CAFB97

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

5 NOV 1997

Colonel James A. Thomas III
Commander, 27th Support Group
110 E Sextant Avenue Suite 1098
Cannon AFB NM 88103-5323

ENTERED

Mr. Benito J. Garcia, Chief
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2044 Galisteo Street
P O Box 26110
Sante Fe NM 87502

Dear Mr. Garcia

Enclosed is the Groundwater Monitoring Report for June 97 sampling at Landfill 3 (SWMU 105), Landfill 4 (SWMU 104), and Landfill 25 (SWMU 97) for your review.

If you have questions, please contact Mr. Sanford Hutsell of my environmental staff at (505) 784-6378.

Sincerely

JAMES A. THOMAS III, Colonel, USAF

Attachment:
Groundwater Monitoring Report

cc:
NMED w/o Atch (C. Will)
NMED GW Bureau (J. Jacobs)
EPA Region VI (D. Neleigh)
HQ ACC CES/ESVW w/o Atch (M. Patterson)

MONITORING WELL IDENTIFICATION

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS & RADIOACTIVE MATERIALS BUREAU
525 CAMINO de LOS MARQUEZ, SUITE #4
SANTA FE, NEW MEXICO 87502

FACILITY NAME CANNON AIR FORCE BASE

EPA I.D. NUMBER NM7572124454

COUNTY CURRY

WELL NUMBER MWR

WELL LOCATION (LONGITUDE) E811219.66

WELL LOCATION (LATITUDE) N1234746.82

AQUIFER NAME OGALLALA

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 17 APRIL 1997

DRILLING METHOD 0 - 260' - STRATEX (underreaming bit) 260' - 314' - TRICONE-CASING HAMMER

INNER CASING DIAMETER 11 ½ - INCH

BOREHOLE DIAMETER 12 - INCH

CASING MATERIAL SCHEDULE 80, FLUSH THREADED PVC

METHOD OF DEVELOPMENT SAND BAILER AND GRUNDFOS SUBMERSIBLE PUMP

ELEV.. BOTTOM OF BOREHOLE 3958.92

ELEV. BOTTOM OF WELL CASING 3969.32

ELEV. BOTTOM OF SCREENED INT 3972.32

ELEV. OF TOP OF SCREENED INT 4002.32

SURVEYED ELEV. OF CASING TOP 4276.79

DATE OF REPORT 19 JUNE 1997 SIGNATURE Sanford D. Hutsell

RESPONSE TO USACE COMMENTS
(Comments Received August 19, 1997)

Cannon Air Force Base
Clovis, New Mexico

Long-Term Monitoring and Well Installation - Landfill Nos. 3, 4, and 25

Comments from: Nick Naraine

Comment 1 *Pg 1, Executive Summary, bullets 1,4,& 5. Text Methods are 8260A, 8081 & 8151. See Workplan Addenda, Document II, page 6-1, Table 6-1.*

Response: **Analytical methods used for groundwater sample analyses were 8260A, 8080A, and 8150. Table 6-1 of the Workplan Addenda, Document II, has been modified appropriately.**

SW-846 Methods 8081 and 8151 were specified in the Workplan Addenda. However, SW-846 8080A and 8150 were used for PCB and herbicides analyses, respectively. In a 03-11-97 telephone conference call between Larry Penfold (Quanterra) and Nick Naraine (USACE), it was indicated that methods 8080A and 8150 were acceptable methods of analysis, with the stipulation that detection limit requirements for Cannon AFB were met. These methods, which employ a capillary column, were performed by the laboratory for the appropriate analysis.

Comment 2 *Appendix II Pages need to be numbered.*

Response: **Pages in Appendix II have been numbered, as requested (see Appendix II).**

Comment 3 *First table, Volatile Organics. Test Method should be 8260A and Reporting Limits are incorrect. See Workplan Addenda, Document II, page 2-2 Table 2-1.*

Response: **Quanterra, the contract analytical laboratory, inadvertently performed SW-846 8240B for VOC analyses, as opposed to the requested SW-846 8260A. In performing SW-8240B, Quanterra used a capillary column and a 5 ml purge volume. The reporting limits for this SW-846 8240B are higher due to the smaller purge volume. Upon discussions with Quanterra, VOC results were resubmitted and reported down to the MDLs. Values reported down to the MDL were flagged with "J" to indicate that values were above the MDL but below the respective reporting limits. Only the results for Trip Blank #4 and MWR-1 were resubmitted as the other sample results did not contain detections down to the MDL.**

For future sampling events, Quanterra will ensure that SW-8260A is

performed using a 25 ml purge volume to attain the reporting limits specified in the Workplan Addenda. Sample results from previous sampling events have indicated the absence of VOCs. Results obtained during the June 1997 sampling event by SW-8240B were reported as non-detected and are consistent with previous results.

Comment 4 *Test Method for Herbicide is incorrect. Should be 8151 and Dinoseb is missing from the Appendix IX list of Herbicides. See Table 2-6 of the above referenced Addenda.*

Response: **SW-846 8150, employing a capillary column, was performed for herbicides analyses. In a 03-11-97 telephone conference call between Larry Penfold (Quanterra) and Nick Naraine (USACE), it was indicated that method 8150 was an acceptable method of analysis, as long as it met detection limit requirements for Cannon AFB.**

Dinoseb was not reported originally. Sample results were resubmitted by Quanterra and include results for Dinoseb. Dinoseb was not detected above reporting limits in any of the samples.

Comment 5 *Total Metals. The Reporting Limit for Thallium is supposed to be 0.1 ppb if done by SW-846 Method 6020 (ICP-MS). Selenium test method should be 7740 not 6010.*

Response: **The contract laboratory performed SW-846 6010 (ICP) for analysis of thallium and selenium. FEC takes responsibility for this oversight and has instructed the laboratory to perform SW-846 6020 for thallium and 7740 for selenium during subsequent sampling events. Also, arsenic and lead will be analyzed using SW-846 7041 and 7421, respectively.**

General Comment(s).

Comment *Missing are the Chain-of-Custody Forms.*

Response: **Chain-of-custody forms have been submitted (see Appendix II).**

Comment *Comments 3, 4, & 5 apply to all other data sheets on the other samples.*

Response: **Comments 3, 4, and 5 were noted for all samples. Responses are provided above.**

Comments from: Sanford Hutsell

Comment 1 *Cover. Put the SWMU numbers after the landfill numbers on the cover sheet. NMED has trouble keeping track of which landfill is which. LF-3 is SWMU #105, LF-4 is SWMU #104, and LF-25 is SWMU #97.*

Response: **SWMU numbers were added to the cover page as requested.**

Comment 2 *Table 1. Please put extra column on the right hand side listing the Maximum Contaminant Level for Metals and where applicable.*

Response: **A column listing MCLs where applicable has been added to Table 1.**

Comment 3 *I could use 6 copies of the Final Report instead of 5, which runs me a little short. p*

Response: **Six copies of the final report have been submitted for Sanford Hutsell, as requested.**

FINAL

QUARTERLY AND SEMIANNUAL MONITORING REPORT JUNE 1997 SAMPLING EVENT

LONG-TERM MONITORING AND WELL INSTALLATION LANDFILL NOs. 3 (SWMU 105), 4 (SWMU 104), AND 25 (SWMU 97)

CANNON AIR FORCE BASE
Clovis, New Mexico

Contract Number DACW45-94-D-0031
Project Number 96-333

Prepared for
U.S. Army Corps of Engineers
Omaha District

Prepared by
Foothill Engineering Consultants, Inc.
350 Indiana Street, Suite 415
Golden, Colorado 80401
(303) 278-0622

September 1997

ACEC

FINAL

QUARTERLY AND SEMIANNUAL MONITORING REPORT JUNE 1997 SAMPLING EVENT

LONG-TERM MONITORING AND WELL INSTALLATION LANDFILL NOs. 3 (SWMU 105), 4 (SWMU 104), AND 25 (SWMU 97)

CANNON AIR FORCE BASE
Clovis, New Mexico

September 1997

EXECUTIVE SUMMARY

This report summarizes data obtained during the June 1997 sampling event performed at monitoring Wells N (Landfill 4), O (Landfill 3) and newly installed Well R (Landfill 25) at the Cannon Air Force Base near Clovis, New Mexico (Figure 1). All three wells are located downgradient of their respective landfills (Figure 2). The scope of the 1997-1998 long-term monitoring program at Wells N, O, and R includes semiannual sampling at Wells N and O, and quarterly sampling at Well R. Wells N and O were sampled on June 3, 1997, using previously installed dedicated pumps. An initial groundwater sample was also collected at Well R during the June 1997 sampling effort using a recently installed dedicated pump.

One groundwater sample was collected from each well. Additionally, one field duplicate sample and one field split sample were collected for quality assurance and quality control (QA/QC) purposes. Groundwater samples collected from each of the three wells were analyzed for the parameters listed below. The corresponding analytical method used for analysis is also specified.

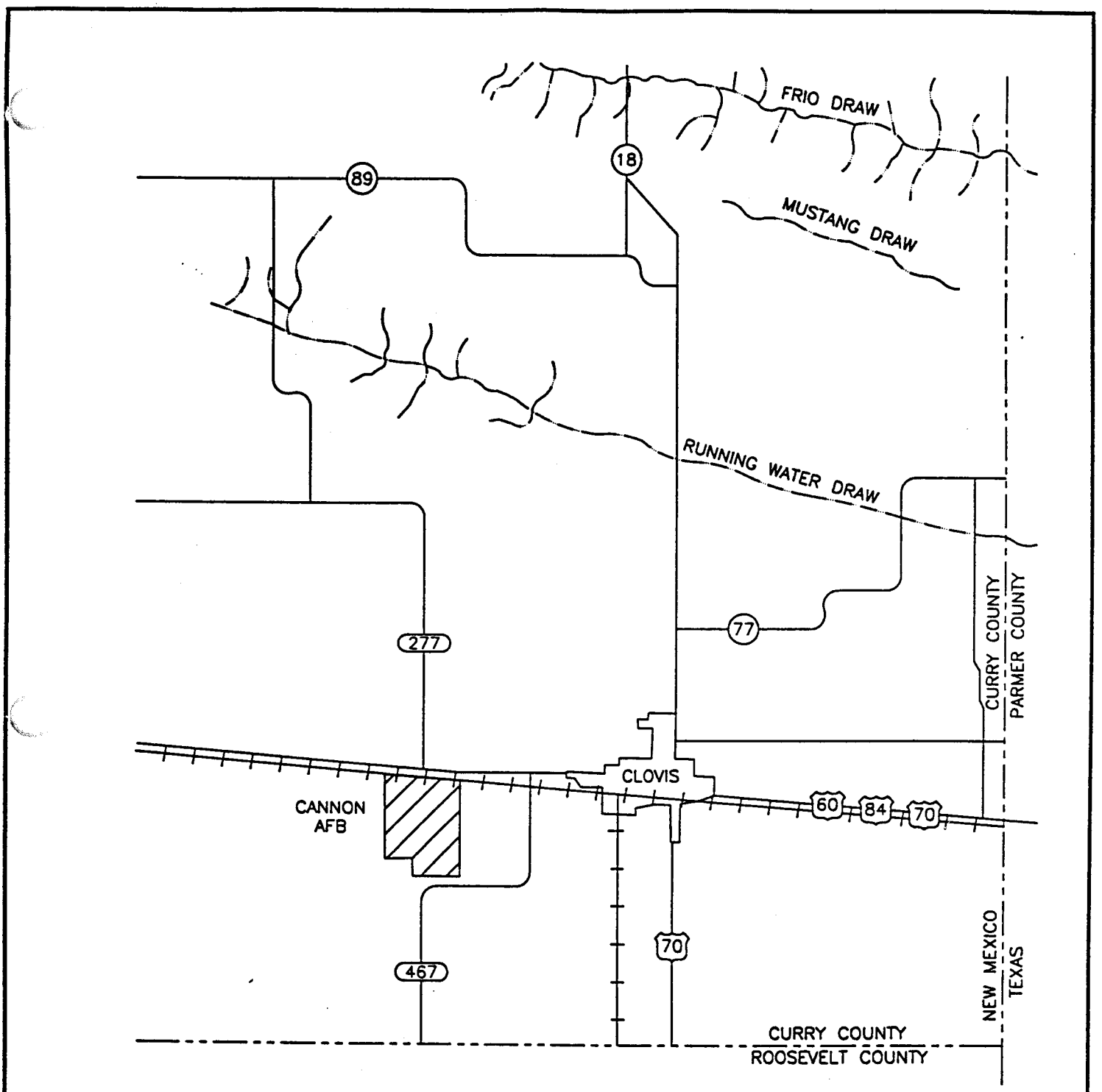
- Appendix IX VOCs, SW-846 Method 8240B (capillary column)
- Appendix IX SVOCs, SW-846 Method 8270B
- Dioxin - 2, 3, 7, 8-TCDD, SW-846 Method 8280,
- Appendix IX Pesticides/PCBs, SW-846 Method 8080A
- Appendix IX Herbicides, SW-846 Method 8150,
- Appendix IX Metals, SW-846 Method 6010 and 7000,
- Cyanide, SW-846 Method 9012,
- Sulfide, EPA 376.2,
- Total Organic Carbon, SW-846 Method 9060,
- Total Organic Halides, SW-846 Method 9020.

