performance

GC/MS instrument performance checks were performed to ensure mass resolution, identification, and instrument sensitivity. Criteria for evaluation of instrument performance included possible transcription/calculation errors, adherence to instrument tuning frequency requirements, mass assignments, and ion abundance criteria. Instrument performance check samples were evaluated against criteria established in USEPA SW-846 Method 8260B.

Based on the raw data, the ion abundance criteria were within evaluation criteria for all masses, and no calculation or transcription errors were noted.

1.5 Initial Calibration

Calibration criteria were established to assess whether the instrument was capable of producing acceptable qualitative and quantitative data for volatiles analyses. Samples included in this SDG were analyzed using a Hewlett Packard GC/MS named “Neo”. The initial calibration for instrument “Neo” was performed on 3-2-05. At least five concentration standards were used to establish the initial calibration curve as required by Method 8260B. For the initial calibration, the response factors (RFs) were reviewed and were greater than 0.10 for chloromethane, 1,1-dichloroethane and bromoform, greater

than 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, and greater than 0.05 for all other target analytes.

Review of the initial calibration summary forms indicated percent relative standard deviation (%RSDs) was ≤ 30 percent for calibration check compounds (CCCs) [1,1-dichloroethene, toluene, chloroform, ethylbenzene, 1,2-dichloropropane, and vinyl chloride], and for non-CCCs quantitated using linear calibration (response factor) with the exception of acetone (65%). Qualifications based on initial calibration outliers are listed in the following table.

Field ID	Parameter	Analyte	Qualification
CAA-SB02-020	VOC	Acetone	**UJ**
CAA-SB02-220	VOC	Acetone	**UJ**
CAA-SB02-023	VOC	Acetone	**UJ**

Recalculations of the RFs and %RSD for one compound per internal standard were performed, and no errors in calculation were noted.

1.6 Calibration Verification

Review of the analysis run log indicated the calibration verifications (CVs) were performed at the required frequency of every 12 hours. Review of the continuing calibration summary form indicated all RFs met the evaluation criteria of greater than 0.10 (chloromethane, 1,1-dichloroethane and Bromoform), 0.30 (chlorobenzene and 1,1,2,2-tetrachloroethane), and greater than 0.05 for all target analytes quantitated using linear calibration (response factor). Target analytes quantitated using linear calibration had %Ds that met the evaluation criteria of ≤ 20 percent for the CCCs and < 25 percent for all other target analytes with the exception of those listed in the following table.

CV ID	Parameter	Analyte	%D
0302N10S.D	VOC	Bromomethane	**27**
0302N10S.D	VOC	Acetone	**32**

Qualifications based on calibration verification outliers are listed in the following table. Acetone was previously qualified and no additional qualification was required.

Field ID	Parameter	Analyte	Qualification
CAA-SB02-020	VOC	Bromomethane	**J**
CAA-SB02-220	VOC	Bromomethane	**UJ**
CAA-SB02-023	VOC	Bromomethane	**UJ**

Recalculation of the RFs and %Ds for one compound per internal standard were performed, and no errors in calculation were noted.

1.7 Blank Samples

The purpose of the method blank samples was to evaluate the existence and magnitude of contamination problems emanating from laboratory activities. Method blank samples

were analyzed with each analytical batch as required by USEPA SW-846 Method 8260B. All target compounds were reported as non-detect. Review of chromatograms indicated all peaks present were accounted or the concentrations reported were below the method detection limit.

1.8 Surrogate Spike Recoveries

Surrogate compounds were used to evaluate the overall laboratory sample preparation efficiency on a per sample basis. All surrogate recoveries were within the acceptance criteria for the validated samples. No qualification of data was required. A minimum of ten percent of the recoveries was recalculated, and the summary forms versus the raw data were verified. No calculation or transcription errors were noted.

1.9 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

MS/MSD samples were used to assess the accuracy and precision of the analytical process on a particular sample. No samples from this SDG were designated for MS/MSD analysis.

1.10 Internal Standards and Retention Times

Internal standard (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during each analytical run. IS areas must be within -50 percent to +100 percent, and the IS retention times must be within 30 seconds of the IS continuing calibration retention time. IS areas and retention times for the samples in this SDG were within evaluation criteria with the exception of the area for 1,4-Dichlorobenzene-D. The area for 1,4-Dichlorobenzene-D was below the lower limit. Qualifications based on calibration verification outliers are listed in the following table.

Field ID	Parameter	Analyte	Qualification
CAA-SB02-020	VOC	1,1,2,2-Tetrachloroethane	**UJ**
CAA-SB02-020	VOC	1,2,4-Trichlorobenzene	**UJ**
CAA-SB02-020	VOC	1,2,4-Trimethylbenzene	**UJ**
CAA-SB02-020	VOC	1,2-Dibromo-3-chloropropane	**UJ**
CAA-SB02-020	VOC	1,2-Dichlorobenzene	**UJ**
CAA-SB02-020	VOC	1,3,5-Trimethylbenzene	**UJ**
CAA-SB02-020	VOC	1,3-Dichlorobenzene	**UJ**
CAA-SB02-020	VOC	1,4-Dichlorobenzene	**UJ**
CAA-SB02-020	VOC	Benzyl chloride	**UJ**
CAA-SB02-020	VOC	Hexachlorobutadiene	**UJ**
CAA-SB02-020	VOC	Isopropylbenzene	**UJ**
CAA-SB02-220	VOC	1,1,2,2-Tetrachloroethane	**UJ**
CAA-SB02-220	VOC	1,2,4-Trichlorobenzene	**UJ**
CAA-SB02-220	VOC	1,2,4-Trimethylbenzene	**UJ**
CAA-SB02-220	VOC	1,2-Dibromo-3-chloropropane	**UJ**
CAA-SB02-220	VOC	1,2-Dichlorobenzene	**UJ**
CAA-SB02-220	VOC	1,3,5-Trimethylbenzene	**UJ**

Field ID	Parameter	Analyte	Qualification
CAA-SB02-220	VOC	1,3-Dichlorobenzene	**UJ**
CAA-SB02-220	VOC	1,4-Dichlorobenzene	**UJ**
CAA-SB02-220	VOC	Benzyl chloride	**UJ**
CAA-SB02-220	VOC	Hexachlorobutadiene	**UJ**
CAA-SB02-220	VOC	Isopropylbenzene	**UJ**
CAA-SB02-023	VOC	1,1,2,2-Tetrachloroethane	**UJ**
CAA-SB02-023	VOC	1,2,4-Trichlorobenzene	**UJ**
CAA-SB02-023	VOC	1,2,4-Trimethylbenzene	**UJ**
CAA-SB02-023	VOC	1,2-Dibromo-3-chloropropane	**UJ**
CAA-SB02-023	VOC	1,2-Dichlorobenzene	**UJ**
CAA-SB02-023	VOC	1,3,5-Trimethylbenzene	**UJ**
CAA-SB02-023	VOC	1,3-Dichlorobenzene	**UJ**
CAA-SB02-023	VOC	1,4-Dichlorobenzene	**UJ**
CAA-SB02-023	VOC	Benzyl chloride	**UJ**
CAA-SB02-023	VOC	Hexachlorobutadiene	**UJ**
CAA-SB02-023	VOC	Isopropylbenzene	**UJ**

The summary forms were verified to the raw data, and no transcription errors were noted.

1.11 Laboratory Control Sample (LCS)

LCS samples were analyzed with the analytical batch to assess the accuracy of the analytical process. LCS recoveries were within evaluation criteria with the exception of those listed in the following table.

LCS ID	Parameter	LCS Compound	LCS Recovery	LCS Criteria
81246	VOCs	Benzyl chloride	**166**	72-126

Benzyl chloride was previously qualified and no additional qualification was required. A minimum of ten percent of the spiking compound recoveries for the LCS were recalculated using the LCS summary forms, and no calculation or transcription errors were noted.

1.12 Target Compound Identification and Quantitation

For validation of the compound identification, chromatograms were reviewed to verify the major peaks were identified, the spectra of the identified compounds were verified against the library spectra, and the relative retention time was no greater than 0.06 different from the associated continuing calibration retention times. No anomalies were noted with the identification of the target compounds in the samples.

For the validation of compound quantitation, a minimum of ten percent of the detected results was recalculated from the raw data, and no calculation errors were noted. Additionally, the reporting limits were verified to determine if reporting limits were adjusted for dilutions.

1.13 Overall Data Assessment

Based on the criteria outlined, it is recommended that the results reported for these analyses be accepted for their intended use. Acceptable levels of accuracy and precision, based on LCS, MS/MSD and surrogate data were achieved for this SDG. In addition, completeness defined to be the percentage of analytical results, which are judged to be valid, including, estimated (**J**) data, was 100 percent for this SDG.

1.0 FULL VALIDATION OF SVOC DATA – SDG 46638

This section describes the full validation for eight soil samples, which were prepared by USEPA SW-846 Method 3540C and analyzed for SVOCs by USEPA SW-846 Method 8270C. Samples were analyzed by Agriculture and Priority Pollutant Laboratories, Inc., of Fresno, California, and submitted as part of sample delivery group (SDG) 46638. Samples included as part of this validation are listed below:

Sample Identification	Sample Identification
CAA-SB02-020	CAA-SB03-019
CAA-SB02-220	CAA-SB04-020
CAA-SB02-023	CAA-SB04-120
CAA-SB03-015	CAA-SB04-025

QA/QC criteria are identified in the QAPP (URS, 2004) and EPA Method 8270C. Evaluation of the analytical data followed procedures outlined in the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review (USEPA, 2001) where applicable to SW-846 Method 8270C.

Criteria evaluated included the following method performance criteria:

- Data package completeness
- Laboratory case narrative/cooler receipt form
- Sample preservation and holding times
- Instrument performance
- Initial calibration
- Calibration verification
- Method blank samples
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) samples
- Internal standard areas and retention times
- Laboratory control sample (LCS)
- Target compound identification and quantitation
- Overall data assessment

1.1 Data Package Completeness

The data package was reviewed to make certain that it contained the data contractually required in the deliverable. This included checking the data package for the results of each analyte requested for each field sample submitted in the analytical batch, along with requested QC documentation for the respective methods. The data package was complete.

1.2 Laboratory Case Narrative/Cooler Receipt Form

The laboratory case narrative indicated the MS/MSD RPD for 4-Chloroaniline and LCS recoveries for hexachlorocyclopentadiene were outside evaluation criteria. Di-n-butylphthalate was detected above the RL and bis(2-ethylhexyl)phthalate was detected above the MDL in the SVOC method blank. These issues are addressed further in the appropriate sections below.

1.3 Sample Preservation and Holding Times

Review of the sample collection and analysis dates involved comparing the chain-of-custody, the summary forms, the raw data forms, and the chromatograms for accuracy, consistency, and holding time compliance. The cooler receipt form indicated the cooler temperatures were $4 \pm 2^{o}C$ upon receipt at the laboratory. The samples were extracted and analyzed within holding time criteria of 14 days to extraction and 40 days to analysis. No qualification of data was required due to the sample preservation or holding time criteria.

1.4 Instrument Performance

GC/MS instrument performance checks were performed to ensure mass resolution, identification, and instrument sensitivity. Criteria for evaluation of instrument performance included possible transcription/calculation errors, adherence to instrument tuning frequency requirements, mass assignments, and ion abundance criteria. Instrument performance check samples were evaluated against the laboratory tuning criteria established in Method 8270C.

Based on the raw data, the ion abundance criteria were within evaluation criteria for all masses, so no qualification of the data was required. The raw data forms were checked against the summary forms and no calculation or transcription errors were noted.

1.5 Initial Calibration

Calibration criteria were established to assess whether the instrument was capable of producing acceptable qualitative and quantitative data for volatiles analyses. Samples included in this SDG were analyzed using a Hewlett Packard GC/MS named “Linus”. The initial calibration for instrument “Linus” was performed on 10-25-04. At least five concentration standards were used to establish the initial calibration curve as required by Method 8270C. An average response factor (RF) was determined for each target analyte, and the RFs were reviewed and verified as greater than 0.05 for all target analytes. Review of the initial calibration summary forms indicated calibration check compounds (CCCs) and target analytes had percent relative standard deviations (%RSDs) $\leq$20 percent with the exception of hexachlorocyclopentadiene (24%). Qualification of data based initial calibration data is listed in the following table.

Field ID	Parameter	Analyte	Qualification
CAA-SB02-020	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB02-220	SVOCs	Hexachlorocyclopentadiene	**UJ**

Field ID	Parameter	Analyte	Qualification
CAA-SB02-023	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB03-015	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB03-019	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB04-020	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB04-120	SVOCs	Hexachlorocyclopentadiene	**UJ**
CAA-SB04-025	SVOCs	Hexachlorocyclopentadiene	**UJ**

Recalculations of the RFs and %RSD for one compound per internal standard were performed, and no errors in calculation were noted.

1.6 Calibration Verification

Review of the analysis run log indicated the calibration verifications (CVs) were performed at the required frequency of every 12 hours. Review of continuing calibration summary form indicated all RFs met the evaluation criteria. Based on the review of CV raw data and summary forms, all RFs met the evaluation criteria of greater than 0.05 for all target analytes. In addition, percent differences (%Ds) met the evaluation criteria of ≤ 20 percent for CCCs and all other target analytes. Recalculations of the RFs and %RSD for one compound per internal standard were performed, and no errors in calculation were noted.

1.7 Method Blank Samples

The purpose of method blank samples is to evaluate the existence and magnitude of contamination problems emanating from laboratory activities. Method blank samples were analyzed with each analytical batch as required by USEPA SW-846 Method 8270C. Target compounds were reported as non-detect with the exception of those listed in the following table.

Blank ID	Parameter	Analyte	Concentration	Units
84405	SVOCs	bis(2-ethylhexyl)phthalate	290	ug/kg
84405	SVOCs	Di-n-butylphthalate	17000	ug/kg

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration did not require qualification.

Field ID	Parameter	Analyte	New RL	Qualification
CAA-SB02-020	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB02-020	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB02-220	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB02-220	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB02-023	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB02-023	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB03-015	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB03-015	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB03-019	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB03-019	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB04-020	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**

Field ID	Parameter	Analyte	New RL	Qualification
CAA-SB04-020	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB04-120	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB04-120	SVOCs	Di-n-butylphthalate	-	**U**
CAA-SB04-025	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**
CAA-SB04-025	SVOCs	Di-n-butylphthalate	-	**U**

Review of chromatograms indicated all peaks present were either surrogate compounds, internal standards or the above-mentioned blank contaminants.

1.8 Surrogate Spike Recoveries

Surrogate compounds were used to evaluate the overall laboratory sample preparation efficiency on a per-sample basis. All surrogate recoveries were within the method acceptance criteria for all samples. A minimum of ten percent of the surrogate recoveries was recalculated, and the summary forms versus the raw data were verified. No calculation or transcription errors were noted.

1.9 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

MS/MSD spike samples were analyzed to assess the accuracy and precision of an analytical sample. Sample CAA-SB04-120 was spiked as an MS/MSD sample and all MS/MSD data was within evaluation criteria with the exception of the RPD for 4-chloroaniline (60%). The MS/MSD recoveries were within evaluation criteria and no qualification of data was required. A minimum of ten percent of the spiking compound recoveries and RPDs for the MS/MSD were recalculated using the MS/MSD summary forms, and no calculation or transcription errors were noted.

1.10 Internal Standard Areas and Retention Times

Internal standard (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during each analytical run. Following Method 8270C, the IS areas for the samples and CVs must be within –50 percent to +100 percent and retention times must be within 30 seconds of the IS area and retention time of the midpoint of the ICAL.

The IS areas for the CVs and investigative samples validated in this SDG were within evaluation criteria.

1.11 Laboratory Control Sample (LCS)

An LCS was analyzed to assess the accuracy of the analytical process. All LCS recoveries were within evaluation criteria with the exception of hexachlorocyclopentadiene (12%). The hexachlorocyclopentadiene data was previously qualified and no additional qualifications to the data based on LCS recoveries were required. A minimum of ten percent of the spiking compound recoveries for the LCS were recalculated from the raw data and verified using the LCS summary forms, and no calculation or transcription errors were noted.