Concentrations of detected analytes are summarized in Table 1. A New Mexico Environmental Department (NMED) Assessment Monitoring Quarterly Report, completed for Well R, and Semiannual Groundwater Quality Reports completed for Wells N and O, are presented at the end of this document.

Field forms completed for the June 1997 sampling event are contained in Appendix I. Analytical results and associated QC data, as reported and submitted by Quanterra Environmental Services, are presented in Appendix II. A data assessment summary for samples CAFB-MWN-0697-1, CAFB-MWO-0697-1, and CAFB-MWR-0697-1, containing a discussion of QC criteria that were evaluated, is included as Appendix III.

As part of the QA/QC program for this sampling event, FEC collected a field duplicate and a field split sample to measure field and analytical precision and accuracy. For analytes detected above reporting limits, adequate precision was observed in the sample-duplicate pair (CAFB-MWO-0697-1/CAFB-MWO-0697-2) collected during the June 1997 sampling event (see Table 1).

Barium and vanadium were detected at trace levels in all three wells. Relatively low concentrations of lead and selenium were also detected in the sample from Well N, and nickel was detected in the sample collected from Well R. Results for all other analyses were reported as "not detected" (ND), indicating that Appendix IX compounds were not present above laboratory reporting limits in any of the groundwater samples. Results for VOCs obtained during the June 1997 groundwater sampling event were obtained by SW-846 method 8240B, using a 5 milliliter purge volume. The relatively small purge volume resulted in elevated reporting limits for all VOC analyses. However, the contract analytical laboratory, Quanterra, subsequently reported VOC results as low as the method detection limits. Values between the laboratory reporting limits and method detection limits were reported and flagged with a "J" qualifier.



NEW MEXICO

N

0 5

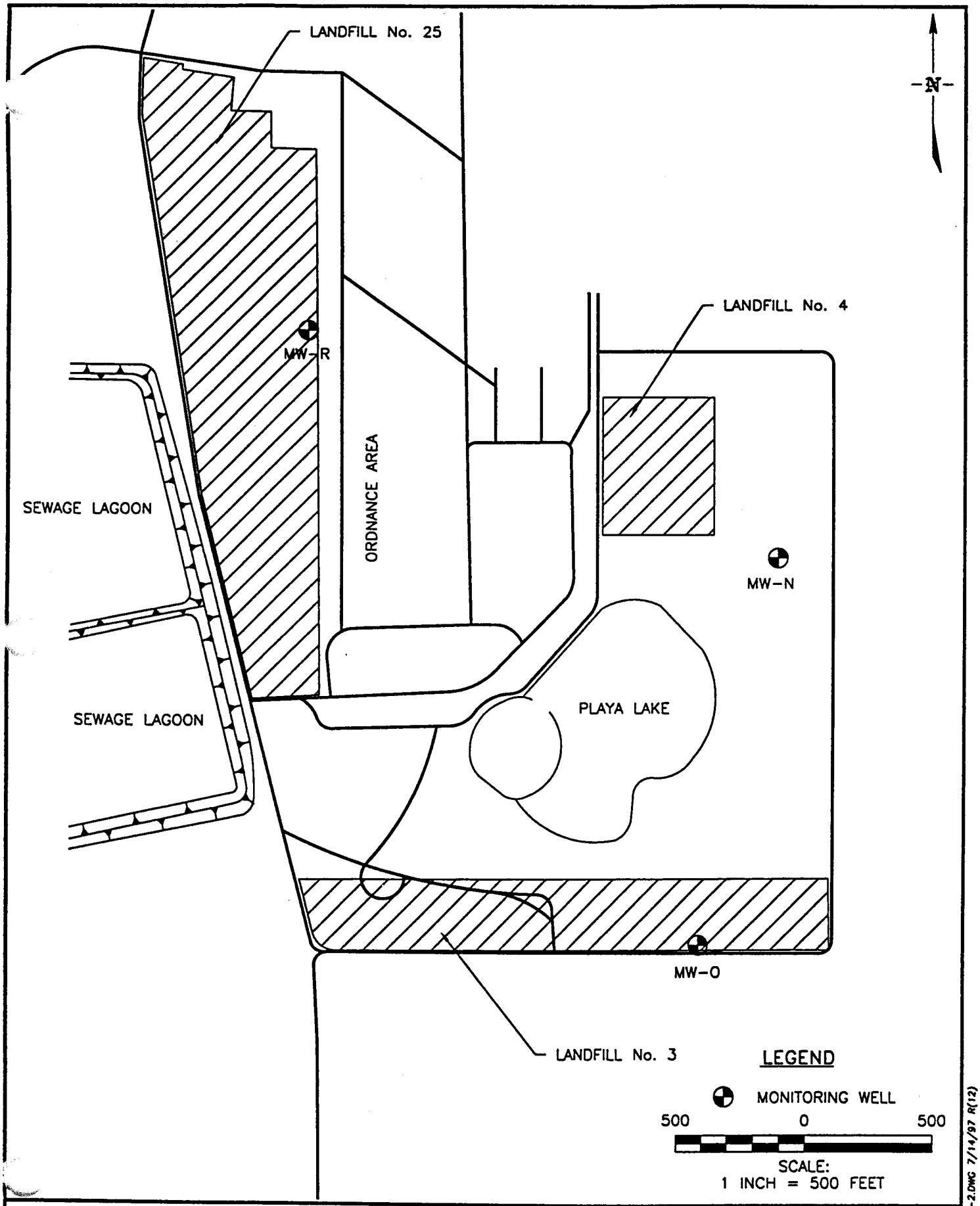
SCALE IN MILES

FOOTHILL ENGINEERING CONSULTANTS, INC.

FIGURE 1
SITE LOCATION MAP
CANNON AIR FORCE BASE

DATE:	SCALE:	DRAWN BY:
7/97	SHOWN	SHN

96-333\FIGURE1.DWG 7/14/97 (R13)



FOOTHILL ENGINEERING CONSULTANTS, INC.

FIGURE 2
MONITORING WELL LOCATION MAP
CANNON AIR FORCE BASE

DATE:	SCALE:	DRAWN BY:
7/97	1"=500'	SHN

96-133\FIGA-1-2.DWG 7/14/97 R(12)

Table 1: Groundwater Sample Results Summary - June 1997

Quarterly Groundwater Sampling - Monitoring Well R
Semi-Annual Groundwater Sampling Monitoring Wells N and O

Cannon Air Force Base, Clovis, New Mexico

Sample ID/ Analyte/ Method of Analysis	CAFB-MWN-0697-1	CAFB-MWO-0697-1	CAFB-MWO-0697-2**	CAFB-MWR-0697-1	MCL
Barium-SW-846 6010	0.066	0.064	0.062	0.091	2.0
Lead-SW-846 6010	0.013	ND	ND	ND	---
Nickel-SW-846 6010	ND	ND	ND	0.042	0.10
Selenium-SW-846 7740	0.015	ND	ND	ND	0.05
Vanadium-SW-846 6010	0.021	0.016	0.015	0.010	---
TOC-SW-846 9060	ND	1.2	1.3	2.6	---
TOX-SW-846 9020	ND	ND	ND	ND	---
VOCs-SW-846 8240B	ND	ND	ND	ND	---
SVOCs-SW-846 8270B	ND	ND	ND	ND	---
Sulfide-EPA 376.2	ND	ND	ND	0.053	---
Herbicides- SW-846 8150	ND	ND	ND	ND	----
Dioxin-2, 3, 7, 8-TCDD-SW-846 8280	ND	ND	ND	ND	3E-08
Cyanide-SW-846 9012	ND	ND	ND	ND	---
Organochlorine Pesticides/PCBs- SW-846 8080A	ND	ND	ND	ND	---
Reporting Units	mg/L	mg/L	mg/L	mg/L	mg/L

All samples collected on June 3, 1997
** = sample is a field duplicate of CAFB-MWO-0697-1
MCL = Maximum Contaminant Level
ND = analytes not detected above reporting limits

INTERIM STATUS DETECTION MONITORING SEMI-ANNUAL INDICATOR PARAMETER REPORT

This set of data sheets should be completed by facilities in semi-annual detection monitoring, HWMR-6, Part VI, Section 265.92(d) (2) and (e) and Section 265.94(a). These data sheets should be completed semi-annually and submitted annually. The raw lab data sheets should be submitted in addition to the Semi-Annual Report. In order to be acceptable the raw lab data sheets must include 1) the date the sample was taken, 2) the sample extraction date, if any, and 3) the date of analysis.

FACILITY NAME **Cannon Air Force Base** EPA I.D. NUMBER **NM 7572124454**

WELL NUMBER **MW-N**

FIRST SAMPLING EVENT SEMI-ANNUAL REPORT

LABORATORY NAME **Quanterra Inc.** DATE SAMPLED **6/03/97**

SAMPLED BY **Foothill Engineering Consultants** LABORATORY SAMPLE I.D. #

TIME SAMPLED **1530** DATE RECEIVED BY LAB. **6/05/97**

PARAMETERS	STORET CODE	UNITS	VALUE	DATE ANALYZED
Elevation of G. Water	71993	ft.	3995.1	6/03/97
Well Depth	-----	ft.	297.5	6/03/97
Well Casing Volume	-----	gal.	13.75	6/03/97
Pump Rate	-----	gal/min	1	6/03/97
Pump Period	72004	min.	50	6/03/97
Volume Evacuated	73675	gal.	45	6/03/97

Sampler Material: TEFLN Well Sampling Method: PSPMP

FIRST SAMPLING EVENT
SEMI-ANNUAL REPORT
(continued)

PARAMETERS	STORET CODE	UNITS	VALUE	DETECTION LIMIT	DATE ANALYZED	METHOD USED
pH	00400	S.U.	7.55 (f)	N/A	6/03/97	
	00400	S.U.	7.47 (f)	N/A	6/03/97	Field Probe
	00400	S.U.	7.43 (f)	N/A	6/03/97	
	00400	S.U.	7.42 (f)	N/A	6/03/97	
Specific Conductivity	00095	umhos/cm	0.805 (f)	N/A	6/03/97	
	00095	umhos/cm	0.812 (f)	N/A	6/03/97	Field Probe
	00095	umhos/cm	0.811 (f)	N/A	6/03/97	
	00095	umhos/cm	0.816 (f)	N/A	6/03/97	
T.O.X.	70354	µg/l	ND	30.0 µg/L	6/19/97	
	70354	µg/l	N/A	N/A	N/A	SW846-9020
	70354	µg/l	N/A	N/A	N/A	
	70354	µg/l	N/A	N/A	N/A	
			ND	1.0	6/16/97	
T.O.C.	00680	mg/l	N/A	N/A	N/A	SW846-9060
	00680	mg/l	N/A	N/A	N/A	
	00680	mg/l	N/A	N/A	N/A	
	00680	mg/l				