1.12 Target Compound Identification and Quantitation

For validation of the compound identification, chromatograms were reviewed to verify the major peaks were identified, the spectra of the identified compounds were verified against the library spectra, and the relative retention time was no greater than 0.06 different from the associated CV retention times. A minimum of ten percent of the detected target analytes were verified. No anomalies were noted with the identification of the target compounds in the samples.

For the validation of compound quantitation, a minimum of ten percent of the detected target analytes were recalculated from the raw data, and no calculation errors were noted. Additionally, the reporting limits were verified to determine if reporting limits (RLs) were adjusted for dilutions. No qualification of the data was required and review of the data indicated the correct RLs were reported.

1.13 Overall Data Assessment

Based on the criteria outlined, it is recommended that the results reported for these analyses be accepted for their intended use. Acceptable levels of accuracy and precision, based on LCS, MS/MSD and surrogate data were achieved for this SDG with the noted exceptions. In addition, completeness defined to be the percentage of analytical results, which are judged to be valid, including, estimated (**J/UJ**) data, was 100 percent for this SDG.

1.0 FULL VALIDATION OF LEAD DATA – SDG 46638

This section describes the full data validation for seven soil samples, which were prepared by USEPA SW-846 Method 3050B and analyzed for lead by USEPA SW-846 Method 6010B. Samples were analyzed by Agriculture and Priority Pollutant Laboratories, Inc. of Fresno, California and submitted as part of sample delivery group (SDG) 46638. Samples included as part of this validation are listed below:

Sample Identification #	Sample Identification #
CAA-SB02-020	CAA-SB03-019
CAA-SB02-220	CAA-SB04-020
CAA-SB02-023	CAA-SB04-120
CAA-SB03-015	

QA/QC criteria are identified in the QAPP (URS, 2005) and USEPA SW-846 Method 6010B. Evaluation of the analytical data followed procedures outlined in the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA, 2004) where applicable to USEPA SW-846 Method 6010B.

Criteria evaluated included the following method performance criteria:

- Data package completeness
- Laboratory case narrative \ cooler receipt form
- Sample preservation and holding times
- Blank contamination
- Initial calibration
- Calibration verification
- Laboratory control spike/laboratory control spike duplicate (LCS/LCSD)
- Matrix spike (MS/MSD)
- Laboratory duplicate sample
- ICP serial dilution
- ICP interference check samples (ICS)
- Sample result verification
- Overall assessment of data

1.1 Data Package Completeness

The data package was reviewed to make certain that it contained the data contractually required in the deliverable. This included checking the data package for the results of each analyte requested for each field sample submitted in the analytical batch, along with requested QC

documentation for the respective methods. The data package was considered complete for SDG 46638.

1.2 Laboratory Case Narrative \ Cooler Receipt Form

The laboratory case narrative indicated that no problems were encountered during analysis. No discrepancies were noted on the cooler receipt form.

1.3 Sample Preservation and Holding Times

Review of the sample collection and analysis dates involved comparing the chain-of-custody, the sample preparation logs, the analysis run logs, and raw data forms for holding time compliance. The samples were received by the laboratory at 4 $\pm$ 2 °C, and analyzed within the evaluation criteria of 6 months lead. No qualification of data was required based on holding time criteria or sample preservation.

1.4 Blank Contamination

The purpose of blank samples was to evaluate the existence and magnitude of contamination problems emanating from laboratory activities. Initial Calibration Blanks (ICBs), Continuing Calibration Blanks (CCBs), and preparation blanks were all reported nondetect for lead. No qualification of data was required.

1.5 Initial Calibration

Initial calibration (ICAL) criteria were established to assess whether the instrument was capable of producing acceptable qualitative and quantitative data for metals analyses. An ICAL was analyzed at the beginning of the run sequence. ICAL curves were established using a blank and three standards for analysis of metals by Trace ICP ™ and must have a correlation coefficient (r) greater than 0.995. All initial calibration verification (ICV) recoveries were within evaluation criteria (90-110%) and r-values were greater than 0.995. All of the ICAL curves and ICV recoveries were recalculated and compared to the raw data; no calculation or transcription errors were noted. No qualification of the data was required based on ICV data.

1.6 Calibration Verification

Calibration Verification (CV) criteria were established to assess whether the instrument was capable of producing acceptable qualitative and quantitative data established by the ICAL. The laboratory analyzed CV samples at a frequency of ten percent as specified by the methodologies. CV samples associated with the validated samples had recoveries within the evaluation criteria (90-110%). All CV sample recoveries were recalculated and compared to the raw data and no calculation or transcription errors were noted.

1.7 Laboratory Control Spike/Laboratory Control Spike Duplicate (LCS/LCSD)

Laboratory control spike (LCS) samples and LCS duplicates (LCSD) were analyzed to assess the accuracy and precision of the analytical method and to demonstrate laboratory performance.

All LCS and LCSD recoveries were within evaluation criteria (80-120%). All LCS/LCSD recoveries and RPDs were recalculated and compared to the raw data; no calculation or transcription errors were noted.

1.8 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD samples were analyzed to assess accuracy and precision and the effects of matrix interference during the analysis of a particular sample. The laboratory spiked and analyzed samples CAB-SB02-020 and CAA-SB04-120 for lead. All MS/MSD recoveries were within evaluation criteria (80-120%). All MS/MSD data was recalculated and compared to the raw data. No calculation or transcription errors were noted.

1.9 Laboratory Duplicate Sample

A laboratory duplicate sample was analyzed to assess the precision of a particular sample. The laboratory analyzed sample CAB-SB02-020 for lead in duplicate. The laboratory duplicate and parent sample relative percent difference (RPD) were within evaluation criteria (30%). The laboratory duplicate and parent sample RPD was recalculated and no transcription and calculation errors were noted.

1.10 ICP Serial Dilutions

Serial dilutions were analyzed to assess the potential significant physical or chemical interferences due to sample matrix. The laboratory analyzed the serial dilution on samples CAB-SB02-020 and CAA-SB04-120. The serial dilution %Ds were all within evaluation criteria of ± 10% difference. All of the serial dilution %Ds for lead were recalculated and compared to the raw data; no transcription and calculation errors were noted.

1.11 ICP Interference Check Sample

Interference Check Samples (ICSs) were analyzed to verify the contract laboratory's interelement and background correction factors for analysis of lead by ICP. The laboratory analyzed the ICS at the beginning of the analytical run as specified in Method 6010B. The ICS lead recoveries were within evaluation criteria (80-120%), therefore, no qualification of the lead data was required. All ICS lead recoveries were recalculated and compared to the raw data; no transcription and calculation errors were noted.

1.12 Sample Result Verification

A minimum of ten percent of the validated sample results were recalculated to validate that analyte quantitation was derived accurately, and no calculation errors were noted. Data summary forms were reviewed and compared to the raw data package. No transcription errors were noted and the correct reporting limits were used.

1.13 Overall Data Assessment

Based on the criteria outlined, it is recommended that the results reported for these analyses be accepted for their intended use. Completeness, defined to be the percentage of analytical

results that are judged to be valid, including estimated (**J/UJ**) data, was 100 percent for this SDG.

TABLE B-1
SUMMARY OF DATA QUALIFICATIONS
AOC A

SDG	Field ID	Matrix	Analysis	Analyte	NEW RL	URS Qual.	Code
46626	CAA-SB01-005	soil	SVOCs	Hexachlorocyclopentadiene		**UJ**	LL
46626	CAA-SB01-005	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46626	CAA-SB01-005	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46626	CAA-SB01-005	soil	VOCs	Acetone	-	**U**	PJ
46626	CAA-SB01-005	soil	VOCs	Methylene chloride	-	**U**	PJ
46626	CAA-SB01-010	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46626	CAA-SB01-010	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46626	CAA-SB01-010	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46626	CAA-SB01-010	soil	VOCs	Acetone	-	**U**	PJ
46638	CAA-SB02-020	soil	VOCs	Bromomethane	-	**J**	CD
46638	CAA-SB02-020	soil	VOCs	Acetone	-	**UJ**	ID
46638	CAA-SB02-020	soil	VOCs	1,1,2,2-Tetrachloroethane	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	1,2,4-Trichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	1,2,4-Trimethylbenzene	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	1,2-Dibromo-3-chloropropane	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	1,2-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	1,3,5-Trimethylbenzene	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	1,3-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	1,4-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	Benzyl chloride	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	Hexachlorobutadiene	-	**UJ**	IS
46638	CAA-SB02-020	soil	VOCs	Isopropylbenzene	-	**UJ**	IS
46638	CAA-SB02-020	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46638	CAA-SB02-020	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46638	CAA-SB02-020	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46638	CAA-SB02-020	soil	VOCs	2-Butanone	-	**U**	PJ
46638	CAA-SB02-020	soil	VOCs	Acetone	-	**U**	PJ
46638	CAA-SB02-020	soil	VOCs	Methylene chloride	75	**U**	PJ
46638	CAA-SB02-023	soil	VOCs	Bromomethane	-	**UJ**	CD
46638	CAA-SB02-023	soil	VOCs	Acetone	-	**UJ**	ID
46638	CAA-SB02-023	soil	VOCs	1,1,2,2-Tetrachloroethane	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	1,2,4-Trichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	1,2,4-Trimethylbenzene	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	1,2-Dibromo-3-chloropropane	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	1,2-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	1,3,5-Trimethylbenzene	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	1,3-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	1,4-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	Benzyl chloride	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	Hexachlorobutadiene	-	**UJ**	IS
46638	CAA-SB02-023	soil	VOCs	Isopropylbenzene	-	**UJ**	IS
46638	CAA-SB02-023	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46638	CAA-SB02-023	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46638	CAA-SB02-023	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46638	CAA-SB02-023	soil	VOCs	2-Butanone	-	**U**	PJ
46638	CAA-SB02-023	soil	VOCs	Acetone	-	**U**	PJ
46638	CAA-SB02-023	soil	VOCs	Methylene chloride	69	**U**	PJ
46638	CAA-SB02-220	soil	VOCs	Bromomethane	-	**UJ**	CD
46638	CAA-SB02-220	soil	VOCs	Acetone	-	**UJ**	ID
46638	CAA-SB02-220	soil	VOCs	1,1,2,2-Tetrachloroethane	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	1,2,4-Trichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	1,2,4-Trimethylbenzene	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	1,2-Dibromo-3-chloropropane	-	**UJ**	IS

TABLE B-1
SUMMARY OF DATA QUALIFICATIONS
AOC A

SDG	Field ID	Matrix	Analysis	Analyte	NEW RL	URS Qual.	Code
46638	CAA-SB02-220	soil	VOCs	1,2-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	1,3,5-Trimethylbenzene	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	1,3-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	1,4-Dichlorobenzene	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	Benzyl chloride	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	Hexachlorobutadiene	-	**UJ**	IS
46638	CAA-SB02-220	soil	VOCs	Isopropylbenzene	-	**UJ**	IS
46638	CAA-SB02-220	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46638	CAA-SB02-220	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46638	CAA-SB02-220	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46638	CAA-SB02-220	soil	VOCs	2-Butanone	-	**U**	PJ
46638	CAA-SB02-220	soil	VOCs	Acetone	-	**U**	PJ
46638	CAA-SB02-220	soil	VOCs	Methylene chloride	79	**U**	PJ
46638	CAA-SB03-015	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46638	CAA-SB03-015	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46638	CAA-SB03-015	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46638	CAA-SB03-015	soil	VOCs	Acetone	-	**U**	PJ
46638	CAA-SB03-015	soil	VOCs	Methylene chloride	-	**U**	PJ
46638	CAA-SB03-015RE	soil	VOCs	Acetone	-	**UJ**	SL
46638	CAA-SB03-015RE	soil	VOCs	Methylene chloride	-	**UJ**	SL
46638	CAA-SB03-019	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46638	CAA-SB03-019	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46638	CAA-SB03-019	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46638	CAA-SB03-019	soil	VOCs	2-Butanone	60	**U**	PJ
46638	CAA-SB03-019	soil	VOCs	Acetone	76	**U**	PJ
46638	CAA-SB03-019	soil	VOCs	Methylene chloride	-	**U**	PJ
46638	CAA-SB03-019RE	soil	VOCs	Acetone	-	**UJ**	SL
46638	CAA-SB03-019RE	soil	VOCs	Methylene chloride	-	**UJ**	SL
46638	CAA-SB04-020	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46638	CAA-SB04-020	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46638	CAA-SB04-020	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46638	CAA-SB04-020	soil	VOCs	2-Butanone	-	**U**	PJ
46638	CAA-SB04-020	soil	VOCs	Acetone	-	**U**	PJ
46638	CAA-SB04-020	soil	VOCs	Methylene chloride	-	**U**	PJ
46638	CAA-SB04-020RE	soil	VOCs	Acetone	-	**UJ**	SL
46638	CAA-SB04-020RE	soil	VOCs	Methylene chloride	-	**UJ**	SL
46638	CAA-SB04-025	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46638	CAA-SB04-025	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46638	CAA-SB04-025	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46638	CAA-SB04-025	soil	VOCs	Acetone	-	**U**	PJ
46638	CAA-SB04-025	soil	VOCs	Methylene chloride	-	**U**	PJ
46638	CAA-SB04-025RE	soil	VOCs	Acetone	-	**UJ**	SL
46638	CAA-SB04-025RE	soil	VOCs	Methylene chloride	-	**UJ**	SL
46638	CAA-SB04-120	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46638	CAA-SB04-120	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46638	CAA-SB04-120	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46638	CAA-SB04-120	soil	VOCs	2-Butanone	-	**U**	PJ
46638	CAA-SB04-120	soil	VOCs	Acetone	-	**U**	PJ
46638	CAA-SB04-120	soil	VOCs	Methylene chloride	-	**U**	PJ
46626	CAB-SB01-020	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46626	CAB-SB01-020	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46626	CAB-SB01-020	soil	SVOCs	Di-n-butylphthalate	2600	**U**	MB
46626	CAB-SB01-020	soil	VOCs	Acetone	-	**U**	PJ

TABLE B-1
SUMMARY OF DATA QUALIFICATIONS
AOC A

SDG	Field ID	Matrix	Analysis	Analyte	NEW RL	URS Qual.	Code
46626	CAB-SB01-020	soil	VOCs	Methylene chloride	60	**U**	PJ
46626	CAB-SB01-024	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46626	CAB-SB01-024	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46626	CAB-SB01-024	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46626	CAB-SB01-024	soil	VOCs	Acetone	-	**U**	PJ
46626	CAB-SB01-024	soil	VOCs	Methylene chloride	-	**U**	PJ
46626	CAB-SB02-019	soil	SVOCs	Hexachlorocyclopentadiene		**UJ**	LL
46626	CAB-SB02-019	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46626	CAB-SB02-019	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46626	CAB-SB02-019	soil	VOCs	Acetone	-	**U**	PJ
46626	CAB-SB02-024	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46626	CAB-SB02-024	soil	SVOCs	bis(2-ethylhexyl)phthalate	390	**U**	MB
46626	CAB-SB02-024	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46626	CAB-SB02-024	soil	VOCs	Acetone	-	**U**	PJ
46626	CAB-SB02-024	soil	VOCs	Methylene chloride	-	**U**	PJ
46626	CAC-SB02-010	soil	PCBs	All PCBs	-	**UJ**	HT

Code definations

CV %D	**CD**	Method Blank Contamination	**MB**
ICAL %RSD	**ID**	Professional Judgment	**PJ**
Internal Standards	**IS**	Surrogate Recovery Low	**SL**
LCS Recovery Low	**LL**		