Signature: _____

SEMI-ANNUAL GROUND WATER QUALITY PARAMETERS REPORT

Please indicate the date of the semi-annual sampling event during which samples were taken to evaluate the ground water parameters:

Date Sampled: **6/03/97**

PARAMETERS	STORET CODE	UNITS	VALUE	DETECTION LIMIT	DATE ANALYZED	METHOD USED
Chloride	00940		N/A	N/A	N/A	
Iron	01045	µg/l	N/A	N/A	N/A	N/A
Manganese	71883	µg/l	N/A	N/A	N/A	
Phenols	32730	µg/l	N/A	N/A	N/A	
Sodium	00929	mg/l	N/A	N/A	N/A	
Sulfate	00945	mg/l	N/A	N/A	N/A	N/A
Turbidity		NTU	-10 (f)	N/A	6/03/97	Horiba-U10

Signature: _____

Name (Printed): _____

Assessment Monitoring Semi-annual Report (continued)

Well Number: MW-N Facility Name Cannon Air Force Base

MONITORING WELL APPENDIX IX DATA FOR FACILITIES IN ASSESSMENT

Under assessment monitoring, per 20 NMAC 4.1 Subpart VI Section 265.93 (d) (4), (5), and (7) and per 42 Federal Register, 25942 (July 9, 1987), please list values for the Appendix IX parameters which were found in your Appendix IX scan.

PARAMETER	STORET CODE	VALUE	UNITS	DETECTION LIMIT	DATE EXTRACTED	DATE ANALYZED	METHOD USED
Barium		0.066	mg/L	0.010	6/18/97	6/27/97	SW846-6010
Lead		0.013	mg/L	0.0030	6/18/97	6/27/97	SW846-6010
Selenium		0.015	mg/L	0.005	6/18/97	6/27/97	SW846-6010
Vanadium		0.021	mg/L	0.010	6/18/97	6/27/97	SW846-6010
TOC	00680	ND	mg/L	1.0	N/A	6/16/97	SW846-9060
TOX	70354	ND	mg/L	0.030	N/A	6/19/97	SW846-9020

INTERIM STATUS DETECTION MONITORING SEMI-ANNUAL INDICATOR PARAMETER REPORT

This set of data sheets should be completed by facilities in semi-annual detection monitoring, HWMR-6, Part VI, Section 265.92(d) (2) and (e) and Section 265.94(a). These data sheets should be completed semi-annually and submitted annually. The raw lab data sheets should be submitted in addition to the Semi-Annual Report. In order to be acceptable the raw lab data sheets must include 1) the date the sample was taken, 2) the sample extraction date, if any, and 3) the date of analysis.

FACILITY NAME **Cannon Air Force Base** EPA I.D. NUMBER **NM 7572124454**

WELL NUMBER **MW-O**

FIRST SAMPLING EVENT SEMI-ANNUAL REPORT

LABORATORY NAME **Quanterra Inc.** DATE SAMPLED **6/03/97**

SAMPLED BY **Foothill Engineering Consultants, Inc.** LABORATORY SAMPLE I.D. #

TIME SAMPLED **1150** DATE RECEIVED BY LAB. **6/05/97**

PARAMETERS	STORET CODE	UNITS	VALUE	DATE ANALYZED
Elevation of G. Water	71993	ft.	3985.92	6/03/97
Well Depth	-----	ft.	304.3	6/03/97
Well Casing Volume	-----	gal.	14.3	6/03/97
Pump Rate	-----	gal/min	1	6/03/97
Pump Period	72004	min.	50	6/03/97
Volume Evacuated	73675	gal.	38	6/03/97

Sampler Material: **TEFLN** Well Sampling Method: **PSPMP**

FIRST SAMPLING EVENT
SEMI-ANNUAL REPORT
(continued)

PARAMETERS	STORET CODE	UNITS	VALUE	DETECTION LIMIT	DATE ANALYZED	METHOD USED
pH	00400	S.U.	6.88 (f)	N/A	6/03/97	
	00400	S.U.	6.94 (f)	N/A	6/03/97	Field Probe
	00400	S.U.	6.92 (f)	N/A	6/03/97	
	00400	S.U.	6.92 (f)	N/A	6/03/97	
Specific Conductivity	00095	umhos/cm	2.05 (f)	N/A	6/03/97	
	00095	umhos/cm	2.07 (f)	N/A	6/03/97	Field Probe
	00095	umhos/cm	2.07 (f)	N/A	6/03/97	
	00095	umhos/cm	2.04 (f)	N/A	6/03/97	
T.O.X.	70354	µg/l	ND	30.0	6/19/97	
	70354	µg/l	N/A	N/A	N/A	SW846-9020
	70354	µg/l	N/A	N/A	N/A	
	70354	µg/l	N/A	N/A	N/A	
			1.2	1.0	6/16/97	
T.O.C.	00680	mg/l	N/A	N/A	N/A	
	00680	mg/l	N/A	N/A	N/A	SW846-9060
	00680	mg/l	N/A	N/A	N/A	
	00680	mg/l				

Signature: _____

SEMI-ANNUAL GROUND WATER QUALITY PARAMETERS REPORT

Please indicate the date of the semi-annual sampling event during which samples were taken to evaluate the ground water parameters:

Date Sampled: 6/03/97

PARAMETERS	STORET CODE	UNITS	VALUE	DETECTION LIMIT	DATE ANALYZED	METHOD USED
Chloride	00940		N/A	N/A	N/A	
Iron	01045	µg/l	N/A	N/A	N/A	N/A
Manganese	71883	µg/l	N/A	N/A	N/A	
Phenols	32730	µg/l	N/A	N/A	N/A	
Sodium	00929	mg/l	N/A	N/A	N/A	
Sulfate	00945	mg/l	N/A	N/A	N/A	N/A
Turbidity		NTU	-10(f)	N/A	6/03/97	Horiba-U10

Signature: _____

Name (Printed): _____

Assessment Monitoring Semi-Annual Report (continued)

Well Number: MW-O Facility Name Cannon Air Force Base

MONITORING WELL APPENDIX IX DATA FOR FACILITIES IN ASSESSMENT

Under assessment monitoring, per 20 NMAC 4.1 Subpart VI Section 265.93 (d) (4), (5), and (7) and per 42 Federal Register, 25942 (July 9, 1987), please list values for the Appendix IX parameters which were found in your Appendix IX scan.

PARAMETER	STORET CODE	VALUE	UNITS	DETECTION LIMIT	DATE EXTRACTED	DATE ANALYZED	METHOD USED
Barium		0.064	mg/L	0.010	6/18/97	6/27/97	SW846-6010
Vanadium		0.016	mg/L	0.010	6/18/97	6/27/97	SW846-6010
TOC	00680	1.2	mg/L	1.0	N/A	6/16/97	SW846-9060
TOX	70354	ND	mg/L	0.030	N/A	6/19/97	SW846-9020

ASSESSMENT MONITORING QUARTERLY REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS & RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NM 87502

This set of data sheets is for use by all facilities in assessment monitoring (20 NMAC 4.1, Subpart VI, Section 265.93(D) (4), (5) and (7) (e) and (f), and Section 265.94 (b).

FACILITY NAME **Cannon Air Force Base** EPA I.D.# **NM 7572124454**

WELL NUMBER **MW-R** SAMPLE COLLECTION BY **Foothill Engineering Consultants, Inc.**

LABORATORY NAME **Quanterra Inc.** DATE SAMPLED **6/03/97**

TIME SAMPLED **1150** DATE RECEIVED BY LAB **6/05/97**

PARAMETERS	STORET CODE	UNITS	VALUE	DATE ANALYZED
Elevation of G. Water	71993	ft.	3997.82	6/03/97
Well Depth	N/A	ft.	304.0	6/03/97
Well Casing Volume	N/A	gal.	38.5	6/03/97
Pump Rate	N/A	gal/min	1	6/03/97
Pump Period	72004	min.	120	6/03/97
Volume Evacuated	73675	gal.	116	6/03/97
Sampler Material	N/A	N/A	TEFLN	6/03/97
Well Sampling Method: PSPMP				

Assessment Monitoring Quarterly Report (continued)

Well Number: MW-R Facility Name Cannon Air Force Base

INDICATOR PARAMETERS

PARAMETERS	STORET CODE	UNITS	VALUE	DETECTION LIMIT	DATE ANALYZED	METHOD USED
pH	00400	S.U.	7.88 (f)	N/A	6/03/97	
	00400	S.U.	7.38 (f)	N/A	6/03/97	Field Probe
	00400	S.U.	7.33 (f)	N/A	6/03/97	
	00400	S.U.	7.33 (f)	N/A	6/03/97	
Specific Conductivity	00095	umhos/cm	0.804 (f)	N/A	6/03/97	
	00095	umhos/cm	0.814 (f)	N/A	6/03/97	Field Probe
	00095	umhos/cm	0.824 (f)	N/A	6/03/97	
	00095	umhos/cm	0.830 (f)	N/A	6/03/97	
TOX	70354	µg/L	ND	30.0	6/19/97	
	70354	mg/L	N/A	N/A	N/A	SW846-9020
	70354	mg/L	N/A	N/A	N/A	
	70354	mg/L	N/A	N/A	N/A	
TOC	00680	mg/L	1.2	1.0	6/16/97	
	00680	mg/L	N/A	N/A	N/A	SW846-9060
	00680	mg/L	N/A	N/A	N/A	
	00680	mg/L	N/A	N/A	N/A	

Assessment Monitoring Quarterly Report (continued)

Well Number: MW-R Facility Name Cannon Air Force Base

INDICATOR PARAMETERS

PARAMETERS	STORET CODE	UNITS	VALUE	DETECTION LIMIT	DATE ANALYZED	METHOD USED
Chloride	00940	mg/L	N/A	N/A	N/A	
Iron	01045	mg/L	N/A	N/A	N/A	N/A
Manganese	71883	mg/L	N/A	N/A	N/A	
Phenols	32730	mg/L	N/A	N/A	N/A	
Sodium	00929	mg/L	N/A	N/A	N/A	
Sulfate	00945	mg/L	N/A	N/A	N/A	N/A
Turbidity		TU	6(f)	N/A	6/03/97	Horiba-U10

Date Of This Report: 7/11/97

Signature: _____

Name (Printed): Foothill Engineering Consultants

Assessment Monitoring Quarterly Report (continued)

Well Number: MW-R Facility Name Cannon Air Force Base

MONITORING WELL APPENDIX IX DATA FOR FACILITIES IN ASSESSMENT

Under assessment monitoring, per 20 NMAC 4.1 Subpart VI Section 265.93 (d) (4), (5), and (7) and per 42 Federal Register, 25942 (July 9, 1987), please list values for the Appendix IX parameters which were found in your Appendix IX scan.

PARAMETER	STORET CODE	VALUE	UNITS	DETECTION LIMIT	DATE EXTRACTED	DATE ANALYZED	METHOD USED
Barium		0.091	mg/L	0.010	6/18/97	6/27/97	SW846-6010
Nickel		0.042	mg/L	0.040	6/18/97	6/27/97	SW846-6010
Vanadium		0.010	mg/L	0.010	6/18/97	6/27/97	SW846-6010
TOC	00680	2.6	mg/L	1.0	N/A	6/16/97	SW846-9060
TOX	70354	ND	mg/L	0.030	N/A	6/19/97	SW846-9020

APPENDIX I

Field Forms

DAILY QUALITY CONTROL REPORT

PROJECT: Cannon AFB IH Sampling

Date: 6/2/97

LOCATION: Clovis NM

Weather:
Temp: 92°F
Wind light-variable
Humidity 70%

PERSONNEL

Name	Position	Hours Worked
Jan Broussard	Geologist	
Phill Aschbacher	Field Tech	

FIELD INSTALLATIONS

ID No(s).
Drilled:
from
to
Footage
Casing Set:
Screen
Riser

EQUIPMENT

	Calibrated
PID/FID MiniRAE Model PGM75	(Yes)/No
O_2/LEL N/A	Yes/No
pH/Conductivity/Temp.	Yes/No
Other Solinst water-level Gauge	Yes/(No)

Hours Drilling
Hours Installing
Hours Decon
Hours Development
Hours Sampling
Hours Shut Down
# of Samples: Type

SAMPLING SUMMARY:

Boring/Well No.	Sample No.	Media Sampled	Depth	QC	Analytes

Description of work performed: Opened, monitored & Gauged wells O N & R. Tested atmosphere w/ PID prior to gauging static-water level. Set slug for hydrophysical testing of well R. Slug set approx 1 ft. above static water level & lines guided into position w/ the water level gauge. Set transducer approx. 15 ft. below static water level by lowering to the bottom & retracting it ten feet from the bottom.

Health and Safety Levels D

Summary of Monitoring Activities: Gauge wells w/ PID Prior to performing sampling Activities

Problems encountered/Corrective Actions: Had to cut locks off wells R, N, & O. The drillers did not leave keys to well R. We cut locks off the other wells & replaced them w/ locks that are keyed the same.

Any changes from work plan? None

Signature: Jan Broussard

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DAILY QUALITY CONTROL REPORT

PROJECT: Cannon AFB - 1st sampling

LOCATION: Clovis NM

Date: 6/3/97

Weather:
Temp: 68°F
Wind light - SW
Humidity 100%

PERSONNEL

Name	Position	Hours Worked
Jon Broussard	Geologist	
Chell Aschbacher	Field Tech	

FIELD INSTALLATIONS

ID No(s).
Drilled:
from
to
Footage
Casing Set:
Screen
Riser

EQUIPMENT

	Calibrated
OVA	Yes/No
O_2/LEL	Yes/No
pH/Conductivity/Temp. See below	Yes/No
Other Horiba U10, Serial # 510037	Yes/No

Calibrated against buffered solutions for pH, conductivity & turbidity. Used Hermit 1000 datalogger to slug test well R.

Hours Drilling
Hours Installing
Hours Decon
Hours Development
Hours Sampling
Hours Shut Down
# of Samples: Type

SAMPLING SUMMARY:

Boring/Well No.	Sample No.	Media Sampled	Depth	QC	Analytes
N	CAFB-MWN-0697-1	Water-field			Appendix IX SVOC, VOC, Pest/PCB, Herb, Metals.
O	CAFB-MWO-0697-1	Water-field			
O	CAFB-MWO-0697-2	Water-duplicate			
O	CAFB-MWO-0697-3	Water-MRL split			
R	CAFB-MWR-0697-1	Water-field			Dioxin/TCDD, Cyanides, Sulfides, TOC, TOX

Description of work performed: Performed slug test on well R - Sampled wells N, O and R for the above mentioned analytes. Placed new, keyed alike locks on wells N, O and R.

Health and Safety Levels D Summary of Monitoring Activities: Gauged wells w/ PID prior to beginning sampling. Used surgical gloves while sampling each well.

Problems encountered/Corrective Actions: Both tanks at wells MWN and MWO are filled to capacity. They will need to be emptied prior to another round of groundwater sampling.

Any changes from work plan? No

Signature: Jon Broussard

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Well Purge Data Sheet for June 3, 1997 - Clovis, New Mexico

Water Column = (20.99) feet X 0 .655 = Bore Volume = 13.75

Groundwater Quality Parameters - MW N, 3 June 1997 TD=297.5 DTW = 276.51							
Bore Volumes	pH	Conductivity	Salinity	Dissolved Oxygen	Temperature	Turbidity	
½	~~7.55~~ 6.88	0.805	0.03	12.65	19.8	23	
1	~~7.47~~ 6.94	0.813	0.03	12.43	19.3	1	1523
1 ½	7.43	0.812	0.03	12.78	19.6	-10	
2	7.40	0.811	0.03	12.85	19.7	-10	1540
2 ½	7.39	0.816	0.03	13.03	19.5	34	1547
3	7.42	0.816	0.03	13.00	19.8	-8	

Water Column = (19.22) feet X 0 .655 = Bore Volume = 12.59

Groundwater Quality Parameters - MW O, 3 June 1997 TD= 303.9 DTW = 294.68							
Bore Volumes	pH	Conductivity	Salinity	Dissolved Oxygen	Temperature	Turbidity	
½	6.88	2.05	0.09	10.98	17.5	-10	
1	6.94	2.07	0.09	11.11	17.2	-10	1110
1 ½	6.92	2.07	0.09	11.19	17.1	-10	
2	6.92	2.07	0.09	11.28	16.9	-10	1122
2 ½	6.91	2.04	0.09	11.34	17.0	36	1127
3	6.92	2.04	0.09	11.46	16.9	-10	1131

Water Column = (~~26.23~~ 1.47) feet X 0 ~~.655~~ = Bore Volume = 38.5

Groundwater Quality Parameters - MW R, 3 June 1997 TD= 304① DTW = 281.27							
Bore Volumes	pH	Conductivity	Salinity	Dissolved Oxygen	Temperature	Turbidity	
½	7.88	0.804	0.03	11.80	21.4	225	1806
1	7.74	0.814	0.03	11.90	19.6	21	1818
1 ½	7.38	0.824	0.03	11.38	19.1	2	1832
2	7.33	0.824	0.03	11.39	19.2	4	1846
2 ½	7.33	0.822	0.03	11.44	19.1	8	1900
3	7.33	0.830	0.03	11.41	19.0	10	1915

D = 6" r = 3" = 0.25 ft

$V = \pi r^2 h$ C = (3.14)(0.25 ft)^2(1 ft)(7.48 gal / ft^3) ≈ 1.5 gal

IIII IIII IIII IIII II

C:\office\fec\new-mex\gw-tabl.wpd

① add 3½ feet to TD for stickup = 307.5

1997

APPENDIX II

Analytical Results/Quality Control Data

Quanterra
Environmental Services

Table Of Contents

Standard Deliverables With Supporting Documentation

Report Contents	Section	Number Of Pages
Standard Deliverables		
Introduction	**A**	110
• Table of Contents • Narrative • LIMs Report Key • Sample Description • Test Requests • Analytical Results • QC Summary • Chain-of-Custody • Miscellaneous		
Supporting Documentation		
[Please Note: A one-page "Description of Supporting Documentation" is provided in the Supporting Documentation section(s).]		
Volatile GC/MS	**B**	312
Semivolatile GC/MS	**C**	237
Volatile GC	**D**	/
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LC/MS or HPLC	**F**	/
Metals	**G**	68
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Subcontracted Data	**I**	

Introduction

Eight aqueous samples were received at Quanterra Environmental Services Denver on June 5, 1997. The samples arrived at the laboratory with cooler temperatures of 8.0°C, 8.2°C, 9.1°C, and 10.6°C. The samples arrived in good condition with the exception of two of the #12 bottles for sample 055535-0005 (CAFB-MW0-0697-2). Extra sample bottles were provided for this sample.

The chain of custody (#26014) does not have a relinquishment signature, date, and time indicated. The laboratory acknowledges the relinquishment as provided on the other chains of custody.

Due to laboratory error, the sample containers for sulfide and cyanide were not shipped to the site for sample collection. The samples were collected and preserved with sodium hydroxide. The laboratory added zinc acetate to the samples for the sulfide analysis immediately upon sample receipt.

This report presents the analytical results as well as supporting information to aid in the evaluation and interpretation of the data and is arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results

All analyses at Quanterra's Denver laboratory are performed so that the maximum concentration of sample consistent with the method is analyzed. Dilutions are at times required to avoid saturation of the detector, to achieve linearity for a specific target compound, or to reduce matrix interferences. In this event, reporting limits are adjusted proportionately.

APPENDIX IX VOLATILES BY GC/MS

There were no reportable anomalies for volatile organics by Method 8240B.

APPENDIX IX SEMIVOLATILES BY GC/MS

For the method blank associated with samples 055535-0001, -0003, -0005, and -0007, bis(2-ethylhexyl) phthalate was detected above the reporting limit by Method 8270B. This compound was not detected in the samples and appears to be isolated to the method blank. Data are reported.

APPENDIX IX SEMIVOLATILES BY GC

The average spike recoveries for all of the compounds were outside the laboratory control limits for the DCS QC (Lot: 10 JUN 97-01) by Method 8080A. The precision was in control for all of the compounds. All samples were reprepped outside the holding time and reanalyzed. The DCS QC was in control for precision and accuracy for the reanalysis. The reprep data confirms that no target compounds were detected in the samples. Both sets of data are provided with the report. The repreps are reported with a -RE suffix.

The surrogate recovery for dibutyl chlorendate was below the laboratory QC limits for sample 055535-0003, by Method 8080A. The other 2 surrogates are within the QC limits. Data are reported.

Matrix specific batch QC was not extracted and analyzed with the samples by Methods 8080A and 8150. DCS QC is provided for accuracy and precision data for these analyses.

APPENDIX IX METALS

There were no reportable anomalies by Methods 6010 and 7470.

GENERAL INORGANICS

The recovery of the low distilled standard slightly exceeded the established recovery limits for the cyanide analysis. The LCS was in control and the high distilled standard was within limits. All sample recoveries were "ND". Data are reported.

The spike recovery for TOX (total organic halogen) is above the upper laboratory QC limit for the matrix spike only for the matrix specific batch QC. The precision is within the QC limit for the matrix QC and the associated LCS is in control. Data are reported.

DIOXINS/ FURANS

The analysis for 2,3,7,8-TCDD by Method 8280 was performed by the Quanterra-West Sacramento laboratory.

Detection limits for dioxins and furans are reported on a sample specific basis and all results are recovery corrected per the isotope dilution technique.

There were no anomalies associated with the dioxin analysis.

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LIMs Report Key

Section	Description
Cover Letter	Signature page, report narrative as applicable.
Sample Description Information	Tabulated cross-reference between the Lab ID and Client ID, including matrix, date and time sampled, and the date received for all samples in the project.
Sample Analysis Results Sheets	Lists sample results, test components, reporting limits, dates prepared and analyzed, and any data qualifiers. Pages are organized by test.
QC LOT Assignment Report	Cross-reference between lab IDs and applicable QC batches (DCS, LCS, Blank, MS/SD, DU)
Duplicate Control Sample Report	Percent recovery and RPD results, with acceptance limits, for the laboratory duplicate control samples for each test are tabulated in this report. These are measures of accuracy and precision for each test. Acceptance limits are based upon laboratory historical data.
Laboratory Control Sample Report	Percent recovery results for a single Laboratory Control Sample (if applicable) are tabulated in this report, with the applicable acceptance limits for each test.
Matrix Spike/Matrix Spike Duplicate Report	Percent recovery and RPD results for matrix-specific QC samples and acceptance limits, where applicable. This report can be used to assess matrix effects on an analysis.
Single Control Sample Report	A tabulation of the surrogate recoveries for the blank for organic analyses.
Method Blank Report	A summary of the results of the analysis of the method blank for each test.