TABLE B-2
SUMMARY OF DATA QUALIFICATIONS
AOC B

SDG	Field ID	Matrix	Analysis	Analyte	NEW RL	URS Qual.	Code
46626	CAB-SB01-020	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46626	CAB-SB01-020	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46626	CAB-SB01-020	soil	SVOCs	Di-n-butylphthalate	2600	**U**	MB
46626	CAB-SB01-020	soil	VOCs	Acetone	-	**U**	PJ
46626	CAB-SB01-020	soil	VOCs	Methylene chloride	60	**U**	PJ
46626	CAB-SB01-024	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46626	CAB-SB01-024	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46626	CAB-SB01-024	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46626	CAB-SB01-024	soil	VOCs	Acetone	-	**U**	PJ
46626	CAB-SB01-024	soil	VOCs	Methylene chloride	-	**U**	PJ
46626	CAB-SB02-019	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46626	CAB-SB02-019	soil	SVOCs	bis(2-ethylhexyl)phthalate	-	**U**	MB
46626	CAB-SB02-019	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46626	CAB-SB02-019	soil	VOCs	Acetone	-	**U**	PJ
46626	CAB-SB02-024	soil	SVOCs	Hexachlorocyclopentadiene	-	**UJ**	LL
46626	CAB-SB02-024	soil	SVOCs	bis(2-ethylhexyl)phthalate	390	**U**	MB
46626	CAB-SB02-024	soil	SVOCs	Di-n-butylphthalate	-	**U**	MB
46626	CAB-SB02-024	soil	VOCs	Acetone	-	**U**	PJ
46626	CAB-SB02-024	soil	VOCs	Methylene chloride	-	**U**	PJ

Code definations

Method Blank Contamination	**MB**
Professional Judgment	**PJ**
LCS Recovery Low	**LL**

TABLE B-3
SUMMARY OF DATA QUALIFICATIONS
AOC C

SDG	Field ID	Matrix	Analysis	Analyte	NEW RL	URS Qual.	Code	Comments
46626	CAC-SB02-010	soil	PCBs	All PCBs	-	**UJ**	HT	Missed holding time

Code definations

Missed Holding Time	**HT**

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAA-SB01-005			CAA-SB01-010			CAA-SB02-020			CAA-SB02-023			CAA-SB03-015		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																	
1,1,1-Trichloroethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,1,2,2-Tetrachloroethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,1,2-Trichloroethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,1-Dichloroethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,1-Dichloroethene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,2,4-Trichlorobenzene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
1,2,4-Trimethylbenzene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
1,2-Dibromo-3-Chloropropane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
1,2-Dibromoethane (Ethylene Dibromide)	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,2-Dichlorobenzene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
1,2-Dichloroethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,2-Dichloroethene (cis)	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,2-Dichloroethene (trans)	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,2-Dichloropropane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
1,3,5-Trimethylbenzene (Mesitylene)	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
1,3-Dichlorobenzene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
1,4-Dichlorobenzene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
2-Hexanone	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
4-Methyl-2-Pentanone	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Acetone	ND	0 / 12	<	59	U	<	56	U	<	59	UJ	<	59	UJ	<	55	UJ
Benzene	0.9 J	3 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	0.8	5.5	J
Benzyl Chloride	ND	0 / 12	<	24	U	<	23	U	<	24	UJ	<	24	UJ	<	22	U
Bromodichloromethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Bromoform	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Bromomethane	2.6 J	3 / 12	<	12	U	<	11	U	2.2	12	J	<	12	UJ	<	11	U
Carbon Disulfide	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Carbon Tetrachloride	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Chlorobenzene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Chloroethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Chloroform	12	9 / 12	9.2	5.9		<	5.6	U	9.8	5.9		12	5.9		12	5.5	
Chloromethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
cis-1,3-Dichloropropene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Cyclohexane	3.5 J	9 / 12	2.3	5.9	J	<	5.6	U	2.4	5.9	J	3.2	5.9	J	3.1	5.5	J
Dibromochloromethane	6	9 / 12	2.6	5.9	J	<	5.6	U	3.1	5.9	J	5.8	5.9	J	6	5.5	
Dichlorodifluoromethane	ND	0 / 12	<	12	U	<	11	U	<	12	U	<	12	U	<	11	U

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAA-SB01-005			CAA-SB01-010			CAA-SB02-020			CAA-SB02-023			CAA-SB03-015		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Ethylbenzene	1.1 J	3 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	1	5.5	J
Hexachlorobutadiene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
Isopropylbenzene (Cumene)	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	UJ	<	5.9	UJ	<	5.5	U
m,p-Xylene (sum of isomers)	3.9 J	8 / 12	1.2	5.9	J	<	5.6	U	1.8	5.9	J	3.3	5.9	J	<	5.5	U
Methylcyclohexane	13 J	9 / 12	6	24	J	<	23	U	6.8	24	J	11	24	J	12	22	J
Methyl Acetate	8.8 J	6 / 12	<	12	U	2.7	11	J	1.8	12	J	<	12	U	4.9	11	J
Methyl Ethyl Ketone (2-Butanone)	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Methyl t-Butyl Ether	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Methylene Chloride	ND	0 / 12	<	59	U	<	56	U	<	75	U	<	69	U	<	55	UJ
o-Xylene (1,2-Dimethylbenzene)	0.7 J	3 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	0.7	5.5	J
Styrene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Tetrachloroethene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Toluene	47	12 / 12	19	5.9		1.5	5.6	J	25	5.9		46	5.9		44	5.5	
trans-1,3-Dichloropropene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Trichloroethene	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Trichlorofluoromethane	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
Vinyl Acetate	ND	0 / 12	<	12	U	<	11	U	<	12	U	<	12	U	<	11	U
Vinyl Chloride	ND	0 / 12	<	5.9	U	<	5.6	U	<	5.9	U	<	5.9	U	<	5.5	U
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																	
2,2-Oxybis(1-chloro)propane	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2,4,5-Trichlorophenol	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2,4,6-Trichlorophenol	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2,4-Dichlorophenol	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2,4-Dimethylphenol	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2,4-Dinitrophenol	ND	0 / 12	<	1900	U	<	1800	U	<	1900	U	<	1900	U	<	1700	U
2,4-Dinitrotoluene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2,6-Dinitrotoluene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2-Chloronaphthalene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2-Chlorophenol	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2-Methylnaphthalene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2-Methylphenol (o-cresol)	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
2-Nitroaniline	ND	0 / 12	<	780	U	<	740	U	<	780	U	<	780	U	<	720	U
2-Nitrophenol	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
3,3-Dichlorobenzidine	ND	0 / 12	<	780	U	<	740	U	<	780	U	<	780	U	<	720	U
3-Nitroaniline	ND	0 / 12	<	780	U	<	740	U	<	780	U	<	780	U	<	720	U
4,6-Dinitro-2-methylphenol	ND	0 / 12	<	1900	U	<	1800	U	<	1900	U	<	1900	U	<	1700	U
4-Bromophenyl-phenylether	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAA-SB01-005			CAA-SB01-010			CAA-SB02-020			CAA-SB02-023			CAA-SB03-015		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
4-Chloro-3-methylphenol	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
4-Chloroaniline	ND	0 / 12	<	780	U	<	740	U	<	780	U	<	780	U	<	720	U
4-Chlorophenyl-phenylether	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
4-Methylphenol (p-cresol)	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
4-Nitroaniline	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
4-Nitrophenol	ND	0 / 12	<	1900	U	<	1800	U	<	1900	U	<	1900	U	<	1700	U
Acenaphthene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Acenaphthylene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Acetophenone	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Anthracene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Atrazine	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Benzaldehyde	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Benzo(a)anthracene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Benzo(a)pyrene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Benzo(b)fluoranthene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Benzo(g,h,i)perylene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Benzo(k)fluoranthene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Biphenyl (diphenyl)	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
bis(2-Chloroethoxy)methane	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
bis(2-Chloroethyl)ether	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
bis(2-Ethylhexyl)phthalate	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Butylbenzylphthalate	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Caprolactam	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Carbazole	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Chrysene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Dibenz(a,h)anthracene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Dibenzofuran	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Diethylphthalate	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Dimethylphthalate	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Di-n-butylphthalate	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Di-n-octylphthalate	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Fluoranthene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Fluorene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Hexachlorobenzene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Hexachlorobutadiene	ND	0 / 12	<	390	U	<	370	U	<	390	UJ	<	390	UJ	<	360	U
Hexachlorocyclopentadiene	ND	0 / 12	<	390	UJ	<	370	UJ	<	390	UJ	<	390	UJ	<	360	UJ
Hexachloroethane	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAA-SB01-005			CAA-SB01-010			CAA-SB02-020			CAA-SB02-023			CAA-SB03-015		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 17, 2005			February 17, 2005			February 17, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Indeno(1,2,3-cd)pyrene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Isophorone	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Naphthalene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Nitrobenzene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
N-Nitroso-di-n-propylamine	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
N-Nitrosodiphenylamine	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Pentachlorophenol	ND	0 / 12	<	1900	U	<	1800	U	<	1900	U	<	1900	U	<	1700	U
Phenanthrene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Phenol	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
Pyrene	ND	0 / 12	<	390	U	<	370	U	<	390	U	<	390	U	<	360	U
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																	
Aroclor 1016	ND	0 / 10															
Aroclor 1221	ND	0 / 10															
Aroclor 1232	ND	0 / 10															
Aroclor 1242	ND	0 / 10															
Aroclor 1248	ND	0 / 10															
Aroclor 1254	ND	0 / 10															
Aroclor 1260	ND	0 / 10															
METALS (mg/kg)																	
Lead	5.9	12 / 12	0.54	0.6	J	0.71	0.6		3.2	0.6		1.4	0.6		5.9	0.6	

Notes:
ND = Not Detected
RL = Reporting Limit
µg/kg = microgram per kilogram
mg/kg = milligram per kilogram
Qual = Qualifier
J = Estimated
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAA-SB03-019			CAA-SB04-020			CAA-SB04-025			CAB-SB01-020			CAB-SB01-024		
DATE COLLECTED			February 17, 2005			February 17, 2005			February 17, 2005			February 16, 2005			February 16, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																	
1,1,1-Trichloroethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,1,2,2-Tetrachloroethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,1,2-Trichloroethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,1-Dichloroethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,1-Dichloroethene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2,4-Trichlorobenzene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2,4-Trimethylbenzene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2-Dibromo-3-Chloropropane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2-Dibromoethane (Ethylene Dibromide)	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2-Dichlorobenzene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2-Dichloroethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2-Dichloroethene (cis)	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2-Dichloroethene (trans)	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,2-Dichloropropane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,3,5-Trimethylbenzene (Mesitylene)	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,3-Dichlorobenzene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
1,4-Dichlorobenzene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
2-Hexanone	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
4-Methyl-2-Pentanone	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Acetone	ND	0 / 12	<	76	UJ	<	58	UJ	<	56	UJ	<	57	U	<	56	U
Benzene	0.9 J	3 / 12	0.9	5.7	J	<	5.8	U	0.8	5.6	J	<	5.7	U	<	5.6	U
Benzyl Chloride	ND	0 / 12	<	23	U	<	23	U	<	22	U	<	23	U	<	23	U
Bromodichloromethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Bromoform	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Bromomethane	2.6 J	3 / 12	<	11	U	<	12	U	<	11	U	2.6	11	J	2	11	J
Carbon Disulfide	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Carbon Tetrachloride	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Chlorobenzene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Chloroethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Chloroform	12	9 / 12	11	5.7		10	5.8		12	5.6		12	5.7		<	5.6	U
Chloromethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
cis-1,3-Dichloropropene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Cyclohexane	3.5 J	9 / 12	3	5.7	J	2.9	5.8	J	3.5	5.6	J	3.5	5.7	J	<	5.6	U
Dibromochloromethane	6	9 / 12	4.7	5.7	J	3.3	5.8	J	5.4	5.6	J	5.4	5.7	J	<	5.6	U
Dichlorodifluoromethane	ND	0 / 12	<	11	U	<	12	U	<	11	U	<	11	U	<	11	U

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAA-SB03-019			CAA-SB04-020			CAA-SB04-025			CAB-SB01-020			CAB-SB01-024		
DATE COLLECTED			February 17, 2005			February 17, 2005			February 17, 2005			February 16, 2005			February 16, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Ethylbenzene	1.1 J	3 / 12	0.9	5.7	J	<	5.8	U	1.1	5.6	J	<	5.7	U	<	5.6	U
Hexachlorobutadiene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Isopropylbenzene (Cumene)	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
m,p-Xylene (sum of isomers)	3.9 J	8 / 12	3	5.7	J	2.3	5.8	J	3.9	5.6	J	2.9	5.7	J	<	5.6	U
Methylcyclohexane	13 J	9 / 12	9.3	23	J	9.1	23	J	13	22	J	11	23	J	<	23	U
Methyl Acetate	8.8 J	6 / 12	8.8	11	J	5.2	12	J	<	11	U	<	11	U	1.3	11	J
Methyl Ethyl Ketone (2-Butanone)	ND	0 / 12	<	6	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Methyl t-Butyl Ether	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Methylene Chloride	ND	0 / 12	<	57	UJ	<	58	UJ	<	56	UJ	<	60	U	<	56	U
o-Xylene (1,2-Dimethylbenzene)	0.7 J	3 / 12	0.7	5.7	J	<	5.8	U	0.7	5.6	J	<	5.7	U	<	5.6	U
Styrene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Tetrachloroethene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Toluene	47	12 / 12	37	5.7		30	5.8		47	5.6		40	5.7		4.7	5.6	J
trans-1,3-Dichloropropene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Trichloroethene	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Trichlorofluoromethane	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
Vinyl Acetate	ND	0 / 12	<	11	U	<	12	U	<	11	U	<	11	U	<	11	U
Vinyl Chloride	ND	0 / 12	<	5.7	U	<	5.8	U	<	5.6	U	<	5.7	U	<	5.6	U
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																	
2,2-Oxybis(1-chloro)propane	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2,4,5-Trichlorophenol	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2,4,6-Trichlorophenol	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2,4-Dichlorophenol	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2,4-Dimethylphenol	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2,4-Dinitrophenol	ND	0 / 12	<	1800	U	<	1800	U	<	1800	U	<	1800	U	<	1800	U
2,4-Dinitrotoluene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2,6-Dinitrotoluene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2-Chloronaphthalene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2-Chlorophenol	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2-Methylnaphthalene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2-Methylphenol (o-cresol)	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
2-Nitroaniline	ND	0 / 12	<	750	U	<	760	U	<	740	U	<	750	U	<	740	U
2-Nitrophenol	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
3,3-Dichlorobenzidine	ND	0 / 12	<	750	U	<	760	U	<	740	U	<	750	U	<	740	U
3-Nitroaniline	ND	0 / 12	<	750	U	<	760	U	<	740	U	<	750	U	<	740	U
4,6-Dinitro-2-methylphenol	ND	0 / 12	<	1800	U	<	1800	U	<	1800	U	<	1800	U	<	1800	U
4-Bromophenyl-phenylether	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAA-SB03-019			CAA-SB04-020			CAA-SB04-025			CAB-SB01-020			CAB-SB01-024		
DATE COLLECTED			February 17, 2005			February 17, 2005			February 17, 2005			February 16, 2005			February 16, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
4-Chloro-3-methylphenol	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
4-Chloroaniline	ND	0 / 12	<	750	U	<	760	U	<	740	U	<	750	U	<	740	U
4-Chlorophenyl-phenylether	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
4-Methylphenol (p-cresol)	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
4-Nitroaniline	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
4-Nitrophenol	ND	0 / 12	<	1800	U	<	1800	U	<	1800	U	<	1800	U	<	1800	U
Acenaphthene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Acenaphthylene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Acetophenone	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Anthracene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Atrazine	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Benzaldehyde	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Benzo(a)anthracene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Benzo(a)pyrene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Benzo(b)fluoranthene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Benzo(g,h,i)perylene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Benzo(k)fluoranthene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Biphenyl (diphenyl)	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
bis(2-Chloroethoxy)methane	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
bis(2-Chloroethyl)ether	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
bis(2-Ethylhexyl)phthalate	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Butylbenzylphthalate	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Caprolactam	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Carbazole	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Chrysene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Dibenz(a,h)anthracene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Dibenzofuran	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Diethylphthalate	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Dimethylphthalate	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Di-n-butylphthalate	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	2600	U	<	370	U
Di-n-octylphthalate	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Fluoranthene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Fluorene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Hexachlorobenzene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Hexachlorobutadiene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Hexachlorocyclopentadiene	ND	0 / 12	<	370	UJ	<	380	UJ	<	370	UJ	<	380	UJ	<	370	UJ
Hexachloroethane	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAA-SB03-019			CAA-SB04-020			CAA-SB04-025			CAB-SB01-020			CAB-SB01-024		
DATE COLLECTED			February 17, 2005			February 17, 2005			February 17, 2005			February 16, 2005			February 16, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Indeno(1,2,3-cd)pyrene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Isophorone	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Naphthalene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Nitrobenzene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
N-Nitroso-di-n-propylamine	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
N-Nitrosodiphenylamine	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Pentachlorophenol	ND	0 / 12	<	1800	U	<	1800	U	<	1800	U	<	1800	U	<	1800	U
Phenanthrene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Phenol	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
Pyrene	ND	0 / 12	<	370	U	<	380	U	<	370	U	<	380	U	<	370	U
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																	
Aroclor 1016	ND	0 / 10															
Aroclor 1221	ND	0 / 10															
Aroclor 1232	ND	0 / 10															
Aroclor 1242	ND	0 / 10															
Aroclor 1248	ND	0 / 10															
Aroclor 1254	ND	0 / 10															
Aroclor 1260	ND	0 / 10															
METALS (mg/kg)																	
Lead	5.9	12 / 12	1.7	0.6		1.4	0.6		4.4	0.6		3.1	0.6		0.79	0.6	