List of Abbreviations and Terms

Abbreviation	Term	Abbreviation	Term
DCS	Duplicate Control Sample	MSD	Matrix Spike Duplicate
DU	Sample Duplicate	QC Run	Preparation Batch
EB	Equipment Blank	QC Category	LIMs QC Category
FB	Field Blank	QC Lot	DCS Batch
FD	Field Duplicate	ND	Not Detected at or above the reporting limit expressed
IDL	Instrument Detection Limit (Metals)	QC Matrix	Matrix of the laboratory control sample(s)
LCS	Laboratory Control Sample	RL	Reporting Limit
MB	Method Blank	QC	Quality Control
MDL	Method Detection Limit	SA	Sample
MS	Matrix Spike	SD	Spike Duplicate
RPD	Relative Percent Difference	TB	Trip Blank
ppm (part-per-million)	mg/L or mg/kg (usually)	ppb (part-per-billion)	ug/L or ug/kg (usually)
QUAL	Qualifier flag	DIL	Dilution Factor

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Quanterra's Denver laboratory is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

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Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Foothill Engineering Consultants Inc.

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
055535-0001-SA	CAFB-MWN-0697-1	AQUEOUS	03 JUN 97	15:30	05 JUN 97
055535-0001-MB	Method Blank	AQUEOUS	05 JUN 97		05 JUN 97
055535-0001-RE	CAFB-MWN-0697-1	AQUEOUS	03 JUN 97	15:30	05 JUN 97
055535-0002-TB	TRIP BLANK #1	AQUEOUS	03 JUN 97		05 JUN 97
055535-0003-SA	CAFB-MWO-0697-1	AQUEOUS	03 JUN 97	11:50	05 JUN 97
055535-0003-RE	CAFB-MWO-0697-1	AQUEOUS	03 JUN 97	11:50	05 JUN 97
055535-0004-TB	TRIP BLANK #2	AQUEOUS	03 JUN 97		05 JUN 97
055535-0005-SA	CAFB-MWO-0697-2	AQUEOUS	03 JUN 97	12:00	05 JUN 97
055535-0005-RE	CAFB-MWO-0697-2	AQUEOUS	03 JUN 97	12:00	05 JUN 97
055535-0006-TB	TRIP BLANK #3	AQUEOUS	03 JUN 97		05 JUN 97
055535-0007-SA	CAFB-MWR-0697-1	AQUEOUS	03 JUN 97	19:10	05 JUN 97
055535-0007-RE	CAFB-MWR-0697-1	AQUEOUS	03 JUN 97	19:10	05 JUN 97
055535-0008-TB	TRIP BLANK #4	AQUEOUS	03 JUN 97		05 JUN 97

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ANALYTICAL TEST REQUESTS
for
Foothill Engineering Consultants Inc.

Lab ID: 055535	Group Code	Analysis Description	Custom Test?
0001 , 0003, 0005 , 0007	A	Volatile Organics	N
		Appendix IX List	N
		Screen - Volatile Organics	N
		Semivolatile Organics	N
		Appendix IX List	
		Prep - Semivolatile Organics by GC/MS	N
		Chlorinated Pesticides and PCB's	N
		Appendix IX List	
		Prep - Organochlorine Pesticides/PCBs by GC (Appendix IX)	N
		2,3,7,8-TCDD - by Low Resolution MS	N
		Prep - Low Res. Method 613 L-L Extraction for Dioxins/Furans	N
		Appendix IX Herbicides	N
		Prep - Herbicides by GC	N
		Appendix IX Metals (Total) done by ICP	Y
		Prep - Total Metals, ICP	N
		ICP Metals (Total) by Trace ICP	N
		Mercury, Cold Vapor AA (Total)	N
		Prep - Mercury, Cold Vapor AA (Total)	N
		Cyanide, Total	N
		Prep - Cyanide, Total	N
		Sulfide, Total	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
0002 , 0004, 0006 , 0008	B	Volatile Organics	N
		Appendix IX List	N
		Screen - Volatile Organics	N

Analytical Results

The analytical results for this project are presented in the following data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization date is the date when the project was defined by the client such that laboratory work could begin.

Data sheets contain a listing of the parameters measured in each test, the analytical results and the Quanterra reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

The results from the Standard Quanterra QA/QC Program, which generates data which are independent of matrix effects, are provided subsequently.

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ANALYTICAL RESULT SUMMARY

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SCS SUMMARY

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SINGLE CONTROL SAMPLE REPORT
latile Organics by GC/MS

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: Q8240-A Matrix: AQUEOUS QC Lot: 13 JUN 97-Z QC Run: 13 JUN 97-Z Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	47.2	94	77-115
4-Bromofluorobenzene	50.0	52.8	106	87-113
Toluene-d8	50.0	51.4	103	90-112
Category: Q8240-A Matrix: AQUEOUS QC Lot: 16 JUN 97-J QC Run: 16 JUN 97-J Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	49.0	98	77-115
4-Bromofluorobenzene	50.0	50.4	101	87-113
Toluene-d8	50.0	49.7	99	90-112

lculations are performed before rounding to avoid round-off errors in calculated results.

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SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: Q8270-A				
Matrix: AQUEOUS				
QC Lot: 09 JUN 97-03 QC Run: 09 JUN 97-03				
Concentration Units: ug/L				
Nitrobenzene-d5	100	77.5	78	51-104
2-Fluorobiphenyl	100	68.3	68	43-116
Terphenyl-d14	100	59.6	60	33-141
2-Fluorophenol	150	114	76	36-108
Phenol-d5	150	121	81	47-106
2,4,6-Tribromophenol	150	118	78	49-106

Calculations are performed before rounding to avoid round-off errors in calculated results.

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NGLE CONTROL SAMPLE REPORT
nivolatile Organics by GC

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: 8080-A Matrix: AQUEOUS QC Lot: 10 JUN 97-01 QC Run: 10 JUN 97-01 Concentration Units: ug/L				
Tetrachloro-m-xylene	1.00	0.782	78	51-103
Dibutyl chlorendate	1.00	0.872	87	71-109
Decachlorobiphenyl	0.200	0.186	93	50-138
Category: 615-A Matrix: AQUEOUS QC Lot: 10 JUN 97-01 QC Run: 10 JUN 97-01 Concentration Units: ug/L				
DCAA	5.00	4.20	84	27-121
Category: 8080-A Matrix: AQUEOUS QC Lot: 01 JUL 97-01 QC Run: 01 JUL 97-01 Concentration Units: ug/L				
Tetrachloro-m-xylene	1.00	0.949	95	51-103
Dibutyl chlorendate	1.00	0.929	93	71-109
Decachlorobiphenyl	0.200	0.224	112	50-138

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK SUMMARY

Quanterra
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METHOD BLANK REPORT
latile Organics by GC/MS

Analyte	Result	Units	Reporting Limit	
Test: Q8240-AP9-AP				
Matrix: AQUEOUS				
QC Lot: 13 JUN 97-Z QC Run: 13 JUN 97-Z				
Acetone	3.6	ug/L	20	J
Acetonitrile	ND	ug/L	100	
Acrolein	ND	ug/L	100	
Acrylonitrile	ND	ug/L	100	
Allyl chloride	ND	ug/L	10	
Benzene	ND	ug/L	5.0	
Bromodichloromethane	ND	ug/L	5.0	
Bromoform	ND	ug/L	5.0	
Bromomethane	ND	ug/L	10	
2-Butanone (MEK)	ND	ug/L	20	
Carbon disulfide	ND	ug/L	5.0	
Carbon tetrachloride	ND	ug/L	5.0	
Chlorobenzene	ND	ug/L	5.0	
Chloroethane	ND	ug/L	10	
Chloroform	ND	ug/L	5.0	
Chloromethane	ND	ug/L	10	
Chloroprene	ND	ug/L	5.0	
bromochloromethane	ND	ug/L	5.0	
,2-Dibromo-3-chloro-propane (DBCP)	ND	ug/L	10	
1,2-Dibromoethane (EDB)	ND	ug/L	5.0	
Dibromomethane	ND	ug/L	5.0	
trans-1,4-Dichloro-2-butene	ND	ug/L	5.0	
Dichlorodifluoromethane	ND	ug/L	10	
1,1-Dichloroethane	ND	ug/L	5.0	
1,2-Dichloroethane	ND	ug/L	5.0	
1,1-Dichloroethene	ND	ug/L	5.0	
trans-1,2-Dichloroethene	ND	ug/L	2.5	
1,2-Dichloroethene (total)	ND	ug/L	5.0	
1,2-Dichloropropane	ND	ug/L	5.0	
cis-1,3-Dichloropropene	ND	ug/L	5.0	
trans-1,3-Dichloropropene	ND	ug/L	5.0	
1,4-Dioxane	ND	ug/L	500	
Ethylbenzene	ND	ug/L	5.0	
Ethyl methacrylate	ND	ug/L	5.0	
2-Hexanone	ND	ug/L	20	
Iodomethane	ND	ug/L	5.0	
Isobutyl alcohol	ND	ug/L	200	
Methacrylonitrile	ND	ug/L	5.0	
Methylene chloride	ND	ug/L	5.0	

J = Result is detected below the reporting limit or is an estimated concentration.

Quanterra
Environmental Services

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit	
Test: Q8240-AP9-AP Matrix: AQUEOUS QC Lot: 13 JUN 97-Z QC Run: 13 JUN 97-Z				
Methyl methacrylate	ND	ug/L	5.0	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	20	
Propionitrile	ND	ug/L	20	
Styrene	ND	ug/L	5.0	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0	
Tetrachloroethene	ND	ug/L	5.0	
Toluene	ND	ug/L	5.0	
1,1,1-Trichloroethane	ND	ug/L	5.0	
1,1,2-Trichloroethane	ND	ug/L	5.0	
Trichloroethene	ND	ug/L	5.0	
Trichlorofluoromethane	ND	ug/L	10	
1,2,3-Trichloropropane	ND	ug/L	5.0	
Vinyl acetate	ND	ug/L	10	
Vinyl chloride	ND	ug/L	10	
Xylenes (total)	ND	ug/L	5.0	
Test: Q8240-AP9-AP Matrix: AQUEOUS QC Lot: 13 JUN 97-Z QC Run: 13 JUN 97-Z				
Acetone	3.6	ug/L	20	J
Acetonitrile	ND	ug/L	100	
Acrolein	ND	ug/L	100	
Acrylonitrile	ND	ug/L	100	
Allyl chloride	ND	ug/L	10	
Benzene	ND	ug/L	5.0	
Bromodichloromethane	ND	ug/L	5.0	
Bromoform	ND	ug/L	5.0	
Bromomethane	ND	ug/L	10	
2-Butanone (MEK)	ND	ug/L	20	
Carbon disulfide	ND	ug/L	5.0	
Carbon tetrachloride	ND	ug/L	5.0	
Chlorobenzene	ND	ug/L	5.0	
Chloroethane	ND	ug/L	10	
Chloroform	ND	ug/L	5.0	
Chloromethane	ND	ug/L	10	
Chloroprene	ND	ug/L	5.0	
Dibromochloromethane	ND	ug/L	5.0	

J = Result is detected below the reporting limit or is an estimated concentration.