Notes:
ND = Not Detected
RL = Reporting Limit
µg/kg = microgram per kilogram
mg/kg = milligram per kilogram
Qual = Qualifier
J = Estimated
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAB-SB02-019			CAB-SB02-024			CAC-SB01-000			CAC-SB01-005			CAC-SB01-010		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																	
1,1,1-Trichloroethane	ND	0 / 12	<	5.7	U	<	5.7	U									
1,1,2,2-Tetrachloroethane	ND	0 / 12	<	5.7	U	<	5.7	U									
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	0 / 12	<	5.7	U	<	5.7	U									
1,1,2-Trichloroethane	ND	0 / 12	<	5.7	U	<	5.7	U									
1,1-Dichloroethane	ND	0 / 12	<	5.7	U	<	5.7	U									
1,1-Dichloroethene	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2,4-Trichlorobenzene	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2,4-Trimethylbenzene	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2-Dibromo-3-Chloropropane	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2-Dibromoethane (Ethylene Dibromide)	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2-Dichlorobenzene	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2-Dichloroethane	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2-Dichloroethene (cis)	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2-Dichloroethene (trans)	ND	0 / 12	<	5.7	U	<	5.7	U									
1,2-Dichloropropane	ND	0 / 12	<	5.7	U	<	5.7	U									
1,3,5-Trimethylbenzene (Mesitylene)	ND	0 / 12	<	5.7	U	<	5.7	U									
1,3-Dichlorobenzene	ND	0 / 12	<	5.7	U	<	5.7	U									
1,4-Dichlorobenzene	ND	0 / 12	<	5.7	U	<	5.7	U									
2-Hexanone	ND	0 / 12	<	5.7	U	<	5.7	U									
4-Methyl-2-Pentanone	ND	0 / 12	<	5.7	U	<	5.7	U									
Acetone	ND	0 / 12	<	57	U	<	57	U									
Benzene	0.9 J	3 / 12	<	5.7	U	<	5.7	U									
Benzyl Chloride	ND	0 / 12	<	23	U	<	23	U									
Bromodichloromethane	ND	0 / 12	<	5.7	U	<	5.7	U									
Bromoform	ND	0 / 12	<	5.7	U	<	5.7	U									
Bromomethane	2.6 J	3 / 12	<	11	U	<	11	U									
Carbon Disulfide	ND	0 / 12	<	5.7	U	<	5.7	U									
Carbon Tetrachloride	ND	0 / 12	<	5.7	U	<	5.7	U									
Chlorobenzene	ND	0 / 12	<	5.7	U	<	5.7	U									
Chloroethane	ND	0 / 12	<	5.7	U	<	5.7	U									
Chloroform	12	9 / 12	<	5.7	U	11	5.7										
Chloromethane	ND	0 / 12	<	5.7	U	<	5.7	U									
cis-1,3-Dichloropropene	ND	0 / 12	<	5.7	U	<	5.7	U									
Cyclohexane	3.5 J	9 / 12	<	5.7	U	2.9	5.7	J									
Dibromochloromethane	6	9 / 12	<	5.7	U	4.5	5.7	J									
Dichlorodifluoromethane	ND	0 / 12	<	11	U	<	11	U									

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAB-SB02-019			CAB-SB02-024			CAC-SB01-000			CAC-SB01-005			CAC-SB01-010		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Ethylbenzene	1.1 J	3 / 12	<	5.7	U	<	5.7	U									
Hexachlorobutadiene	ND	0 / 12	<	5.7	U	<	5.7	U									
Isopropylbenzene (Cumene)	ND	0 / 12	<	5.7	U	<	5.7	U									
m,p-Xylene (sum of isomers)	3.9 J	8 / 12	<	5.7	U	2.1	5.7	J									
Methylcyclohexane	13 J	9 / 12	<	23	U	9.1	23	J									
Methyl Acetate	8.8 J	6 / 12	<	11	U	<	11	U									
Methyl Ethyl Ketone (2-Butanone)	ND	0 / 12	<	5.7	U	<	5.7	U									
Methyl t-Butyl Ether	ND	0 / 12	<	5.7	U	<	5.7	U									
Methylene Chloride	ND	0 / 12	<	57	U	<	57	U									
o-Xylene (1,2-Dimethylbenzene)	0.7 J	3 / 12	<	5.7	U	<	5.7	U									
Styrene	ND	0 / 12	<	5.7	U	<	5.7	U									
Tetrachloroethene	ND	0 / 12	<	5.7	U	<	5.7	U									
Toluene	47	12 / 12	1.5	5.7	J	33	5.7										
trans-1,3-Dichloropropene	ND	0 / 12	<	5.7	U	<	5.7	U									
Trichloroethene	ND	0 / 12	<	5.7	U	<	5.7	U									
Trichlorofluoromethane	ND	0 / 12	<	5.7	U	<	5.7	U									
Vinyl Acetate	ND	0 / 12	<	11	U	<	11	U									
Vinyl Chloride	ND	0 / 12	<	5.7	U	<	5.7	U									
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																	
2,2-Oxybis(1-chloro)propane	ND	0 / 12	<	380	U	<	380	U									
2,4,5-Trichlorophenol	ND	0 / 12	<	380	U	<	380	U									
2,4,6-Trichlorophenol	ND	0 / 12	<	380	U	<	380	U									
2,4-Dichlorophenol	ND	0 / 12	<	380	U	<	380	U									
2,4-Dimethylphenol	ND	0 / 12	<	380	U	<	380	U									
2,4-Dinitrophenol	ND	0 / 12	<	1800	U	<	1800	U									
2,4-Dinitrotoluene	ND	0 / 12	<	380	U	<	380	U									
2,6-Dinitrotoluene	ND	0 / 12	<	380	U	<	380	U									
2-Chloronaphthalene	ND	0 / 12	<	380	U	<	380	U									
2-Chlorophenol	ND	0 / 12	<	380	U	<	380	U									
2-Methylnaphthalene	ND	0 / 12	<	380	U	<	380	U									
2-Methylphenol (o-cresol)	ND	0 / 12	<	380	U	<	380	U									
2-Nitroaniline	ND	0 / 12	<	760	U	<	750	U									
2-Nitrophenol	ND	0 / 12	<	380	U	<	380	U									
3,3-Dichlorobenzidine	ND	0 / 12	<	760	U	<	750	U									
3-Nitroaniline	ND	0 / 12	<	760	U	<	750	U									
4,6-Dinitro-2-methylphenol	ND	0 / 12	<	1800	U	<	1800	U									
4-Bromophenyl-phenylether	ND	0 / 12	<	380	U	<	380	U									

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAB-SB02-019			CAB-SB02-024			CAC-SB01-000			CAC-SB01-005			CAC-SB01-010		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
4-Chloro-3-methylphenol	ND	0 / 12	<	380	U	<	380	U									
4-Chloroaniline	ND	0 / 12	<	760	U	<	750	U									
4-Chlorophenyl-phenylether	ND	0 / 12	<	380	U	<	380	U									
4-Methylphenol (p-cresol)	ND	0 / 12	<	380	U	<	380	U									
4-Nitroaniline	ND	0 / 12	<	380	U	<	380	U									
4-Nitrophenol	ND	0 / 12	<	1800	U	<	1800	U									
Acenaphthene	ND	0 / 12	<	380	U	<	380	U									
Acenaphthylene	ND	0 / 12	<	380	U	<	380	U									
Acetophenone	ND	0 / 12	<	380	U	<	380	U									
Anthracene	ND	0 / 12	<	380	U	<	380	U									
Atrazine	ND	0 / 12	<	380	U	<	380	U									
Benzaldehyde	ND	0 / 12	<	380	U	<	380	U									
Benzo(a)anthracene	ND	0 / 12	<	380	U	<	380	U									
Benzo(a)pyrene	ND	0 / 12	<	380	U	<	380	U									
Benzo(b)fluoranthene	ND	0 / 12	<	380	U	<	380	U									
Benzo(g,h,i)perylene	ND	0 / 12	<	380	U	<	380	U									
Benzo(k)fluoranthene	ND	0 / 12	<	380	U	<	380	U									
Biphenyl (diphenyl)	ND	0 / 12	<	380	U	<	380	U									
bis(2-Chloroethoxy)methane	ND	0 / 12	<	380	U	<	380	U									
bis(2-Chloroethyl)ether	ND	0 / 12	<	380	U	<	380	U									
bis(2-Ethylhexyl)phthalate	ND	0 / 12	<	380	U	<	390	U									
Butylbenzylphthalate	ND	0 / 12	<	380	U	<	380	U									
Caprolactam	ND	0 / 12	<	380	U	<	380	U									
Carbazole	ND	0 / 12	<	380	U	<	380	U									
Chrysene	ND	0 / 12	<	380	U	<	380	U									
Dibenz(a,h)anthracene	ND	0 / 12	<	380	U	<	380	U									
Dibenzofuran	ND	0 / 12	<	380	U	<	380	U									
Diethylphthalate	ND	0 / 12	<	380	U	<	380	U									
Dimethylphthalate	ND	0 / 12	<	380	U	<	380	U									
Di-n-butylphthalate	ND	0 / 12	<	380	U	<	380	U									
Di-n-octylphthalate	ND	0 / 12	<	380	U	<	380	U									
Fluoranthene	ND	0 / 12	<	380	U	<	380	U									
Fluorene	ND	0 / 12	<	380	U	<	380	U									
Hexachlorobenzene	ND	0 / 12	<	380	U	<	380	U									
Hexachlorobutadiene	ND	0 / 12	<	380	U	<	380	U									
Hexachlorocyclopentadiene	ND	0 / 12	<	380	UJ	<	380	UJ									
Hexachloroethane	ND	0 / 12	<	380	U	<	380	U									

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAB-SB02-019			CAB-SB02-024			CAC-SB01-000			CAC-SB01-005			CAC-SB01-010		
DATE COLLECTED			February 16, 2005			February 16, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Indeno(1,2,3-cd)pyrene	ND	0 / 12	<	380	U	<	380	U									
Isophorone	ND	0 / 12	<	380	U	<	380	U									
Naphthalene	ND	0 / 12	<	380	U	<	380	U									
Nitrobenzene	ND	0 / 12	<	380	U	<	380	U									
N-Nitroso-di-n-propylamine	ND	0 / 12	<	380	U	<	380	U									
N-Nitrosodiphenylamine	ND	0 / 12	<	380	U	<	380	U									
Pentachlorophenol	ND	0 / 12	<	1800	U	<	1800	U									
Phenanthrene	ND	0 / 12	<	380	U	<	380	U									
Phenol	ND	0 / 12	<	380	U	<	380	U									
Pyrene	ND	0 / 12	<	380	U	<	380	U									
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																	
Aroclor 1016	ND	0 / 10							<	560	U	<	540	U	<	530	U
Aroclor 1221	ND	0 / 10							<	560	U	<	540	U	<	530	U
Aroclor 1232	ND	0 / 10							<	560	U	<	540	U	<	530	U
Aroclor 1242	ND	0 / 10							<	560	U	<	540	U	<	530	U
Aroclor 1248	ND	0 / 10							<	560	U	<	540	U	<	530	U
Aroclor 1254	ND	0 / 10							<	560	U	<	540	U	<	530	U
Aroclor 1260	ND	0 / 10							<	560	U	<	540	U	<	530	U
METALS (mg/kg)																	
Lead	5.9	12 / 12	0.21	0.6	J	0.75	0.6										

Notes:
ND = Not Detected
RL = Reporting Limit
µg/kg = microgram per kilogram
mg/kg = milligram per kilogram
Qual = Qualifier
J = Estimated
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAC-SB01-015			CAC-SB02-000			CAC-SB02-005			CAC-SB02-010			CAC-SB03-000		
DATE COLLECTED			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																	
1,1,1-Trichloroethane	ND	0 / 12															
1,1,2,2-Tetrachloroethane	ND	0 / 12															
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	0 / 12															
1,1,2-Trichloroethane	ND	0 / 12															
1,1-Dichloroethane	ND	0 / 12															
1,1-Dichloroethene	ND	0 / 12															
1,2,4-Trichlorobenzene	ND	0 / 12															
1,2,4-Trimethylbenzene	ND	0 / 12															
1,2-Dibromo-3-Chloropropane	ND	0 / 12															
1,2-Dibromoethane (Ethylene Dibromide)	ND	0 / 12															
1,2-Dichlorobenzene	ND	0 / 12															
1,2-Dichloroethane	ND	0 / 12															
1,2-Dichloroethene (cis)	ND	0 / 12															
1,2-Dichloroethene (trans)	ND	0 / 12															
1,2-Dichloropropane	ND	0 / 12															
1,3,5-Trimethylbenzene (Mesitylene)	ND	0 / 12															
1,3-Dichlorobenzene	ND	0 / 12															
1,4-Dichlorobenzene	ND	0 / 12															
2-Hexanone	ND	0 / 12															
4-Methyl-2-Pentanone	ND	0 / 12															
Acetone	ND	0 / 12															
Benzene	0.9 J	3 / 12															
Benzyl Chloride	ND	0 / 12															
Bromodichloromethane	ND	0 / 12															
Bromoform	ND	0 / 12															
Bromomethane	2.6 J	3 / 12															
Carbon Disulfide	ND	0 / 12															
Carbon Tetrachloride	ND	0 / 12															
Chlorobenzene	ND	0 / 12															
Chloroethane	ND	0 / 12															
Chloroform	12	9 / 12															
Chloromethane	ND	0 / 12															
cis-1,3-Dichloropropene	ND	0 / 12															
Cyclohexane	3.5 J	9 / 12															
Dibromochloromethane	6	9 / 12															
Dichlorodifluoromethane	ND	0 / 12															

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAC-SB01-015			CAC-SB02-000			CAC-SB02-005			CAC-SB02-010			CAC-SB03-000		
DATE COLLECTED			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Ethylbenzene	1.1 J	3 / 12															
Hexachlorobutadiene	ND	0 / 12															
Isopropylbenzene (Cumene)	ND	0 / 12															
m,p-Xylene (sum of isomers)	3.9 J	8 / 12															
Methylcyclohexane	13 J	9 / 12															
Methyl Acetate	8.8 J	6 / 12															
Methyl Ethyl Ketone (2-Butanone)	ND	0 / 12															
Methyl t-Butyl Ether	ND	0 / 12															
Methylene Chloride	ND	0 / 12															
o-Xylene (1,2-Dimethylbenzene)	0.7 J	3 / 12															
Styrene	ND	0 / 12															
Tetrachloroethene	ND	0 / 12															
Toluene	47	12 / 12															
trans-1,3-Dichloropropene	ND	0 / 12															
Trichloroethene	ND	0 / 12															
Trichlorofluoromethane	ND	0 / 12															
Vinyl Acetate	ND	0 / 12															
Vinyl Chloride	ND	0 / 12															
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																	
2,2-Oxybis(1-chloro)propane	ND	0 / 12															
2,4,5-Trichlorophenol	ND	0 / 12															
2,4,6-Trichlorophenol	ND	0 / 12															
2,4-Dichlorophenol	ND	0 / 12															
2,4-Dimethylphenol	ND	0 / 12															
2,4-Dinitrophenol	ND	0 / 12															
2,4-Dinitrotoluene	ND	0 / 12															
2,6-Dinitrotoluene	ND	0 / 12															
2-Chloronaphthalene	ND	0 / 12															
2-Chlorophenol	ND	0 / 12															
2-Methylnaphthalene	ND	0 / 12															
2-Methylphenol (o-cresol)	ND	0 / 12															
2-Nitroaniline	ND	0 / 12															
2-Nitrophenol	ND	0 / 12															
3,3-Dichlorobenzidine	ND	0 / 12															
3-Nitroaniline	ND	0 / 12															
4,6-Dinitro-2-methylphenol	ND	0 / 12															
4-Bromophenyl-phenylether	ND	0 / 12															

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAC-SB01-015			CAC-SB02-000			CAC-SB02-005			CAC-SB02-010			CAC-SB03-000		
DATE COLLECTED			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
4-Chloro-3-methylphenol	ND	0 / 12															
4-Chloroaniline	ND	0 / 12															
4-Chlorophenyl-phenylether	ND	0 / 12															
4-Methylphenol (p-cresol)	ND	0 / 12															
4-Nitroaniline	ND	0 / 12															
4-Nitrophenol	ND	0 / 12															
Acenaphthene	ND	0 / 12															
Acenaphthylene	ND	0 / 12															
Acetophenone	ND	0 / 12															
Anthracene	ND	0 / 12															
Atrazine	ND	0 / 12															
Benzaldehyde	ND	0 / 12															
Benzo(a)anthracene	ND	0 / 12															
Benzo(a)pyrene	ND	0 / 12															
Benzo(b)fluoranthene	ND	0 / 12															
Benzo(g,h,i)perylene	ND	0 / 12															
Benzo(k)fluoranthene	ND	0 / 12															
Biphenyl (diphenyl)	ND	0 / 12															
bis(2-Chloroethoxy)methane	ND	0 / 12															
bis(2-Chloroethyl)ether	ND	0 / 12															
bis(2-Ethylhexyl)phthalate	ND	0 / 12															
Butylbenzylphthalate	ND	0 / 12															
Caprolactam	ND	0 / 12															
Carbazole	ND	0 / 12															
Chrysene	ND	0 / 12															
Dibenz(a,h)anthracene	ND	0 / 12															
Dibenzofuran	ND	0 / 12															
Diethylphthalate	ND	0 / 12															
Dimethylphthalate	ND	0 / 12															
Di-n-butylphthalate	ND	0 / 12															
Di-n-octylphthalate	ND	0 / 12															
Fluoranthene	ND	0 / 12															
Fluorene	ND	0 / 12															
Hexachlorobenzene	ND	0 / 12															
Hexachlorobutadiene	ND	0 / 12															
Hexachlorocyclopentadiene	ND	0 / 12															
Hexachloroethane	ND	0 / 12															

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAC-SB01-015			CAC-SB02-000			CAC-SB02-005			CAC-SB02-010			CAC-SB03-000		
DATE COLLECTED			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Indeno(1,2,3-cd)pyrene	ND	0 / 12															
Isophorone	ND	0 / 12															
Naphthalene	ND	0 / 12															
Nitrobenzene	ND	0 / 12															
N-Nitroso-di-n-propylamine	ND	0 / 12															
N-Nitrosodiphenylamine	ND	0 / 12															
Pentachlorophenol	ND	0 / 12															
Phenanthrene	ND	0 / 12															
Phenol	ND	0 / 12															
Pyrene	ND	0 / 12															
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																	
Aroclor 1016	ND	0 / 10	<	560	U	<	550	U	<	550	U	<	540	UJ	<	560	U
Aroclor 1221	ND	0 / 10	<	560	U	<	550	U	<	550	U	<	540	UJ	<	560	U
Aroclor 1232	ND	0 / 10	<	560	U	<	550	U	<	550	U	<	540	UJ	<	560	U
Aroclor 1242	ND	0 / 10	<	560	U	<	550	U	<	550	U	<	540	UJ	<	560	U
Aroclor 1248	ND	0 / 10	<	560	U	<	550	U	<	550	U	<	540	UJ	<	560	U
Aroclor 1254	ND	0 / 10	<	560	U	<	550	U	<	550	U	<	540	UJ	<	560	U
Aroclor 1260	ND	0 / 10	<	560	U	<	550	U	<	550	U	<	540	UJ	<	560	U
METALS (mg/kg)																	
Lead	5.9	12 / 12															

Notes:
ND = Not Detected
RL = Reporting Limit
µg/kg = microgram per kilogram
mg/kg = milligram per kilogram
Qual = Qualifier
J = Estimated
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAC-SB03-005			CAC-SB03-010		
DATE COLLECTED			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)								
1,1,1-Trichloroethane	ND	0 / 12						
1,1,2,2-Tetrachloroethane	ND	0 / 12						
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	0 / 12						
1,1,2-Trichloroethane	ND	0 / 12						
1,1-Dichloroethane	ND	0 / 12						
1,1-Dichloroethene	ND	0 / 12						
1,2,4-Trichlorobenzene	ND	0 / 12						
1,2,4-Trimethylbenzene	ND	0 / 12						
1,2-Dibromo-3-Chloropropane	ND	0 / 12						
1,2-Dibromoethane (Ethylene Dibromide)	ND	0 / 12						
1,2-Dichlorobenzene	ND	0 / 12						
1,2-Dichloroethane	ND	0 / 12						
1,2-Dichloroethene (cis)	ND	0 / 12						
1,2-Dichloroethene (trans)	ND	0 / 12						
1,2-Dichloropropane	ND	0 / 12						
1,3,5-Trimethylbenzene (Mesitylene)	ND	0 / 12						
1,3-Dichlorobenzene	ND	0 / 12						
1,4-Dichlorobenzene	ND	0 / 12						
2-Hexanone	ND	0 / 12						
4-Methyl-2-Pentanone	ND	0 / 12						
Acetone	ND	0 / 12						
Benzene	0.9 J	3 / 12						
Benzyl Chloride	ND	0 / 12						
Bromodichloromethane	ND	0 / 12						
Bromoform	ND	0 / 12						
Bromomethane	2.6 J	3 / 12						
Carbon Disulfide	ND	0 / 12						
Carbon Tetrachloride	ND	0 / 12						
Chlorobenzene	ND	0 / 12						
Chloroethane	ND	0 / 12						
Chloroform	12	9 / 12						
Chloromethane	ND	0 / 12						
cis-1,3-Dichloropropene	ND	0 / 12						
Cyclohexane	3.5 J	9 / 12						
Dibromochloromethane	6	9 / 12						
Dichlorodifluoromethane	ND	0 / 12						

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAC-SB03-005			CAC-SB03-010		
DATE COLLECTED			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
Ethylbenzene	1.1 J	3 / 12						
Hexachlorobutadiene	ND	0 / 12						
Isopropylbenzene (Cumene)	ND	0 / 12						
m,p-Xylene (sum of isomers)	3.9 J	8 / 12						
Methylcyclohexane	13 J	9 / 12						
Methyl Acetate	8.8 J	6 / 12						
Methyl Ethyl Ketone (2-Butanone)	ND	0 / 12						
Methyl t-Butyl Ether	ND	0 / 12						
Methylene Chloride	ND	0 / 12						
o-Xylene (1,2-Dimethylbenzene)	0.7 J	3 / 12						
Styrene	ND	0 / 12						
Tetrachloroethene	ND	0 / 12						
Toluene	47	12 / 12						
trans-1,3-Dichloropropene	ND	0 / 12						
Trichloroethene	ND	0 / 12						
Trichlorofluoromethane	ND	0 / 12						
Vinyl Acetate	ND	0 / 12						
Vinyl Chloride	ND	0 / 12						
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)								
2,2-Oxybis(1-chloro)propane	ND	0 / 12						
2,4,5-Trichlorophenol	ND	0 / 12						
2,4,6-Trichlorophenol	ND	0 / 12						
2,4-Dichlorophenol	ND	0 / 12						
2,4-Dimethylphenol	ND	0 / 12						
2,4-Dinitrophenol	ND	0 / 12						
2,4-Dinitrotoluene	ND	0 / 12						
2,6-Dinitrotoluene	ND	0 / 12						
2-Chloronaphthalene	ND	0 / 12						
2-Chlorophenol	ND	0 / 12						
2-Methylnaphthalene	ND	0 / 12						
2-Methylphenol (o-cresol)	ND	0 / 12						
2-Nitroaniline	ND	0 / 12						
2-Nitrophenol	ND	0 / 12						
3,3-Dichlorobenzidine	ND	0 / 12						
3-Nitroaniline	ND	0 / 12						
4,6-Dinitro-2-methylphenol	ND	0 / 12						
4-Bromophenyl-phenylether	ND	0 / 12						

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAC-SB03-005			CAC-SB03-010		
DATE COLLECTED			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
4-Chloro-3-methylphenol	ND	0 / 12						
4-Chloroaniline	ND	0 / 12						
4-Chlorophenyl-phenylether	ND	0 / 12						
4-Methylphenol (p-cresol)	ND	0 / 12						
4-Nitroaniline	ND	0 / 12						
4-Nitrophenol	ND	0 / 12						
Acenaphthene	ND	0 / 12						
Acenaphthylene	ND	0 / 12						
Acetophenone	ND	0 / 12						
Anthracene	ND	0 / 12						
Atrazine	ND	0 / 12						
Benzaldehyde	ND	0 / 12						
Benzo(a)anthracene	ND	0 / 12						
Benzo(a)pyrene	ND	0 / 12						
Benzo(b)fluoranthene	ND	0 / 12						
Benzo(g,h,i)perylene	ND	0 / 12						
Benzo(k)fluoranthene	ND	0 / 12						
Biphenyl (diphenyl)	ND	0 / 12						
bis(2-Chloroethoxy)methane	ND	0 / 12						
bis(2-Chloroethyl)ether	ND	0 / 12						
bis(2-Ethylhexyl)phthalate	ND	0 / 12						
Butylbenzylphthalate	ND	0 / 12						
Caprolactam	ND	0 / 12						
Carbazole	ND	0 / 12						
Chrysene	ND	0 / 12						
Dibenz(a,h)anthracene	ND	0 / 12						
Dibenzofuran	ND	0 / 12						
Diethylphthalate	ND	0 / 12						
Dimethylphthalate	ND	0 / 12						
Di-n-butylphthalate	ND	0 / 12						
Di-n-octylphthalate	ND	0 / 12						
Fluoranthene	ND	0 / 12						
Fluorene	ND	0 / 12						
Hexachlorobenzene	ND	0 / 12						
Hexachlorobutadiene	ND	0 / 12						
Hexachlorocyclopentadiene	ND	0 / 12						
Hexachloroethane	ND	0 / 12						

TABLE C-1
SUMMARY OF ANALYTICAL DATA

FIELD ID			CAC-SB03-005			CAC-SB03-010		
DATE COLLECTED			February 15, 2005			February 15, 2005		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
Indeno(1,2,3-cd)pyrene	ND	0 / 12						
Isophorone	ND	0 / 12						
Naphthalene	ND	0 / 12						
Nitrobenzene	ND	0 / 12						
N-Nitroso-di-n-propylamine	ND	0 / 12						
N-Nitrosodiphenylamine	ND	0 / 12						
Pentachlorophenol	ND	0 / 12						
Phenanthrene	ND	0 / 12						
Phenol	ND	0 / 12						
Pyrene	ND	0 / 12						
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)								
Aroclor 1016	ND	0 / 10	<	560	U	<	540	U
Aroclor 1221	ND	0 / 10	<	560	U	<	540	U
Aroclor 1232	ND	0 / 10	<	560	U	<	540	U
Aroclor 1242	ND	0 / 10	<	560	U	<	540	U
Aroclor 1248	ND	0 / 10	<	560	U	<	540	U
Aroclor 1254	ND	0 / 10	<	560	U	<	540	U
Aroclor 1260	ND	0 / 10	<	560	U	<	540	U
METALS (mg/kg)								
Lead	5.9	12 / 12						

Notes:
ND = Not Detected
RL = Reporting Limit
µg/kg = microgram per kilogram
mg/kg = milligram per kilogram
Qual = Qualifier
J = Estimated
U = Nondetect
UJ = Estimated Nondetect
The calculation of detection frequency does not include results from reanalyzed samples.

URS Corporation

12120 Shamrock Plaza Suite 300, Omaha, NE 68154 (402) 334-8181 Fax (402) 334-1984

CHAIN OF CUSTODY RECORD

Project Name: Supplemental Assessment AOCs A, B, C

Project No.:

Project Location:

Project Manager:

Sampler(s):

Analytical Parameters

Sample Date	Sample Time	Type Comp.	Type Grab	Sample Identification	Matrix	Containers No.	Containers Type												Remarks
2/16/05	1132	X		CAB-SB01-020		1	4oz glass		X	X									
2/16/05	1132		X	CAB-SB01-020		3	5g encore	X											
2/16/05	1152	X		CAB-SB01-024		1	4oz glass		X	X									
2/16/05	1152		X	CAB-SB01-024		3	5g encore	X											
2/16/05	1345	X		CAB-SB02-019		1	4oz glass		X	X									
2/16/05	1345		X	CAB-SB02-019		3	5g encore	X											
2/16/05	1407	X		CAB-SB02-024		1	4oz glass		X	X									
2/16/05	1407		X	CAB-SB02-024		3	5g encore	X											
2/16/05	1512	X		CAA-SB01-005		1	4oz glass		X	X									
2/16/05	1512		X	CAA-SB01-005		3	5g encore	X											
2/16/05	1522	X		CAA-SB01-010		1	4oz glass		X	X									
2/16/05	1522		X	CAA-SB01-010		3	5g encore	X											
							2/16/05												

Signatures	Date	Time	Shipping Details	Special Instructions
Relinquished by:	2/16/05	1700	Method of Shipment: Federal Express	
Received by:			Airbill No.: 8456-9925-1359	
Relinquished by:			Lab Address: [illegible]	
Received for Laboratory by:				

Custody.frm/jdg 3-09-92

White copy - Laboratory Yellow copy - Laboratory Pink copy - WCC

119240

URS Corporation

12120 Shamrock Plaza Suite 300, Omaha, NE 68154 (402) 334-8181 Fax (402) 334-1984

CHAIN OF CUSTODY RECORD

Project Name: Supplemental Assessment AOC's Cannon AFB NM

Project No.: 16169869.00002

Project Location: Clovis, NM

Project Manager: Steve Cox

Sampler(s): Michael Sanderman, Lee Todd

Sample Date	Sample Time	Type Comp.	Type Grab	Sample Identification	Matrix	Containers No.	Containers Type	TCL PCBs (8082)	Remarks
2/15/05	1416	X		CAC-SB01-000	Soil	1	4oz Glass	X	4°C
2/15/05	1428	X		CAC-SB01-005		1		X	
2/15/05	1445	X		CAC-SB01-010		1		X	
2/15/05	1505	X		CAC-SB01-115		1		X	MS/MSD
2/15/05	1505	X		CAC-SB01-015		1		X	
2/15/05	1538	X		CAC-SB02-000		1		X	
2/15/05	0838	X		CAC-SB02-100		1		X	
2/15/05	1549	X		CAC-SB02-005		1		X	
2/15/05	1558	X		CAC-SB02-010		1		X	
~~2/15/05~~		~~X~~		~~CAC-SB02-0~~		~~1~~		~~X~~	LT
2/15/05	1716	X		CAC-SB03-000	Soil	1	4oz Glass	X	4°C
2/15/05	1724	X		CAC-SB03-005		1		X	
2/15/05	1736	X		CAC-SB03-010		1		X	
				~~CAC-SB0~~					LT

Signatures	Date	Time	Shipping Details	Special Instructions
Relinquished by: [signature]	2/16/05	1700	Method of Shipment: Fed Ex priority overnight	
Received by:			Airbill No.: 8456-9925-1359	
Relinquished by:			Lab Address: Agriculture & Priority Pollutants Laboratories, Inc 4203 West Swift Fresno, CA 93722 559-275-2175	
Received for Laboratory by:				