Quanterra
Environmental Services

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Test: Q8240-AP9-AP
Matrix: AQUEOUS
QC Lot: 16 JUN 97-J QC Run: 16 JUN 97-J

Analyte	Result	Units	Reporting Limit
Acetone	ND	ug/L	20
Acetonitrile	ND	ug/L	100
Acrolein	ND	ug/L	100
Acrylonitrile	ND	ug/L	100
Allyl chloride	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	20
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Chloroprene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
-Dibromo-3-chloro-propane (DBCP)	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
Dibromomethane	ND	ug/L	5.0
trans-1,4-Dichloro-2-butene	ND	ug/L	5.0
Dichlorodifluoromethane	ND	ug/L	10
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	2.5
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
1,4-Dioxane	ND	ug/L	500
Ethylbenzene	ND	ug/L	5.0
Ethyl methacrylate	ND	ug/L	5.0
2-Hexanone	ND	ug/L	20
Iodomethane	ND	ug/L	5.0
Isobutyl alcohol	ND	ug/L	200
Methacrylonitrile	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0

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METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: Q8240-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 16 JUN 97-J QC Run: 16 JUN 97-J			
Methyl methacrylate	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	20
Propionitrile	ND	ug/L	20
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0

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METHOD BLANK REPORT
Semivolatile Organics by GC/MS

Test: Q8270-AP9-3520-A
Matrix: AQUEOUS
QC Lot: 09 JUN 97-03 QC Run: 09 JUN 97-03

Analyte	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L	50
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	20
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
sec-Butyl-4,6-dinitro-phenol	ND	ug/L	20
4-Chloroaniline	ND	ug/L	10
bis(2-Chloroethoxy) methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
2,2'-oxybis(1-chloropropane)	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
3,3'-Dichlorobenzidine	ND	ug/L	50
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
Dimethoate	ND	ug/L	20

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METHOD BLANK REPORT
Semivolatile Organics by GC/MS (cont.)

Test: Q8270-AP9-3520-A
Matrix: AQUEOUS
QC Lot: 09 JUN 97-03 QC Run: 09 JUN 97-03

Analyte	Result	Units	Reporting Limit	
p-Dimethylaminoazobenzene	ND	ug/L	20	
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	20	
3,3'-Dimethylbenzidine	ND	ug/L	50	
a,a-Dimethylphenethyl-amine	1.1	ug/L	50	J
2,4-Dimethylphenol	ND	ug/L	10	
Dimethyl phthalate	ND	ug/L	10	
1,3-Dinitrobenzene	ND	ug/L	10	
4,6-Dinitro-2-methylphenol	ND	ug/L	50	
2,4-Dinitrophenol	ND	ug/L	50	
2,4-Dinitrotoluene	ND	ug/L	10	
2,6-Dinitrotoluene	ND	ug/L	10	
Di-n-octyl phthalate	ND	ug/L	10	
Diphenylamine	ND	ug/L	10	
Disulfoton	ND	ug/L	50	
bis(2-Ethylhexyl) phthalate	54	ug/L	10	
Ethyl methanesulfonate	ND	ug/L	10	
Famphur	ND	ug/L	100	
Fluoranthene	ND	ug/L	10	
Fluorene	ND	ug/L	10	
Hexachlorobenzene	ND	ug/L	10	
Hexachlorobutadiene	ND	ug/L	10	
Hexachlorocyclopentadiene	ND	ug/L	50	
Hexachloroethane	ND	ug/L	10	
Hexachlorophene	ND	ug/L	--	
Hexachloropropene	ND	ug/L	100	
Indeno(1,2,3-cd)pyrene	ND	ug/L	10	
Isophorone	ND	ug/L	10	
Isosafrole	ND	ug/L	20	
Methapyrilene	ND	ug/L	50	
3-Methylcholanthrene	ND	ug/L	20	
Methyl methanesulfonate	ND	ug/L	10	
2-Methylnaphthalene	ND	ug/L	10	
Methyl parathion	ND	ug/L	50	
2-Methylphenol	ND	ug/L	10	
3/4-Methylphenol	ND	ug/L	10	
Naphthalene	ND	ug/L	10	
1,4-Naphthoquinone	ND	ug/L	50	

J = Result is detected below the reporting limit or is an estimated concentration.

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METHOD BLANK REPORT
Semivolatile Organics by GC/MS (cont.)

Test: Q8270-AP9-3520-A
Matrix: AQUEOUS
QC Lot: 09 JUN 97-03 QC Run: 09 JUN 97-03

Analyte	Result	Units	Reporting Limit
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	100
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	20
Parathion	ND	ug/L	50
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	50
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	20
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
p-Phenylenediamine	ND	ug/L	100
Phorate	ND	ug/L	50
2-Picoline	ND	ug/L	20
Pronamide	ND	ug/L	20
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	20
Safrole	ND	ug/L	20
Sulfotepp	ND	ug/L	50
1,2,4,5-Tetrachloro-benzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	50
Thionazin	ND	ug/L	50
o-Toluidine	ND	ug/L	10

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METHOD BLANK REPORT
Semivolatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: Q8270-AP9-3520-A			
Matrix: AQUEOUS			
QC Lot: 09 JUN 97-03 QC Run: 09 JUN 97-03			
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
O,O,O-Triethylphosphorothioate	ND	ug/L	50
1,3,5-Trinitrobenzene	ND	ug/L	50

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METHOD BLANK REPORT
Semivolatile Organics by GC (cont.)
Project: 055535

Test: 8080-AP9-A Chlorinated Pesticides and PCB's Appendix IX List
Matrix: AQUEOUS

QC Lot: 01 JUL 97-01 QC Run: 01 JUL 97-01 Date Analyzed: 08 JUL 97

Analyte	Result	Units	Reporting Limit
Aldrin	ND	ug/L	0.050
Aroclor 1016	ND	ug/L	1.0
Aroclor 1221	ND	ug/L	1.0
Aroclor 1232	ND	ug/L	1.0
Aroclor 1242	ND	ug/L	1.0
Aroclor 1248	ND	ug/L	1.0
Aroclor 1254	ND	ug/L	1.0
Aroclor 1260	ND	ug/L	1.0
alpha-BHC	ND	ug/L	0.050
beta-BHC	ND	ug/L	0.050
delta-BHC	ND	ug/L	0.050
gamma-BHC (Lindane)	ND	ug/L	0.050
alpha-Chlordane	ND	ug/L	0.050
gamma-Chlordane	ND	ug/L	0.050
Chlorobenzilate	ND	ug/L	1.0
4,4'-DDD	ND	ug/L	0.10
4,4'-DDE	ND	ug/L	0.10
4,4'-DDT	ND	ug/L	0.10
Diallate	ND	ug/L	1.0
Dieldrin	ND	ug/L	0.10
Endosulfan I	ND	ug/L	0.050
Endosulfan II	ND	ug/L	0.10
Endosulfan sulfate	ND	ug/L	0.10
Endrin	ND	ug/L	0.10
Endrin aldehyde	ND	ug/L	0.10
Heptachlor	ND	ug/L	0.050
Heptachlor epoxide	ND	ug/L	0.050
Isodrin	ND	ug/L	0.10
Kepone	ND	ug/L	2.5
Methoxychlor	ND	ug/L	0.50
Toxaphene	ND	ug/L	5.0

Test: 8150-AP9-A Appendix IX Herbicides
Matrix: AQUEOUS
QC Lot: 10 JUN 97-01 QC Run: 10 JUN 97-01 Date Analyzed: 12 JUN 97

Analyte	Result	Units	Reporting Limit
2,4-D	ND	ug/L	1.2
2,4,5-TP (Silvex)	ND	ug/L	0.17
2,4,5-T	ND	ug/L	0.20
Dinoseb	ND	ug/L	1.0

ND = Not Detected

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METHOD BLANK REPORT
Semivolatile Organics by GC (cont.)

Test: 8080-AP9-A
Matrix: AQUEOUS
QC Lot: 01 JUL 97-01 QC Run: 01 JUL 97-01

Analyte	Result	Units	Reporting Limit
Aldrin	ND	ug/L	0.050
Aroclor 1016	ND	ug/L	1.0
Aroclor 1221	ND	ug/L	1.0
Aroclor 1232	ND	ug/L	1.0
Aroclor 1242	ND	ug/L	1.0
Aroclor 1248	ND	ug/L	1.0
Aroclor 1254	ND	ug/L	1.0
Aroclor 1260	ND	ug/L	1.0
alpha-BHC	ND	ug/L	0.050
beta-BHC	ND	ug/L	0.050
delta-BHC	ND	ug/L	0.050
gamma-BHC (Lindane)	ND	ug/L	0.050
alpha-Chlordane	ND	ug/L	0.050
gamma-Chlordane	ND	ug/L	0.050
Chlorobenzilate	ND	ug/L	1.0
4,4'-DDD	ND	ug/L	0.10
4,4'-DDE	ND	ug/L	0.10
4,4'-DDT	ND	ug/L	0.10
Diallate	ND	ug/L	1.0
Dieldrin	ND	ug/L	0.10
Endosulfan I	ND	ug/L	0.050
Endosulfan II	ND	ug/L	0.10
Endosulfan sulfate	ND	ug/L	0.10
Endrin	ND	ug/L	0.10
Endrin aldehyde	ND	ug/L	0.10
Heptachlor	ND	ug/L	0.050
Heptachlor epoxide	ND	ug/L	0.050
Isodrin	ND	ug/L	0.10
Kepone	ND	ug/L	2.5
Methoxychlor	ND	ug/L	0.50
Toxaphene	ND	ug/L	5.0

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METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-AP9-AT			
Matrix: AQUEOUS			
QC Lot: 18 JUN 97-E1 QC Run: 18 JUN 97-E1			
Barium	ND	mg/L	0.010
Beryllium	ND	mg/L	0.0020
Chromium	ND	mg/L	0.010
Cobalt	ND	mg/L	0.010
Copper	ND	mg/L	0.020
Nickel	ND	mg/L	0.040
Silver	ND	mg/L	0.010
Tin	ND	mg/L	0.10
Vanadium	ND	mg/L	0.010
Zinc	ND	mg/L	0.020
Test: ICP-TRACE-AT			
Matrix: AQUEOUS			
QC Lot: 18 JUN 97-E1 QC Run: 18 JUN 97-E1			
Antimony	ND	mg/L	0.010
Arsenic	ND	mg/L	0.010
Cadmium	ND	mg/L	0.0050
Lead	ND	mg/L	0.0030
Selenium	ND	mg/L	0.0050
Thallium	ND	mg/L	0.010
Test: HG-CVAA-7470-AT			
Matrix: AQUEOUS			
QC Lot: 13 JUN 97-SA QC Run: 13 JUN 97-SA			
Mercury	ND	mg/L	0.00020

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METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: CNTOT-TEC-A Matrix: AQUEOUS QC Lot: 12 JUN 97-N1 QC Run: 12 JUN 97-N1			
Cyanide	ND	mg/L	0.010
Test: S-SPEC-AT Matrix: AQUEOUS QC Lot: 09 JUN 97-S2 QC Run: 09 JUN 97-S2			
Sulfide, Total	ND	mg/L	0.050
Test: TOC-TOC-A Matrix: AQUEOUS QC Lot: 16 JUN 97-P1 QC Run: 16 JUN 97-P1			
Total Organic Carbon	ND	mg/L	1.0
Test: TOX-TOX-A Matrix: AQUEOUS QC Lot: 19 JUN 97-N1 QC Run: 19 JUN 97-N1			
Total Organic Halogen as Cl	ND	ug/L	30.0

2,3,7,8 TCDD
LOW RESOLUTION

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Environmental Services

Client Name: Foothill Engineering Consultants Inc.
Client ID: Method Blank
Lab ID: 055535-0001-MB
Matrix: AQUEOUS
Authorized: 05 JUN 97

Sampled: 05 JUN 97
Received: 05 JUN 97

Prepared: 12 JUN 97
Analyzed: 18 JUN 97

Sample Amt: 1.0

Parameter	Result	Units	Reporting Limit
2,3,7,8-TCDD	ND	ng/L	0.37
Surrogate	**Recovery**		**Limits**
13C-2,3,7,8-TCDD	85	%	-

Dilution factor is 1.0. All results and limits are corrected for dilution.