Custody.frm/jdg 3-09-92

White copy - Laboratory Yellow copy - Laboratory Pink copy - WCC

119244

URS Corporation

12120 Shamrock Plaza Suite 300, Omaha, NE 68154 (402) 334-8181 Fax (402) 334-1984

CHAIN OF CUSTODY RECORD

Project Name: Cannon AFB Supplemental Assessment AOCs A, B, C

Project No.: 16169869.00002

Project Location: Clovis, NM

Project Manager: Steve Cox

Sampler(s): Michael Sanderman, Lee Todd

Analytical Parameters: TCL VOCs (8260B), TCL SVOCs (8270C), Lead (6010B)

Sample Date	Sample Time	Type Comp.	Type Grab	Sample Identification	Matrix	Containers No.	Containers Type	TCL VOCs (8260B)	TCL SVOCs (8270C)	Lead (6010B)	Remarks
2/17/05	0839	X		CAA-SB02-020	Soil	1	4oz glass		X	X	4°C
2/17/05	0839		X	CAA-SB02-020		3	5g encores	X			
2/17/05	0730	X		CAA-SB02-220		1	4oz glass		X	X	
2/17/05	0730		X	CAA-SB02-220		3	5g encores	X			
2/17/05	0857	X	X	CAA-SB02-023		1	4oz glass		X	X	
2/17/05	0857		X	CAA-SB02-023		3	5g encores	X			
2/17/05	1058	X	X	CAA-SB03-015		1	4oz glass		X	X	
2/17/05	1058		X	CAA-SB03-015		3	5g encores	X			
2/17/05	1111	X		CAA-SB03-019		1	4oz glass		X	X	
2/17/05	1111		X	CAA-SB03-019		3	5g encores	X			
2/17/05	1418	X		CAA-~~SB03~~ SB04-020		1	4oz glass		X	X	
2/17/05	1418		X	CAA-~~SB03~~ SB04-020		3	5g encores	X			
2/17/05	1418	X		CAA-SB04-120		1	4oz glass		X	X	MS/MSD
2/17/05	1418		X	CAA-SB04-120		3	5g encores	X			MS/MSD

Signatures	Date	Time	Shipping Details	Special Instructions
Relinquished by: [signature]	2/17/05	1700	Method of Shipment: FedEx Priority overnight	
Received by:			Airbill No.: 8456-9925-1337	
Relinquished by:			Lab Address: APPL, 4203 West Swift, Fresno, CA 93722, 559-275-2175	
Received for Laboratory by:				

URS Corporation

12120 Shamrock Plaza Suite 300, Omaha, NE 68154 (402) 334-8181 Fax (402) 334-1984

CHAIN OF CUSTODY RECORD

Project Name: Cannon AFB Supplemental Assessment ABCS A,B&C

Project No.: 16169869.00002

Project Location: Clovis, NM

Project Manager: Steve Cox

Sampler(s): Michael Sinderman, Lee Todd

Analytical Parameters: TCL VOCs (8260b); TCL SVOCs (8270C); Lead (6010B)

Sample Date	Sample Time	Type Comp.	Type Grab	Sample Identification	Matrix	Containers No.	Containers Type	TCL VOCs (8260b)	TCL SVOCs (8270C)	Lead (6010B)	Remarks
2/17/05	1430	X		CAA-SB04-025	Soil	1	4oz glass		X	X	4°C
2/17/05	1430		X	CAA-SB04-025	Soil	3	5 encores	X			
		X				1	4oz glass		X	X	LT
			X			3	5 encores	X			LT

Lee Todd 2/17/05

Signatures	Date	Time	Shipping Details	Special Instructions
Relinquished by: Lee Todd	2/17/05	1700	Method of Shipment: Fed Ex Priority overnight	
Received by:			Airbill No. 8456-9925-1337	
Relinquished by:			Lab Address: APPL 4203 West Swift Fresno, CA 93722 559-275-2175	
Received for Laboratory by:				

Custody.frm/jdg 3-09-92

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119245

This appendix presents Tables A-1 and A-2 from

New Mexico Environment Department

Hazardous Waste Bureau

and

Groundwater Quality Bureau

Voluntary Remediation Program

Technical Background Document for Development of Soil Screening Levels

Revision 3.0

August 2005

Chemical	Residential Soil (mg/kg)	End-point	Industrial/ Occupational Soil (mg/kg)	End-point	Construction Worker Soil (mg/kg)	End-point	VOC	Tap Water (ug/L)	End-point	DAF 1 (mg/kg)	DAF 20 (mg/kg)
Acenaphthene	3.19E+01	sat	3.19E+01	sat	3.19E+01	sat	x	3.65E+02	nc	2.75E+00	5.49E+01
Acetaldehyde	3.39E+01	nc	1.23E+02	nc	1.11E+02	nc	x	1.72E+01	ca		
Acetone	1.26E+04	nc	5.30E+04	nc	4.26E+04	nc	x	5.48E+03	nc	9.55E-01	1.91E+01
Acrylonitrile	1.81E+00	ca	4.70E+00	ca	2.10E+01	nc	x	3.81E-01	ca	6.68E-05	1.34E-03
Acetophenone	1.48E+03	sat	1.48E+03	sat	1.48E+03	sat	x	3.65E+03	nc	8.86E-01	1.77E+01
Acrolein	6.51E-02	nc	2.37E-01	nc	2.13E-01	nc	x	4.16E-02	nc	8.55E-06	1.71E-04
Aldrin	2.84E-01	ca	1.12E+00	ca	6.99E+00	nc		3.87E-02	ca	1.42E-01	2.84E+00
Aluminum	7.78E+04	nc	1.00E+05	max	1.44E+04	nc		3.65E+04	nc	5.48E+04	1.10E+06
Anthracene	1.93E+00	sat	1.93E+00	sat	1.93E+00	sat	x	1.83E+03	nc	8.11E+01	1.62E+03
Antimony	3.13E+01	nc	4.54E+02	nc	1.24E+02	nc		1.46E+01	nc	6.61E-01	1.32E+01
Arsenic	3.90E+00	ca	1.77E+01	ca	8.52E+01	nc		4.42E-01	ca	1.46E-02	2.92E-01
Barium	5.45E+03	nc	7.83E+04	nc	1.44E+03	nc		2.56E+03	nc	1.06E+02	2.11E+03
Benzene	3.32E+00	ca	8.08E+00	ca	5.83E+01	nc	x	3.49E+00	ca	1.01E-03	2.02E-02
Benzidine	2.11E-02	ca	8.33E-02	ca	7.09E-01	ca		2.89E-03	ca	1.24E-05	2.47E-04
Benzo(a)anthracene	6.21E+00	ca	2.34E+01	ca	2.12E+02	ca		9.09E-01	ca	5.43E-01	1.09E+01
Benzo(a)pyrene	6.21E-01	ca	2.34E+00	ca	2.12E+01	ca		9.09E-02	ca		2.78E+00
Benzo(b)fluoranthene	6.21E+00	ca	2.34E+01	ca	2.12E+02	ca		9.09E-01	ca	1.68E+00	3.35E+01
Benzo(k)fluoranthene	6.21E+01	ca	2.34E+02	ca	2.12E+03	ca		9.09E+00	ca	1.68E+01	3.35E+02
Beryllium	1.56E+02	nc	2.25E+03	nc	5.62E+01	nc		7.30E+01	nc	5.77E+01	1.15E+03
a-BHC	9.02E-01	ca	3.99E+00	ca	3.00E+01	ca		1.05E-01	ca	2.13E-04	4.25E-03
b-BHC	3.16E+00	ca	1.40E+01	ca	5.39E+01	nc		3.69E-01	ca	7.61E-04	1.52E-02
g-BHC	4.37E+00	ca	1.93E+01	ca	8.09E+01	nc		5.10E-01	ca	9.08E-04	1.82E-02
1,1-Biphenyl	8.91E+01	sat	8.91E+01	sat	8.91E+01	sat	x	3.04E+02	nc	3.61E+00	7.22E+01
Bis(2-chloroethyl) ether	1.05E+00	ca	2.76E+00	ca	5.09E+01	ca	x	9.65E-02	ca	1.90E-05	3.80E-04
Bis(2-chloroisopropyl) ether	4.53E+02	sat	4.53E+02	sat	4.53E+02	sat	x	2.43E+02	nc	6.48E-02	1.30E+00
Bis(2-ethylhexyl) phthalate	3.47E+02	ca	1.37E+03	ca	4.66E+03	nc		4.74E+01	ca	1.07E+03	2.15E+04
Bis(chloromethyl) ether	1.64E-03	ca	4.05E-03	ca	8.55E-02	ca	x	5.09E-04	ca	8.96E-08	1.79E-06
Boron	1.22E+04	nc	1.00E+05	max	2.69E+04	nc		7.30E+03	nc	2.40E+01	4.81E+02
Bromobenzene	1.14E+01	nc	4.16E+01	nc	3.72E+01	nc	x	2.06E+01	nc	1.07E-02	2.15E-01
Bromodichloromethane	4.36E+00	ca	1.07E+01	ca	2.29E+02	ca	x	1.78E+00	ca	4.70E-04	9.41E-03
Bromomethane	2.73E+00	nc	1.01E+01	nc	8.95E+00	nc	x	8.66E+00	nc	1.88E-03	3.77E-02
1,3-Butadiene	3.04E-01	ca	7.27E-01	ca	1.40E+00	nc	x	1.26E+00	ca		

Chemical	Residential Soil (mg/kg)	End-point	Industrial/ Occupational Soil (mg/kg)	End-point	Construction Worker Soil (mg/kg)	End-point	VOC	Tap Water (ug/L)	End-point	DAF 1 (mg/kg)	DAF 20 (mg/kg)
2-Butanone (MEK)	4.86E-03	sat	4.86E-03	sat	4.86E-03	sat	x	7.06E+03	nc	1.27E+00	2.54E+01
tert-Butyl methyl ether (MTBE)	6.67E-03	sat	6.67E-03	sat	6.67E-03	sat	x	6.26E+03	nc		
n-Butylbenzene	6.21E+01	sat	6.21E+01	sat	6.21E+01	sat	x	2.43E+02	nc	1.08E+00	2.16E+01
sec-Butylbenzene	6.06E+01	sat	6.06E+01	sat	6.06E+01	sat	x	2.43E+02	nc	8.68E-01	1.74E+01
tert-Butylbenzene	1.06E+02	sat	1.06E+02	sat	1.06E+02	sat	x	2.43E+02	nc	8.60E-01	1.72E+01
Cadmium	3.90E+01	nc	5.64E+02	nc	1.54E+02	nc		1.83E+01		1.37E+00	2.75E+01
Carbon disulfide	1.97E+02	nc	4.60E+02	sat	4.60E+02	sat	x	1.04E+03	nc	4.03E-01	8.06E+00
Carbon tetrachloride	9.65E-01	nc	2.69E+00	ca	3.16E+00	nc	x	1.69E+00	ca	9.88E-04	1.98E-02
Chlordane	1.62E+01	ca	7.19E+01	ca	1.30E+02	nc		1.90E+00	ca	3.42E-01	6.83E+00
2-Chloroacetophenone	1.35E-02	nc	4.97E-02	nc	4.42E-02	nc	x	5.22E-02	nc	4.43E-05	8.85E-04
2-Chloro-1,3-butadiene	1.93E+00	nc	7.00E+00	nc	6.29E+00	nc	x	1.43E+01	nc	5.79E-03	1.16E-01
1-Chloro-1,1-difluoroethane	2.11E+02	sat	2.11E+02	sat	2.11E+02	sat	x	8.66E+04	nc	6.52E+01	1.30E+03
Chlorobenzene	6.44E+01	nc	2.41E+02	nc	2.12E+02	nc	x	1.06E+02	nc	5.51E-02	1.10E+00
1-Chlorobutane	2.99E+02	sat	2.99E+02	sat	2.99E+02	sat	x	2.43E+03	nc	9.84E-01	1.97E+01
Chlorodifluoromethane	2.11E+02	sat	2.11E+02	sat	2.11E+02	sat	x	9.75E+04	nc	7.33E+01	1.47E+03
Chloroethane	1.96E+01	ca	4.71E+01	ca	1.05E+03	ca	x	3.81E+01	ca	9.53E-03	1.91E-01
Chloroform	1.21E+00	ca	2.90E+00	ca	6.53E+01	ca	x	1.65E+00	ca	4.14E-04	8.28E-03
Chloromethane	6.83E+00	ca	1.65E+01	ca	8.63E+01	nc	x	1.49E+01	ca	5.12E-03	1.02E-01
b-Chloronaphthalene	3.09E+01	sat	3.09E+01	sat	3.09E+01	sat	x	4.87E+02	nc	1.25E+00	2.51E+01
o-Chloronitrobenzene	6.72E-01	nc	2.46E+00	nc	2.20E+00	nc	x	1.45E-01	nc	3.94E-05	7.88E-04
p-Chloronitrobenzene	5.37E+00	nc	2.05E+01	nc	1.78E+01	nc	x	1.20E+00	nc	3.25E-04	6.50E-03
2-Chlorophenol	7.25E+01	nc	3.06E+02	nc	2.45E+02	nc	x	3.04E+01	nc	2.36E-02	4.72E-01
2-Chloropropane	9.39E+01	nc	3.52E+02	nc	3.09E+02	nc	x	1.76E+02	nc	4.61E-02	9.21E-01
o-Chlorotoluene	7.15E+01	nc	2.02E+02	sat	2.02E+02	sat	x	1.22E+02	nc	5.23E-02	1.05E+00
Chromium III	1.00E+05	max	1.00E+05	max	1.00E+05	max		5.48E+04	nc	9.86E+07	1.97E+09
Chromium VI	2.34E+02	nc	3.40E+03	nc	2.61E+01	ca		1.10E+02	nc	2.10E+00	4.20E+01
Chrysene	9.55E-01	sat	9.55E-01	sat	9.55E-01	sat	x	2.91E+01	ca	1.74E+01	3.48E+02
Cobalt	1.52E+03	nc	2.05E+04	nc	6.10E+01	nc		7.30E+02	nc	3.31E+01	6.61E+02
Copper	3.13E+03	nc	4.54E+04	nc	1.24E+04	nc		1.46E+03	nc	5.15E+01	1.03E+03
Crotonaldehyde	3.37E+00	ca	1.67E+01	ca	5.27E+01	sat	x	3.49E-01	ca	9.20E-04	1.84E-02
Cumene (isopropylbenzene)	3.41E+01	sat	3.41E+01	sat	3.41E+01	sat	x	6.78E+02	nc	3.79E-01	7.59E+00
Cyanide	1.56E+03	nc	2.27E+04	nc	6.19E+03	nc		7.30E+02	nc	7.35E+00	1.47E+02
Cyanogen	7.68E+01	nc	2.84E+02	nc	2.52E+02	nc	x	2.43E+02	nc	5.78E-02	1.16E+00

Chemical	Residential Soil (mg/kg)	End-point	Industrial/ Occupational Soil (mg/kg)	End-point	Construction Worker Soil (mg/kg)	End-point	VOC	Tap Water (ug/L)	End-point	DAF 1 (mg/kg)	DAF 20 (mg/kg)
Cyanogen bromide	1.73E+02	nc	6.39E+02	nc	5.67E+02	nc	x	5.48E+02	nc	1.30E-01	2.60E+00
Cyanogen chloride	9.60E+01	nc	3.55E+02	nc	3.15E+02	nc	x	3.04E+02	nc	7.22E-02	1.44E+00
DDD	2.44E+01	ca	1.11E+02	ca	8.07E+02	ca		2.77E+00	ca	4.15E+00	8.30E+01
DDE	1.72E+01	ca	7.81E+01	ca	5.70E+02	ca		1.95E+00	ca	1.31E+01	2.62E+02
DDT	1.72E+01	ca	7.81E+01	ca	1.38E+02	nc		1.95E+00	ca	7.70E+00	1.54E+02
Dibenz(a,h)anthracene	6.21E-01	ca	2.34E+00	ca	2.12E+01	ca		9.09E-02	ca	5.18E-01	1.04E+01
Dibenzofuran	3.66E+01	sat	3.66E+01	sat	3.66E+01	sat	x	1.22E+01	nc	1.44E-01	2.87E+00
1,2-Dibromo-3-chloropropane	1.03E+00	nc	4.52E+00	nc	3.51E+00	nc	x	3.47E-01	nc	7.49E-05	1.50E-03
Dibromochloromethane	4.42E+00	ca	1.09E+01	ca	2.30E+02	ca	x	1.32E+00	ca	1.16E-03	2.32E-02
1,2-Dibromoethane	1.82E-01	ca	4.49E-01	ca	9.49E+00	ca	x	5.53E-02	ca	1.33E-05	2.66E-04
1,4-Dichloro-2-butene	4.29E-02	ca	1.06E-01	ca	2.23E+00	ca	x	1.19E-02	ca	2.93E-06	5.87E-05
1,2-Dichlorobenzene	4.30E+01	sat	4.30E+01	sat	4.30E+01	sat	x	3.70E+02	nc	1.02E-01	2.04E+00
1,3-Dichlorobenzene	1.74E+02	sat	1.74E+02	sat	1.74E+02	sat	x	1.83E+02	nc	2.03E-01	4.06E+00
1,4-Dichlorobenzene	1.33E+01	ca	3.28E+01	ca	8.19E+01	sat	x	4.95E+00	ca	5.49E-03	1.10E-01
3,3-Dichlorobenzidine	1.08E+01	ca	4.26E+01	ca	3.63E+02	ca		1.47E+00	ca	1.86E-03	3.71E-02
Dichlorodifluoromethane	4.95E+01	nc	1.80E+02	nc	1.62E+02	nc	x	3.95E+02	nc	2.97E-01	5.94E+00
1,1-Dichloroethane	3.00E+02	nc	1.12E+03	nc	9.88E+02	nc	x	8.11E+02	nc	2.01E-01	4.03E+00
1,2-Dichloroethane	1.82E+00	ca	4.42E+00	ca	1.83E+01	nc	x	1.22E+00	ca	2.48E-04	4.97E-03
cis-1,2-Dichloroethene	2.49E+01	nc	9.24E+01	nc	8.17E+01	nc	x	6.08E+01	nc	1.50E-02	3.00E-01
trans-1,2-Dichloroethene	3.71E+01	nc	1.37E+02	nc	1.22E+02	nc	x	1.22E+02	nc	3.63E-02	7.26E-01
1,1-Dichloroethene	6.41E+01	nc	2.36E+02	nc	2.10E+02	nc	x	3.39E+02	nc	1.33E-01	2.67E+00
2,4-Dichlorophenol	1.83E+02	nc	2.05E+03	nc	6.99E+02	nc		1.10E+02	nc	4.31E-02	8.63E-01
1,2-Dichloropropane	1.90E+00	ca	4.60E+00	ca	1.08E+01	nc	x	1.63E+00	ca	4.11E-04	8.22E-03
1,3-Dichloropropene	4.36E+00	ca	1.08E+01	ca	2.87E+01	nc	x	3.90E+00	ca	1.28E-03	2.57E-02
Dicyclopentadiene	1.98E-01	nc	7.19E-01	nc	6.47E-01	nc	x	4.17E-01	nc	4.50E-04	9.01E-03
Dieldrin	3.04E-01	ca	1.20E+00	ca	1.02E+01	ca		4.15E-02	ca	1.34E-03	2.68E-02
Diethyl phthalate	4.89E+04	nc	1.00E+05	max	1.00E+05	max		2.92E+04	nc	1.77E+01	3.54E+02
Dimethyl phthalate	1.00E+05	max	1.00E+05	max	1.00E+05	max		3.65E+05	nc	8.36E+01	1.67E+03
Di-n-butyl phthalate	6.11E+03	nc	6.84E+04	nc	2.33E+04	nc		3.65E+03	nc	1.86E+02	3.72E+03
2,4-Dimethylphenol	1.22E+03	nc	1.37E+04	nc	4.66E+03	nc		7.30E+02	nc	3.55E-01	7.11E+00
2,4-Dimethylphenol	6.11E+00	nc	6.84E+01	nc	2.33E+01	nc		3.65E+00	nc	3.93E-03	7.85E-02
4,6-Dinitro-o-cresol	1.22E+02	nc	1.37E+03	nc	4.66E+02	nc		7.30E+01	nc	5.25E-02	1.05E+00

Chemical	Residential Soil (mg/kg)	End-point	Industrial/ Occupational Soil (mg/kg)	End-point	Construction Worker Soil (mg/kg)	End-point	VOC	Tap Water (ug/L)	End-point	DAF 1 (mg/kg)	DAF 20 (mg/kg)
2,4-Dinitrotoluene	1.22E+02	nc	1.37E+03	nc	4.66E+02	nc		7.30E+01	nc	2.31E-02	4.62E-01
1,2-Diphenylhydrazine	6.08E+00	ca	2.39E+01	ca	2.04E+02	ca		8.30E-01	ca	4.48E-03	8.95E-02
Endosulfan	3.67E+02	nc	4.10E+03	nc	1.40E+03	nc		2.19E+02	nc	7.41E-01	1.48E+01
Endrin	1.83E+01	nc	2.05E+02	nc	6.99E+01	nc		1.10E+01	nc	2.04E-01	4.08E+00
Epichlorohydrin	6.13E+00	nc	2.29E+01	nc	2.02E+01	nc	x	2.03E+00	nc	3.62E-04	7.25E-03
Ethyl acetate	1.09E+04	nc	2.10E+04	sat	2.10E+04	sat	x	5.48E+03	nc	1.44E+00	2.87E+01
Ethyl acrylate	8.61E-01	ca	2.07E+00	ca	4.62E+01	ca	x	2.30E+00	ca	6.01E-03	1.20E-01
Ethyl chloride	1.96E+01	ca	4.71E+01	ca	1.05E+03	ca	x	3.81E+01	ca	9.53E-03	1.91E-01
Ethyl ether	1.94E+03	sat	1.94E+03	sat	1.94E+03	sat	x	1.22E+03	nc	2.37E-01	4.73E+00
Ethyl methacrylate	5.27E+01	sat	5.27E+01	sat	5.27E+01	sat	x	5.48E+02	nc	1.44E+00	2.88E+01
Ethylbenzene	1.28E+02	sat	1.28E+02	sat	1.28E+02	sat	x	1.34E+03	nc	1.01E+00	2.03E+01
Ethylene oxide	1.18E+00	ca	3.13E+00	ca	5.74E+01	ca	x	2.41E-01	ca	4.27E-05	8.54E-04
Fluoranthene	2.29E+03	nc	2.44E+04	nc	8.73E+03	nc		1.46E+03	nc	2.35E+02	4.69E+03
Fluorene	3.97E+01	sat	3.97E+01	sat	3.97E+01	sat	x	2.43E+02	nc	5.08E+00	1.02E+02
Fluoride	4.68E+03	nc	6.77E+04	nc	1.85E+04	nc		2.19E+03	nc	3.29E+02	6.58E+03
Furan	1.76E+00	nc	6.51E+00	nc	5.78E+00	nc	x	6.08E+00	nc	1.32E-03	2.65E-02
Heptachlor	1.08E+00	ca	4.26E+00	ca	3.63E+01	ca		1.47E-01	ca	3.12E-01	6.24E+00
Hexachlorobenzene	3.04E+00	ca	1.20E+01	ca	1.02E+02	ca		4.15E-01	ca	3.43E-02	6.86E-01
Hexachloro-1,3-butadiene	1.22E+01	nc	1.37E+02	nc	4.66E+01	nc		7.30E+00	nc	5.90E-01	1.18E+01
Hexachlorocyclopentadiene	3.66E+02	nc	4.10E+03	nc	4.31E+02	nc		2.19E+02	nc	6.58E+01	1.32E+03
Hexachloroethane	6.11E+01	nc	6.84E+02	nc	2.33E+02	nc		3.65E+01	nc	1.04E-01	2.09E+00
n-Hexane	3.80E+01	sat	3.80E+01	sat	3.80E+01	sat	x	4.16E+02	nc	8.78E-01	1.76E+01
HMX	3.06E+03	nc	3.42E+04	nc	1.17E+04	nc		1.83E+03	nc	5.39E+00	1.08E+02
Hydrogen cyanide	7.05E+00	nc	2.57E+01	nc	2.30E+01	nc	x	6.20E+00	nc	1.24E-03	2.47E-02
Indeno(1,2,3-c,d)pyrene	6.21E+00	ca	2.34E+01	ca	2.12E+02	ca		9.09E-01	ca	4.73E+00	9.46E+01
Iron	2.35E+04	nc	1.00E+05	max	9.29E+04	nc		1.10E+04	nc	2.77E+02	5.54E+03
Isobutanol	8.44E+03	nc	2.26E+04	sat	2.26E+04	sat	x	1.83E+03	nc	4.86E-01	9.72E+00
Isophorone	5.12E+03	ca	2.02E+04	ca	4.66E+04	nc		6.99E+02	ca	1.70E-01	3.40E+00
Lead	4.00E+02	IEUBK	8.00E+02	IEUBK	8.00E+02	IEUBK					
Lead (tetraethyl-)	6.11E-03	nc	6.84E-02	nc	2.38E-02	nc		3.65E-03	nc	6.33E-07	1.27E-05
Maleic hydrazide	9.30E+02	nc	1.61E+03	sat	1.61E+03	sat	x	3.04E+03	nc	8.17E-01	1.63E+01
Manganese	1.02E+04	nc	1.00E+05	max	1.51E+02	nc		5.11E+03	nc	3.34E+02	6.67E+03

Chemical	Residential Soil (mg/kg)	End-point	Industrial/ Occupational Soil (mg/kg)	End-point	Construction Worker Soil (mg/kg)	End-point	VOC	Tap Water (ug/L)	End-point	DAF 1 (mg/kg)	DAF 20 (mg/kg)
Mercury (elemental)	1.00E+05	max	1.00E+05	max	9.27E+02	nc			ca	1.05E-01	2.09E-03
Mercury (methyl)	6.11E+00	nc	6.84E+01	nc	2.38E+01	nc		3.65E+00	nc	8.37E-04	1.67E-02
Methacrylonitrile	1.83E+00	nc	8.08E+00	nc	6.25E+00	nc	x	1.04E+00	nc	1.83E-04	3.65E-03
Methomyl	2.65E+01	nc	9.72E+01	nc	8.68E+01	nc	x	1.52E+02	nc	5.90E-02	1.18E+00
Methyl acetate	1.94E+04	nc	8.64E+04	nc	6.62E+04	nc	x	6.08E+03	nc	1.08E+00	2.15E+01
Methyl acrylate	2.91E+01	nc	1.06E+02	nc	9.51E+01	nc	x	1.83E+02	nc	4.76E-01	9.52E+00
Methyl isobutyl ketone	4.36E+03	nc	7.01E+03	sat	7.01E+03	sat	x	1.99E+03	nc	7.35E-01	1.47E+01
Methyl methacrylate	1.52E+03	nc	2.92E+03	sat	2.92E+03	sat	x	1.42E+03	nc	2.76E-01	5.52E+00
Methyl styrene (alpha)	2.17E+02	sat	2.17E+02	sat	2.17E+02	sat	x	4.26E+02	nc	3.09E-01	6.17E+00
Methyl styrene (mixture)	5.30E+01	nc	2.10E+02	nc	1.77E+02	nc	x	5.48E+01	nc	3.97E-02	7.93E-01
Methylcyclohexane	7.89E+01	sat	7.89E+01	sat	7.89E+01	sat	x	5.23E+03	nc	2.95E+01	5.89E+02
Methylene bromide	4.22E+01	nc	1.60E+02	nc	1.39E+02	nc	x	6.08E+01	nc	1.31E-02	2.62E-01
Methylene chloride	6.47E+01	ca	1.61E+02	ca	2.63E+03	sat	x	4.22E+01	ca	8.53E-03	1.71E-01
Molybdenum	3.91E+02	nc	5.68E+03	nc	1.55E+03	nc		1.83E+02	nc	3.70E+00	7.41E+01
Naphthalene	2.52E+01	nc	9.25E+01	nc	8.25E+01	nc	x	6.20E+00	nc	1.97E-02	3.94E-01
Nickel	1.56E+03	nc	2.25E+04	nc	5.61E+02	nc		7.30E+02	nc	4.77E+01	9.53E+02
Nitrate	1.00E+05	max	1.00E+05	max	1.00E+05	max		5.84E+04	nc	1.71E+01	3.43E+02
Nitrite	7.82E+03	nc	1.00E+05	max	3.10E+04	nc		3.65E+03	nc	7.63E-01	1.53E+01
Nitrobenzene	1.29E+01	nc	6.24E+01	nc	4.48E+01	nc	x	3.40E+00	nc	9.18E-04	1.84E-02
Nitroglycerin	3.47E+02	ca	1.37E+03	ca	1.17E+04	ca		4.74E+01	ca	2.81E-02	5.63E-01
N-Nitrosodiethylamine	3.24E-02	ca	1.28E-01	ca	1.09E+00	ca		4.42E-03	ca	8.73E-06	1.75E-04
N-Nitrosodimethylamine	9.54E-02	ca	3.76E-01	ca	1.86E+00	nc		1.30E-02	ca	1.22E-05	2.44E-04
N-Nitrosodi-n-butylamine	1.99E-01	ca	5.23E-01	ca	9.53E+00	ca	x	1.99E-02	ca	5.27E-05	1.05E-03
N-Nitrosodiphenylamine	7.40E+01	sat	7.40E+01	sat	7.40E+01	sat		1.35E+02	ca	2.86E-01	5.71E+00
N-Nitrosopyrrolidine	2.32E+00	ca	9.12E+00	ca	7.77E+01	ca		3.16E-01	ca	1.30E-04	2.60E-03
m-Nitrotoluene	4.73E+02	nc	5.69E+02	sat	5.69E+02	sat	x	1.22E+02	nc	3.30E-02	6.59E-01
o-Nitrotoluene	5.11E+00	ca	1.35E+01	ca	2.48E+02	ca	x	4.81E-01	ca	1.30E-04	2.61E-03
p-Nitrotoluene	6.91E+01	ca	1.83E+02	ca	5.69E+02	sat	x	6.51E+00	ca	1.76E-03	3.53E-02
Pentachlorobenzene	4.89E+01	nc	5.47E+02	nc	1.86E+02	nc		2.92E+01	nc	9.38E-02	1.88E+00
Pentachlorophenol	2.98E+01	ca	1.00E+02	ca	1.02E+03	ca		5.53E+00	ca	5.87E-03	1.17E-01
Phenanthrene	1.83E+03	nc	2.05E+04	nc	6.99E+03	nc		1.10E+03	nc	2.32E+01	4.64E+02
Phenol	1.83E+04	nc	1.00E+05	max	6.99E+04	nc		1.10E+04	nc	2.37E+00	4.74E+01