= Not Detected

Reported By: AALGAZI

Approved By: TSTONE

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MATRIX SPIKE & MATRIX SPIKE DUPLICATE SUMMARY

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MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Volatile Organics by GC/MS
Project: 055535

Category: Q8240-A Volatile Organics
Matrix: AQUEOUS
Sample: 055535-0005
MS Run: 13 JUN 97-Z
Units: ug/L

Analyte	Concentration Sample Result	MS Result	MSD Result	Amount Spiked MS	Amount Spiked MSD	% Recovery MS	% Recovery MSD	Recov. Accep. Limits	RPD MS-MSD	RPD Accept Limits
1,1-Dichloroethene	ND	50.2	51.1	50.0	50.0	100	102	80-132	1.8	20
Trichloroethene	ND	52.8	52.5	50.0	50.0	106	105	85-112	0.5	20
Benzene	ND	52.9	52.4	50.0	50.0	106	105	83-121	0.9	20
Toluene	ND	52.9	53.2	50.0	50.0	106	106	85-120	0.5	20
Chlorobenzene	ND	53.4	54.1	50.0	50.0	107	108	90-113	1.3	20

Surrogates	%Recovery			Rec. Accept. Limits
1,2-Dichloroethane-d4	98.0	96.4	95.9	77-115
4-Bromofluorobenzene	104	104	105	87-113
Toluene-d8	103	102	102	90-112

Category: Q8240-A Volatile Organics
Matrix: AQUEOUS
Sample: 055620-0004
MS Run: 16 JUN 97-J
Units: ug/L

Analyte	Concentration Sample Result		MS Result	MSD Result	Amount Spiked MS	Amount Spiked MSD	% Recovery MS	% Recovery MSD	Recov. Accep. Limits	RPD MS-MSD	RPD Accept Limits
1,1-Dichloroethene	ND		1770	1830	1670	1670	106	110	80-132	3.2	20
Trichloroethene	ND		1670	1730	1670	1670	100	104	85-112	3.1	20
Benzene	2960		4500	4970	1670	1670	92	120	83-121	9.8	20
Toluene	70.7	J	1820	1850	1670	1670	105	107	85-120	1.6	20
Chlorobenzene	ND		1750	1790	1670	1670	105	108	90-113	2.5	20

Surrogates	%Recovery			Rec. Accept. Limits
1,2-Dichloroethane-d4	99.8	96.0	96.6	77-115
4-Bromofluorobenzene	103	101	101	87-113
Toluene-d8	101	100	99.5	90-112

J = Result is detected below the reporting limit or is an estimated concentration.
ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

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MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Semivolatile Organics by GC/MS
Project: 055535

Category: Q8270-A Acid, Base and Neutrals by GC/MS.
Matrix: AQUEOUS
Sample: 055541-0001
MS Run: 09 JUN 97-03
Units: ug/L

Analyte	Concentration Sample Result	MS Result	MSD Result	Amount Spiked MS	Amount Spiked MSD	% Recovery MS	% Recovery MSD	Recov. Accep. Limits	RPD MS-MSD	RPD Accept Limits
Phenol	ND	108	123	140	144	77	85	45-105	10	20
2-Chlorophenol	ND	100	109	140	144	72	76	52-107	5.9	22
1,4-Dichlorobenzene	ND	68.9	77.2	93.5	96.1	74	80	20-124	8.7	27
N-Nitroso-di-n-propylamine	ND	78.5	90.5	93.5	96.1	84	94	52-108	12	20
1,2,4-Trichlorobenzene	ND	68.6	83.7	93.5	96.1	73	87	44-142	17	27
4-Chloro-3-methylphenol	ND	107	113	140	144	77	78	22-147	2.1	20
Acenaphthene	ND	64.7	71.9	93.5	96.1	69	75	47-145	7.8	20
4-Nitrophenol	ND	96.6	115	140	144	69	80	42-115	15	32
2,4-Dinitrotoluene	ND	82.2	72.6	93.5	96.1	88	76	55-116	15	21
Pentachlorophenol	ND	103	119	140	144	74	83	14-176	12	30
Pyrene	ND	61.7	64.2	93.5	96.1	66	67	56-120	1.3	20

Surrogates	%Recovery			Rec. Accept. Limits
Nitrobenzene-d5	72.1	77.1	77.8	51-104
2-Fluorobiphenyl	58.7	63.5	67.9	43-116
Terphenyl-d14	49.6	51.0	45.0	33-141
2-Fluorophenol	68.4	71.9	74.7	36-108
Phenol-d5	77.5	81.4	83.6	47-106
2,4,6-Tribromophenol	72.3	77.0	74.5	49-106

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

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IX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
als Analysis and Preparation
Project: 055535

Category: ICP-AT ICP Metals / Total
Matrix: AQUEOUS
Sample: 055541-0001
MS Run: 18 JUN 97-E1
Units: mg/L

Analyte	Concentration Sample Result	MS Result	MSD Result	Amount Spiked MS/MSD	%Recovery MS	%Recovery MSD	%RPD	Acceptance Limit Recov.	Acceptance Limit RPD
Aluminum	3.8	6.07	6.04	2.00	111	110	0.4	86-117	10
Barium	0.15	2.20	2.16	2.00	103	101	2.0	86-114	10
Beryllium	ND	0.0546	0.0541	0.0500	109	108	0.7	83-117	10
Cadmium	ND	0.0488	0.0440	0.0500	98	88	10	80-120	17
Calcium	54.3	105	104	50.0	102	100	1.1	88-112	10
Chromium	ND	0.210	0.202	0.200	105	101	4.0	83-112	10
Cobalt	0.011	0.533	0.520	0.500	104	102	2.4	80-120	10
Copper	0.012	0.272	0.276	0.250	104	106	1.4	84-115	10
Iron	4.0	4.86	4.79	1.00	86	80	1.3	87-117	10
Magnesium	23.1	76.6	76.5	50.0	107	107	0.1	84-114	10
Manganese	0.52	1.02	0.997	0.500	100	96	1.9	84-113	10
Nickel	ND	0.545	0.530	0.500	109	106	2.8	85-112	10
Potassium	2.7	53.2	53.1	50.0	101	101	0.1	82-111	10
er	ND	0.0532	0.0509	0.0500	106	102	4.4	83-115	10
um	90.9	141	141	50.0	101	100	0.4	86-115	10
Tin	0.025	2.16	2.12	2.00	107	105	1.9	86-114	10
Vanadium	0.014	0.533	0.528	0.500	104	103	0.9	85-114	10
Zinc	0.043	0.546	0.531	0.500	101	98	2.8	82-113	10

Category: ICP-TRA-AT ICP Metals / Total by Trace ICP
Matrix: AQUEOUS
Sample: 055541-0001
MS Run: 18 JUN 97-E1
Units: mg/L

Analyte	Concentration Sample Result	MS Result	MSD Result	Amount Spiked MS/MSD	%Recovery MS	%Recovery MSD	%RPD	Acceptance Limit Recov.	Acceptance Limit RPD
Antimony	ND	0.470	0.467	0.500	94	93	0.6	89-115	10
Arsenic	ND	1.87	1.86	2.00	94	93	0.7	86-113	10
Cadmium	ND	0.0504	0.0503	0.0500	101	101	0.1	95-121	10
Lead	0.0070	0.499	0.498	0.500	98	98	0.3	91-117	10
Selenium	0.0079	1.84	1.82	2.00	92	91	1.1	81-114	10
Thallium	ND	1.94	1.93	2.00	97	97	0.2	90-119	10

ND - Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Metals Analysis and Preparation
Project: 055535 (cont.)

Category: HG-CVAA-AT Mercury by CVAA / Total Mercury
Matrix: AQUEOUS
Sample: 055506-0001
MS Run: 13 JUN 97-SA
Units: mg/L

Analyte	Concentration Sample Result	MS Result	MSD Result	Amount Spiked MS/MSD	%Recovery MS	%Recovery MSD	%RPD	Acceptance Limit Recov.	Acceptance Limit RPD
Mercury	ND	0.00101	0.000996	0.00100	101	100	1.4	77-117	10

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

IX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Chemistry Analysis and Preparation
Project: 055535

Category: CN-A Cyanide
Matrix: AQUEOUS
Sample: 055480-0019
MS Run: 12 JUN 97-N1
Units: mg/L

Analyte	Sample Result	Concentration MS Result	Concentration MSD Result	Amount Spiked MS/MSD	%Recovery MS	%Recovery MSD	%RPD	Acceptance Limit Recov.	Acceptance Limit RPD
Cyanide	ND	0.213	0.227	0.197	108	115	6.1	72-118	18

Category: S-A Sulfide
Matrix: AQUEOUS
Sample: 055535-0001
MS Run: 09 JUN 97-S2
Units: mg/L

Analyte	Sample Result	Concentration MS Result	Concentration MSD Result	Amount Spiked MS/MSD	%Recovery MS	%Recovery MSD	%RPD	Acceptance Limit Recov.	Acceptance Limit RPD
.ide, Total	ND	0.426	0.439	0.430	99	102	3.0	79-131	10

Category: TOC-9060-A Total Organic Carbon
Matrix: AQUEOUS
Sample: 055647-0001
MS Run: 16 JUN 97-P1
Units: mg/L

Analyte	Sample Result	Concentration MS Result	Concentration MSD Result	Amount Spiked MS/MSD	%Recovery MS	%Recovery MSD	%RPD	Acceptance Limit Recov.	Acceptance Limit RPD
Total Organic Carbon	3.9	29.0	28.9	25.0	101	100	0.3	90-110	10

ND - Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Wet Chemistry Analysis and Preparation
Project: 055535 (cont.)

Category: TOX-A Total Organic Halogen
Matrix: AQUEOUS
Sample: 055535-0001
MS Run: 19 JUN 97-N1
Units: ug/L

Analyte	Concentration Sample Result	MS Result	MSD Result	Amount Spiked MS/MSD	%Recovery MS	%Recovery MSD	%RPD	Acceptance Limit Recov.	Acceptance Limit RPD
Total Organic Halogen as Cl	ND	121	107	100	121	107	12	84-110	13

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Chain of Custody Record

Quanterra Environmental Services

QUA-4124

Client: Foothill Engineering Consultants	Project Manager: Scott Koepsell	Date: 06/03/97	Chain Of Custody Number: 23016
Address: 350 Indiana St. STE 415	Telephone Number (Area Code)/Fax Number: (303) 278-0622	Lab Number:	Page 1 of 1
City: Golden / State: CO / Zip Code: 80401	Site Contact:		
Project Name: Cannon AFB #4	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: 96-333-310			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: APIX SVOC	APIX VOC	Dioxin TCDD	APIX Pest/PCB	APIX Herb	APIX Metals	Cyanide	Sulfide	TOC	TOX
CAFB-MWN-0697-1	06/03/97	1530	water	2L	LA	2	None											
				120 mL	VOA	3	HCl			3								
				2L	LA	2	None		2									
				2L	LA	2	None					2						
				2L	LP	2	None						2					
				1L	LA	1	HNO_3							1				
				8oz	LP	1	NaOH								1			
				8oz	LP	1	ZnAc + NaOH									1		
				16oz	1/2 LA	1	H_2SO_4										1	
				8oz	1/4 LA	1	H_2SO_4											1
Trip blank #1				120 ml	VOA	3				3								

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required: ☐ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify):

	Date	Time		Date	Time
1. Relinquished By: Dan Broussard	6/4/97	0800	1. Received By: K. Zahller	6/5/97	0900
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

LA = Liter Amber LP = Liter Poly VOA = 40 ml QESD 8.0°C

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

LIMS 4342

Chain of Custody Record

Quanterra Environmental Services

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
Foothill Engineering Consultants	Scott Koepsell	6/3/97	23014
Address 350 Indiana St. STE 415	Telephone Number (Area Code)/Fax Number (303) 278-0622	Lab Number	Page 1 of 1
City Golden **State** CO **Zip Code** 80401	Site Contact		
Project Name Cannon AFB 1/4	Carrier/Waybill Number		
Contract/Purchase Order/Quote No. 96-333-310			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: APIX SVOC	APIX VOC	2 Dioxin TCDD	APIX Pest/PCB	APIX Herb	APIX Metals	Cyanide	Sulfide	TOC	TOX
03 CAFB-MW0-0697-1	6/3/97	1150	Water	2L	LA	2	None				2							
				120 mL	VOA	3	HCl			3								
				2L	LA	2	None		1									
				2L	LA	2	None					2						
				2L	LA	2	None						2					
				1L	LA	1	HNO3							1				
				8OZ	LP	1	NaOH								1			
				8OZ	LP	1	ZnAc + NaOH									1		
				16OZ	2LA	1	H2SO4										1	
				8OZ	1/4LA	1	H2SO4											1
04 Trip blank #2				120 mL	VOA	3				3								