Chemical	Residential Soil (mg/kg)	End-point	Industrial/ Occupational Soil (mg/kg)	End-point	Construction Worker Soil (mg/kg)	End-point	VOC	Tap Water (ug/L)	End-point	DAF 1 (mg/kg)	DAF 20 (mg/kg)
Polychlorinatedbiphenyls											
Aroclor 1016	3.93E+00	nc	4.13E+01	nc	1.50E+01	nc		2.56E+00	nc	1.73E-01	3.45E+00
Aroclor 1221	1.12E+00	nc	8.26E+00	ca	4.28E+00	nc		3.32E-01	ca	2.24E-02	4.47E-01
Aroclor 1232	1.12E+00	nc	8.26E+00	ca	4.28E+00	nc		3.32E-01	ca	2.24E-02	4.47E-01
Aroclor 1242	1.12E+00	nc	8.26E+00	ca	4.28E+00	nc		3.32E-01	ca	2.24E-02	4.47E-01
Aroclor 1248	1.12E+00	nc	8.26E+00	ca	4.28E+00	nc		3.32E-01	ca	2.64E-01	5.28E+00
Aroclor 1254	1.12E+00	nc	8.26E+00	ca	4.28E+00	nc		3.32E-01	ca	2.64E-01	5.28E+00
Aroclor 1260	1.12E+00	nc	8.26E+00	ca	4.28E+00	nc		3.32E-01	ca	2.64E-01	5.28E+00
n-Propylbenzene	6.21E+01	sat	6.21E+01	sat	6.21E+01	sat	x	2.43E+02	nc	1.08E+00	2.16E+01
Propylene oxide	1.63E+01	ca	5.71E+01	ca	3.16E+02	nc	x	2.18E+00	ca	4.60E-04	9.20E-03
Pyrene	2.13E+01	sat	2.13E+01	sat	2.13E+01	sat	x	1.83E+02	nc	2.88E+01	5.76E+02
RDX	4.42E+01	ca	1.74E+02	ca	6.99E+02	nc		6.03E+00	ca	1.68E-03	3.36E-02
Selenium	3.91E+02	nc	5.68E+03	nc	1.55E+03	nc		1.83E+02	nc	9.53E-01	1.91E+01
Silver	3.91E+02	nc	5.68E+03	nc	1.55E+03	nc		1.83E+02	nc	1.57E+00	3.14E+01
Strontium	4.69E+04	nc	1.00E+05	max	1.00E+05	max		2.19E+04	nc	7.73E+02	1.55E+04
Styrene	4.21E+02	sat	4.21E+02	sat	4.21E+02	sat	x	1.62E+03	nc	2.20E+00	4.40E+01
1,2,4,5-Tetrachlorobenzene	1.83E+01	nc	2.05E+02	nc	6.99E+01	nc		1.10E+01	nc	2.14E-02	4.29E-01
1,1,1,2-Tetrachloroethane	1.56E+01	ca	3.86E+01	ca	8.09E+02	ca	x	4.27E+00	ca	1.34E-03	2.68E-02
1,1,2,2-Tetrachloroethane	2.00E+00	ca	4.94E+00	ca	1.04E+02	ca	x	5.46E-01	ca	1.72E-04	3.44E-03
Tetrachloroethene	3.52E+00	ca	8.56E+00	ca	9.93E+01	sat	x	4.32E+00	ca	2.15E-03	4.29E-02
Thallium	5.16E+00	nc	7.49E+01	nc	2.04E+01	nc		2.41E+00	nc	1.72E-01	3.43E+00
Toluene	2.52E+02	sat	2.52E+02	sat	2.52E+02	sat	x	7.23E+02	nc	3.47E-01	6.93E+00
Toxaphene	4.42E+00	ca	1.74E+01	ca	1.48E+02	ca		6.03E-01	ca	2.33E-01	4.65E+00
Tribromomethane	4.11E+02	ca	1.34E+03	ca	2.75E+03	nc		2.44E+01	ca	1.73E-01	3.47E+00
1,1,2-Trichloro-1,2,2-trifluoroethane	3.28E+03	sat	3.28E+03	sat	3.28E+03	sat	x	5.92E+04	nc	1.76E+02	3.53E+03
1,2,4-Trichlorobenzene	2.25E+01	nc	8.34E+01	nc	7.38E+01	nc	x	7.16E+00	nc	2.04E-02	4.08E-01
1,1,1-Trichloroethane	5.63E+02	sat	5.63E+02	sat	5.63E+02	sat	x	3.17E+03	nc	1.34E+00	2.68E+01
1,1,2-Trichloroethane	3.90E+00	ca	9.52E+00	ca	6.60E+01	nc	x	1.97E+00	ca	4.98E-04	9.96E-03
Trichloroethylene	2.26E-01	ca	5.45E-01	ca	1.21E+01	ca	x	2.77E-01	ca	1.31E-04	2.62E-03
Trichlorofluoromethane	1.82E+02	nc	6.65E+02	nc	5.96E+02	nc	x	1.29E+03	nc	1.15E+00	2.30E+01
2,4,5-Trichlorophenol	6.11E+03	nc	6.84E+04	nc	2.33E+04	nc		3.65E+03	nc	7.13E+00	1.43E+02
2,4,6-Trichlorophenol	6.11E+00	nc	6.84E+01	nc	2.33E+01	nc		3.65E+00	nc	7.13E-03	1.43E-01

Chemical	Residential Soil (mg/kg)	End-point	Industrial/ Occupational Soil (mg/kg)	End-point	Construction Worker Soil (mg/kg)	End-point	VOC	Tap Water (ug/L)	End-point	DAF 1 (mg/kg)	DAF 20 (mg/kg)
1,1,2-Trichloropropane	4.08E+01	nc	1.61E+02	nc	1.36E+02	nc	x	3.04E+01	nc	7.65E-03	1.53E-01
1,2,3-Trichloropropane	1.82E-01	ca	4.50E-01	ca	9.50E+00	ca	x	5.53E-02	ca	1.39E-05	2.78E-04
1,2,3-Trichloropropene	2.63E+00	nc	9.58E+00	nc	8.60E+00	nc	x	2.10E+00	nc	5.29E-04	1.06E-02
Triethylamine	1.98E+01	nc	7.94E+01	nc	6.61E+01	nc	x	1.21E+01	nc	2.14E-03	4.29E-02
1,2,4-Trimethylbenzene	1.77E+01	nc	6.45E+01	nc	5.79E+01	nc	x	1.23E+01	nc	7.09E-02	1.42E+00
1,3,5-Trimethylbenzene	7.54E+00	nc	2.74E+01	nc	2.46E+01	nc	x	1.23E+01	nc	1.78E-02	3.55E-01
2,4,6-Trinitrotoluene	3.06E+01	nc	3.42E+02	nc	1.17E+02	nc		1.83E+01	nc	5.34E-02	1.07E+00
Vanadium	7.82E+01	nc	1.14E+03	nc	3.10E+02	nc		3.65E+01	nc	3.65E+01	7.30E+02
Vinyl acetate	3.30E+02	nc	1.20E+03	nc	1.08E+03	nc	x	4.12E+02	nc	7.57E-02	1.51E+00
Vinyl bromide	8.65E-01	ca	2.07E+00	ca	6.15E+00	nc	x	1.18E+00	ca	4.73E-04	9.45E-03
Vinyl chloride (Child)	1.04E+00	ca					x	4.28E-01	ca	1.43E-04	2.86E-03
Vinyl chloride (adult)	2.02E+00	ca	5.48E+00	ca	8.07E+01	nc	x	8.33E-01	ca	2.78E-04	5.57E-03
m-Xylene	1.01E+02	nc	1.32E+02	sat	1.32E+02	sat	x	2.03E+02	nc	1.66E-01	3.33E+00
o-Xylene	1.32E+02	sat	1.32E+02	sat	1.32E+02	sat	x	7.30E+03	nc	5.43E+00	1.09E+02
Xylenes	1.02E+02	nc	1.33E+02	sat	1.33E+02	sat	x	2.03E+02	nc	1.67E-01	3.34E+00
Zinc	2.35E+04	nc	1.00E+05	max	9.29E+04	nc		1.10E+04	nc	6.82E+02	1.36E+04

Table A-2

Default Exposure Factors			
Symbol	Definition (units)	Default	Reference
CSF_o	Cancer slope factor oral $(mg/kg\text{-}day)^{-1}$	Chem.-spec.	IRIS, HEAST, or NCEA
CSF_i	Cancer slope factor inhaled $(mg/kg\text{-}day)^{-1}$	Chem.-spec.	IRIS, HEAST, or NCEA
RfD_o	Reference dose oral (mg/kg-day)	Chem.-spec.	IRIS, HEAST, or NCEA
RfD_i	Reference dose inhaled (mg/kg-day)	Chem.-spec.	IRIS, HEAST, or NCEA
TR	Target cancer risk	1E-05	NMED-specific value
THQ	Target hazard quotient	1	US EPA, 1989
BW	Body weight (kg)		
	-- adult	70	US EPA, 1989
	-- child	15	US EPA, 1991
AT	Averaging time (days)		
	-- carcinogens	25550	US EPA, 1989
	-- noncarcinogens	ED*365	
SA	Exposed surface area for soil/dust (cm^2/day)		US EPA, 1989
	– adult resident	5700	US EPA, 1996a
	– adult worker	3300	US EPA, 1996a
	-- child	2800	US EPA, 1989
AF	Adherence factor, soils (mg/cm^2)		US EPA, 1989
	– adult resident	0.07	US EPA, 1996a
	– adult worker	0.2	US EPA, 1996a
	-- child resident	0.2	US EPA, 1989
	– construction worker	0.3	NMED-specific value
ABS	Skin absorption defaults (unitless):		
	– semi-volatile organics	0.1	US EPA, 1989
	– volatile organics	na	US EPA, 2003a
	– inorganics	na	US EPA, 2000s
IRA	Inhalation rate (m^3/day)		
	-- adult resident	20	US EPA, 1991
	– adult worker	20	US EPA, 2001a
	-- child resident	10	Exposure Factors, (US EPA, 1997)
IRW	Drinking water ingestion rate (L/day)		
	-- adult	2.4	US EPA, 1997
	-- child	1.5	US EPA, 1997
IRS	Soil ingestion (mg/day)		
	-- adult resident	100	US EPA, 1991
	-- child resident	200	US EPA, 1991
	-- commercial/industrial worker	100	US EPA, 2001a
	construction worker	330	US EPA, 1991
EF	Exposure frequency (days/yr)		
	-- residential	350	US EPA, 1991
	-- commercial/industrial	225	US EPA, 2001a
	– construction worker	250	NMED-specific value
ED	Exposure duration (years)		
	-- residential	30[a]	US EPA, 1991)
	-- child	6	(US EPA, 1991)
	-- commercial/industrial	25	(US EPA, 1999)
	– construction worker	1	NMED-specific value
	Age-adjusted factors for carcinogens		
IFSadj	Ingestion factor, soils ([mg-yr]/[kg-day])	114	US EPA, 2001a
SFSadj	Dermal factor, soils ([mg-yr]/[kg-day])	360	US EPA, 2001a
InhFadj	Inhalation factor, air ([m^3-yr]/[kg-day])	11	By analogy to RAGS: Part B, (US
IFWadj	Ingestion factor, water ([L-yr]/[kg-day])	1.1	By analogy to RAGS: Part B, (US
PEF	Particulate emission factor (m^3/kg)	Chem.-spec.	US EPA, 2001a
VFs	Volatilization factor for soil (m^3/kg)	Chem.-spec.	US EPA, 2001a
Csat	Soil saturation concentration (mg/kg)	Chem.-spec.	US EPA, 2001a

[a]Exposure duration for lifetime residents is assumed to be 30 years total. For carcinogens, exposures are combined for children (6 years) and adults (24 years).
Chem.-spec.- Chemical-specific value
na - not applicable
RAGS – Risk Assessment Guidance for Superfund
IRIS – Integrated Risk Information System, USEPA, 2003b
HEAST – Health Effects Assessment Summary Tables, USEPA, 1997
NCEA – National Center for Environmental Assessment, Office of Research and Development (USEPA, 2003c)
NMED – New Mexico Environment Department

<u>Calculations for AOC A based on six lead concentrations in surface soil</u>

Site Risk = $\left(\frac{17.1}{400}+\frac{19.0}{400}+\frac{10.5}{400}+\frac{35.0}{400}+\frac{43.2}{400}+\frac{112}{400}\right) x\ 10^{-5} = 5.93x10^{-6}$

Site Hazard Index = $\left(\frac{17.1}{400}+\frac{19.0}{400}+\frac{10.5}{400}+\frac{35.0}{400}+\frac{43.2}{400}+\frac{112}{400}\right)\ x\ 1 = 0.593$

New Mexico Environment Department's Refined Ecological Risk Assessment for AOC A (SS-19), Cannon Air Force Base, New Mexico

The baseline (ecological risk assessment (ERA) presented in Cannon Air Force Base (CAFB)'s *Phase II Supplemental Assessment at AOC A (SS-19)*, dated February 2012 concluded that the site would provide little or no suitable foraging habitat since the site is industrially developed: 67% of the site is covered in roads/parking lots/buildings, and the remaining 33% consists of regularly maintained lawns. Therefore, further ecological evaluation was not conducted at AOC A. Because detected concentrations of lead in four of the additional soil samples slightly exceeded Los Alamos National Laboratory's (LANL's) Ecological Screening Levels (ESLs) for the American robin and the Montane shrew the New Mexico Environment Department (NMED) conducted a refined ecological risk assessment (ERA) for Area of Concern (AOC) A.

While the site may potentially provide some foraging habitat for ecological receptors, it is agreed that it would not be significant due to the limited area (possibility of 33% of the site) and the relatively small size of the site. The assessment provided by CAFB was limited to an initial screening (Tier 1) based on conservative toxicity data No-Observed Adverse Effect Levels (NOAELs). Because the initial screening did result in slightly elevated hazard quotients (HQs), further quantitative ecological evaluation should have been conducted for the American robin and Montane shrew receptors using an application of lowest observed adverse effect levels (LOAELs) and area use and population area use factors.

NMED assumed that the average home ranges consist of 1.1 acres for the American Robin and 0.96 acres for the Montane shrew. In addition, NMED assumed that only 33% of the acreage at the site was suitable for habitat. Using modifications of the area use factors and population use factors along with LOAEL-based LANL ESLs, more refined HQs were calculated as shown in the below tables.

Table 1 - Refined HQ for American Robin, Insectivore.

Constituent	Maximum (mg/kg)	LOAEL-based ESL American Robin (Avian Insectivore) (mg/kg)	AUF	PAUF	Adjusted Individual HQ	Adjusted Population HQ
Lead	1.12E+02	2.80E+01	1.80E-01	4.50E-03	7.20E-01	1.80E-02

ESL = LANL ecological screening level based on LOAEL.

AUF (area use factor) = exposure area/home range. Exposure area is 33% of site area (0.6 acre) = 0.2 acre. Average home range for American robin is 1.1 acre (USEPA, 1993).

PAUF (population area use factor) = exposure area/population area. Exposure area is 33% of 0.6 acre = 0.2 acre. Population area for American robin is 44 acres (USEPA, 1993).

Table 2 - Refined HQ for American Robin, Omnivore.

Constituent	Maximum (mg/kg)	LOAEL-based ESL American Robin (Avian Omnivore) (mg/kg)	AUF	PAUF	Adjusted Individual HQ	Adjusted Population HQ
Lead	1.12E+02	3.30E+01	1.80E-01	4.50E-03	6.11E-01	1.53E-02

ESL = LANL ecological screening level based on LOAEL.

AUF = exposure area/home range. Exposure area is 33% of site area (0.6 acre) = 0.2 acre. Average home range for American robin is 1.1 acre (USEPA, 1993).

PAUF = exposure area/population area. Exposure area is 33% of site area (0.6 acre) = 0.2 acre. Population area for American robin is 44 acres (USEPA, 1993).

Table 3 - Refined HQ for American Robin, Herbivore.

Constituent	Maximum (mg/kg)	LOAEL-based ESL American Robin (Avian Herbivore) (mg/kg)	AUF	PAUF	Adjusted Individual HQ	Adjusted Population HQ
Lead	1.12E+02	4.20E+01	1.80E-01	4.50E-03	4.80E-01	1.20E-02

ESL = LANL ecological screening level based on LOAEL.

AUF = exposure area/home range. Exposure area is 33% of site area (0.6 acre) = 0.2 acre. Average home range for American robin is 1.1 acre (USEPA, 1993).

PAUF = exposure area/population area. Exposure area is 33% of site area (0.6 acre) = 0.2 acre. Population area for American robin is 44 acres (USEPA, 1993).

Table 4 - Refined HQ for Montane Shrew.

Constituent	Maximum (mg/kg)	LOAEL-based ESL Montane Shrew (mg/kg)	AUF	PAUF	Adjusted Individual HQ	Adjusted Population HQ
Lead	1.12E+02	1.30E+02	2.08E-01	5.00E-03	1.79E-01	4.31E-03

ESL = LANL ecological screening level based on LOAEL.

AUF = exposure area/home range. Exposure area is 33% of site area (0.6 acre) = 0.2 acre. Average home range for Montane shrew is 0.96 acre (USEPA, 1993).

PAUF = exposure area/population area. Exposure area is 33% of site area (0.6 acre) = 0.2 acre. Population area for Montane shrew is 39 acres (USEPA, 1993).

Reference: US EPA, 1993. *Wildlife Exposure Factors Handbook.* EPA/600/R-93/187. December.

The calculated ecological HQs would be well below target levels for both individual American robin and Montane shrew receptors and populations based on a more refined assessment, indicating that lead in soil at AOC A would not likely pose ecological risk. Therefore, the conclusion of the baseline ERA presented in the *Phase II Supplemental Assessment at Area of Concern (AOC) A*, as clarified with this assessment, is adequate and would meet NMED requirements for approval.