Special Instructions

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required
☐ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time
1. Relinquished By		
2. Relinquished By		
3. Relinquished By		

	Date	Time
1. Received By K. ZAHLLER	6/5/97	0900
2. Received By		
3. Received By		

Comments

LA = Liter Amber LP = Liter Poly VOA = 40 ML QES,D 8.2°C

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra Environmental Services

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
Foothill Engineering Consultants	Scott Koepsell	06/03/97	26017
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
350 Indiana St. STE 415	(303) 278-0622		
City / **State** / **Zip Code**	**Site Contact**		
Golden / CO / 80401			
Project Name	**Carrier/Waybill Number**		
Cannon AFB 1/4			
Contract/Purchase Order/Quote No.			
96-333-310			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: APIX sVOC	APIX VOC	APIX Dioxin TCDD	APIX Pest/PCB	APIX Herb	APIX Metals	Cyanide	Sulfide	TOC	TOX
05 CAFB-MWO-0697-2	6/3/97	1200	water	2L	LA	2	None				2							
				120mL	VOA	3	HCl			3								
				2L	LA	2	None		2									
				2L	LA	2	None					2						
				2L	LA	2	None						2					
				1L	LA	1	HNO_3							1				
				8oz	LP	1	NaOH								1			
				8oz	LP	1	ZnAc & NaOH									1		
				16oz	1/2LA	1	H_2SO_4										1	
06 TRIP BLANK #3				8oz	1/4LA	1	H_2SO_4											1
				120ml	VOA	3				3								

Special Instructions

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required
☐ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By: Dan Broussard	6/4/97	0800	1. Received By: K. Zahller	6/5/97	0900
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments
1L A = Liter Amber 1L P = Liter Poly VOA = 40 ml QGS,D 9.1°C

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra Environmental Services

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
Foothill Engineering Consultants	Scott Koepsell	06/03/97	23018
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
350 Indiana St. STE 415	(303) 278-0622		
City / **State** / **Zip Code**	**Site Contact**		
Golden / CO / 80401			
Project Name	**Carrier/Waybill Number**		
Cannon AFB 1/4			
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: APIX SVOC	APIX VOC	APIX Dioxin TCDD	APIX Pest/PCB	APIX Herb	APIX Metals	CYANIDE	Sulfide	TOC	TOX
07 CAFB-MWR-0697-1	6/3/97	1910	water	2L	LA	2	None				2							
				120ml	VOA	3	HCl			3								
				2L	LA	1	None		2									
				2L	LA	2	None					2						
				2L	LA	2	None						2					
				1L	LA	1	HNO3							1				
				8oz	LP	1	NaOH								1			
				8oz	LP	1	Zn Ac & NaOH									1		
				16oz	2LA	1	H2SO4										1	
08 Trip Blank #4				8oz	4LA	1	H2SO4											1
				120ml	VOA	3			3									

Special Instructions

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required
☐ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By: Dan Broussard	6/4/97	0800	1. Received By: K. ZAHLLER	6/5/97	0906
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

EA = Liter Amber LP = Liter Poly VOA = 4 ml QES, D 10.6°C

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Sample Checklist

Quanterra Environmental Services

Project #: 55535 Date/Time Received: 6/5/97 0900

Company Name & Sampling Site: Foothills - Cannon AFR

*Cooler #(s):	#1	#2	#3	#4				
Temperatures:	8.0°C	8.2°C	9.1°C	10.6°C				

*Place copy of airbill inside all non-QUANTERRA coolers. Describe here.

Unpacking & Labeling Check Points:

Yes	No		Initials
☒	☐	1. Radiation checked, record if reading > 0.5 mR/hr. (_____mR/hr)	KZ
☒	☐	2. Cooler seals intact.	
☒	☐	3. Chain of custody present.	
☒	☐	4. Bottles broken and/or are leaking, comment if yes.	
		PHOTOGRAPH BROKEN BOTTLES	
☒	☐	5. Containers labeled, comment if no.	
☒	☐	6. pH of all samples checked and meet requirements, note exceptions.	
☐	☒	7. Chain of custody includes "received by" and "relinquished" by signatures, dates, and times	
☒	☐	8. Chain of custody agrees with bottle count, comment if no.	
☒	☐	9. Chain of custody agrees with labels, comment if no.	
☒	☐	10. VOA samples filled completely, comment if no.	
☒	☐	11. Are VOA bottles preserved, check for labels.	
☐	☒	12. Did samples require preservation with sodium thiosulfate?	
☐	☐	13. If yes to #12, did the samples contain residual chlorine?	
☐	☐	14. Sediment present in "D," dissolved, bottles.	
☐	☒	15. Are analyses with short holding times requested.	
☐	☐	16. Is extra sample volume provided for MS, MSD or matrix duplicates.	
☐	☒	17. Multiphase samples present, comment is yes.	
☐	☒	18. Any subsampling for volatiles, if yes, list samples.	
		PHOTOGRAPH MULTIPHASE SAMPLES	
☒	☐	19. Clear picture taken, labeled, and stapled to project folder.	

Comments: Include action taken to resolve discrepancies/problems. Include a hard copy of e-mail or use extra paper if more space is needed. COC seals not used. COC # 26014 not Relinquished
Both 5VOA bottles of CAFB-MW0-0697-Z were broken.
Sulfide and CN bottles are not preserved

Sample Checklist

Project #: 55535 Duped from Project #: 54706

Set-up by: KZ Duped Group Codes: N/A

Logged by: SHM Date: 6/5/97

Sample Control Review

Yes	No		Initials
☒	☐	1. Chain of custody fill out correctly	KZ
☐	☐	2. Short holding time worksheet correct.	
☒	☐	3. Sample bottle type correct.	
☐	☐	4. Overflow sample storage in special instructions.	
☒	☐	5. All login paperwork(sample list, group code report and acceptance letter) is included and correct:.	
☒	☐	6. Trip blanks, equipment blanks, and field blanks have correct aliquot designation.	
☒	☐	7. Sample description, request list, and acceptance letter in folder.	

Comments: Include action taken to resolve discrepancies/problems. Include a hard copy of e-mail or use extra paper if more space is needed. _____

_____

_____ Initials: _____

PA or PM Review

Yes	No		Initials	Date
☑	☐	1. Report input sheet.	SHM	6-7-97
☑	☐	2. Invoice Information.		
☑	☐	3. All discrepancies resolved.		
☑	☐	4. Sample and test matrices correct.		
☐ N/A	☐	5. Subcontract paper work correct.		
☑	☐	6. Clear picture of subcontract samples in folder.		
☑	☐	7. Special instructions in LIMS.		
☑	☑	8. Modified component lists checked.		
☑	☑	9. Project due, Turn around time, received and collected date OK.		
☑	☐	10. Log released.	↓	↓

Comments: _____

_____

_____ Initials: _____

Client Contact for Discrepancies

Person Calling: Dan Broussard Date of contact: 6-9-97

Person Contacted: Susan McCool

Client Decision: Sulfide and Cr bottles were preserved w NaOH but Zn Acetate was not added to Sulfides. KZ was instructed to add Zn acetate upon arrival @ the lab. Dan Broussard was informed of cooler temps.

APPENDIX III

Data Assessment

DATA ASSESSMENT
CANNON AIR FORCE BASE
QUARTERLY AND SEMIANNUAL MONITORING

Data for the June 1997 sampling event at Cannon Air Force Base was reviewed and evaluated as specified in the Final Work Plan (FEC, February 1996). The following paragraphs discuss specific findings of the data review process for groundwater samples CAFB-MWN-0697-1, CAFB-MWO-0697-1, and CAFB-MWR-0697-1.

VOCs. Each of the groundwater samples was analyzed within the required 14-day holding time for volatile organic compounds. Acetone was detected in the method blank associated with the samples; however, the compound was not detected above the reporting limit in any of the samples and qualification of results was not necessary. Surrogate percent recoveries for p-bromoflurobenzene, dibromofluromethane, and toluene were within QC limits for all three samples. Percent recoveries and relative percent differences obtained in the laboratory control sample, duplicate control sample, and MS/MSD for VOC analyses were within QC limits, demonstrating adequate analytical precision and accuracy. Three trip blanks were submitted for VOC analysis. VOCs were not detected above reporting limits in any of the trip blanks. VOC results, reported as non-detected for Appendix IX compounds, are usable without qualification.

SVOCs. The three groundwater samples were extracted within the required 7-day holding time for semivolatile organic compounds via SW-846 Method 8270B. Surrogate percent recoveries were within control limits for each sample. The method blank associated with the samples contained bis-2-ethylhexylphthalate and a,a'-dimethylphenylamine at 54 µg/L and 1.1 µg/L, respectively. Results for these compounds in the sample were not qualified as they were not detected above reporting limits in the samples. Percent recoveries in the laboratory control sample, duplicate control sample, and matrix spike sample associated with the samples were within control limits. SVOC results, reported as non-detected in each sample, are usable without qualification.

Pesticides/PCBs. Groundwater samples were extracted within the required 7-day holding time for pesticides/PCBs via SW-846 Method 8080A. Pesticides/PCBs were not detected in the method blank associated with the samples. Percent recoveries of all spike compounds (lindane, heptachlor, aldrin, dieldrin, endrin, and 4,4'-DDT) in the duplicate control sample analyzed in conjunction with the samples were below control limits, indicating the potential for low bias. Because surrogate percent recoveries were within control limits for all samples, pesticide/PCB sample results, reported as non-detected, were not qualified.

Herbicides. The three groundwater samples were extracted within the required 7-day holding time via SW-846 Method 8150. Chlorinated herbicide compounds were not detected above reporting limits in the associated method blank. Percent recovery of the surrogate DCAA was acceptable in all samples, as were percent recoveries in the duplicate control sample and MS/MSD analyzed with project samples. Results for

herbicide compounds were reported as non-detected and are usable without qualification.

Metals. All samples were analyzed for metal analytes within the required holding time (mercury - 28 days, all other analytes - 180 days). The associated method blank did not contain metal analytes above the respective reporting limits. Percent recoveries and RPDs in the laboratory control sample and MS/MSD sample were within control limits for all metal analytes. Results for metal analytes are usable without qualification.

Dioxin (2,3,7,8-TCDD). Groundwater samples were extracted within the required holding time of 30 days for dioxin analysis via SW-846 Method 8280. Surrogate percent recoveries and recoveries in the laboratory control sample were within control limits. Sample results for dioxin, reported as non-detected in each sample, are useable without qualification.

Total Organic Carbon (TOC). Groundwater samples were analyzed within the required holding time (28 days) for TOC. Percent recoveries in the laboratory control sample and MS/MSD were within control limits. Reported results for TOC are usable without qualification.

Total Organic Halides (TOX). Groundwater samples were analyzed within the required holding time (28 days) for TOX. Percent recoveries in the laboratory control sample and MS/MSD were within control limits. Results for TOX are usable without qualification.

Cyanide, Sulfide. Groundwater samples were analyzed within the required holding times for cyanide and sulfide analyses (14 days and 7 days, respectively). Neither cyanide or sulfide was detected in associated method blanks. Percent recoveries for cyanide and sulfide were within control limits in the laboratory control sample and MS/MSD analyzed with project samples. Results for cyanide and sulfide are usable as reported.