CAFB 96

FILE: HSWA/CAFB/ APPENDIX II + III AND SEWAGE LAGOONS

TRACK: CAFB/11/22/96/12/12/96/GARCIA/ARD/GW SAMPLING RESULTS LAGOONS AND PLAYA LAKE

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

22 NOV 1996

W. P. Ard, Colonel, USAF
Commander, 27th Support Group
100 S DL Ingram Blvd Suite 200
Cannon AFB NM 88103-5217

ENTERED

DEC 4 1996 RECEIVED

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

Dear Mr. Garcia

Attached for your use and files are groundwater sampling results for the sewage lagoons (SWMU 101) and Well P at the Playa Lake at Cannon AFB. This sampling took place on 24-26 Jun 96. The only results of concern are nitrate levels which exceed the maximum contaminant level for drinking water at Well G and Well P. This problem has occurred before and we are hopeful that the new sewage treatment plant will alleviate it.

If you have any questions, please contact Mr. Sanford Hutsell at (505) 784-6378.

Sincerely

W. P. ARD, Colonel, USAF
Commander, 27th Support Group

Attachment:
Groundwater Monitoring Report

cc:
NMED (B. Hoditschek)
NMED GW Bureau (J. Jacobs)
EPA Region VI (D. Neleigh)
HQ ACC CES/CEVC w/o atch (R. Shannon)

LIBRARY COPY

Cannon Air Force Base, New Mexico

RCRA Ground-Water Sampling at Sewage Lagoons and Well P of Playa Lake

Data Report for June 24-26, 1996 Sampling

Prepared for

United States Air Force Air Combat Command
Cannon Air Force Base, New Mexico 88103

September 11, 1996

Prepared by

U.S. Geological Survey, Water Resources Division
4501 Indian School Road NE
Suite 200
Albuquerque, New Mexico 87110

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EXECUTIVE SUMMARY

The U.S. Geological Survey (USGS), Water Resources Division and the U.S. Air Force Air Combat Command (ACC) have a memorandum of understanding that addresses the USGS assisting any ACC base in their hydrology or environmental programs. The USGS has agreed to assist Cannon Air Force Base (CAFB), an ACC base, in their RCRA ground-water sampling program. Cannon AFB is located in east-central New Mexico about 7 miles west of Clovis as shown on Figure 1. The ground-water sampling is at the sewage lagoons and at the Playa Lake on the east side of the base as shown on Figure 2. The monitoring is conducted as part of the July 13, 1990 Compliance Agreement between CAFB and the New Mexico Environment Department (NMED).

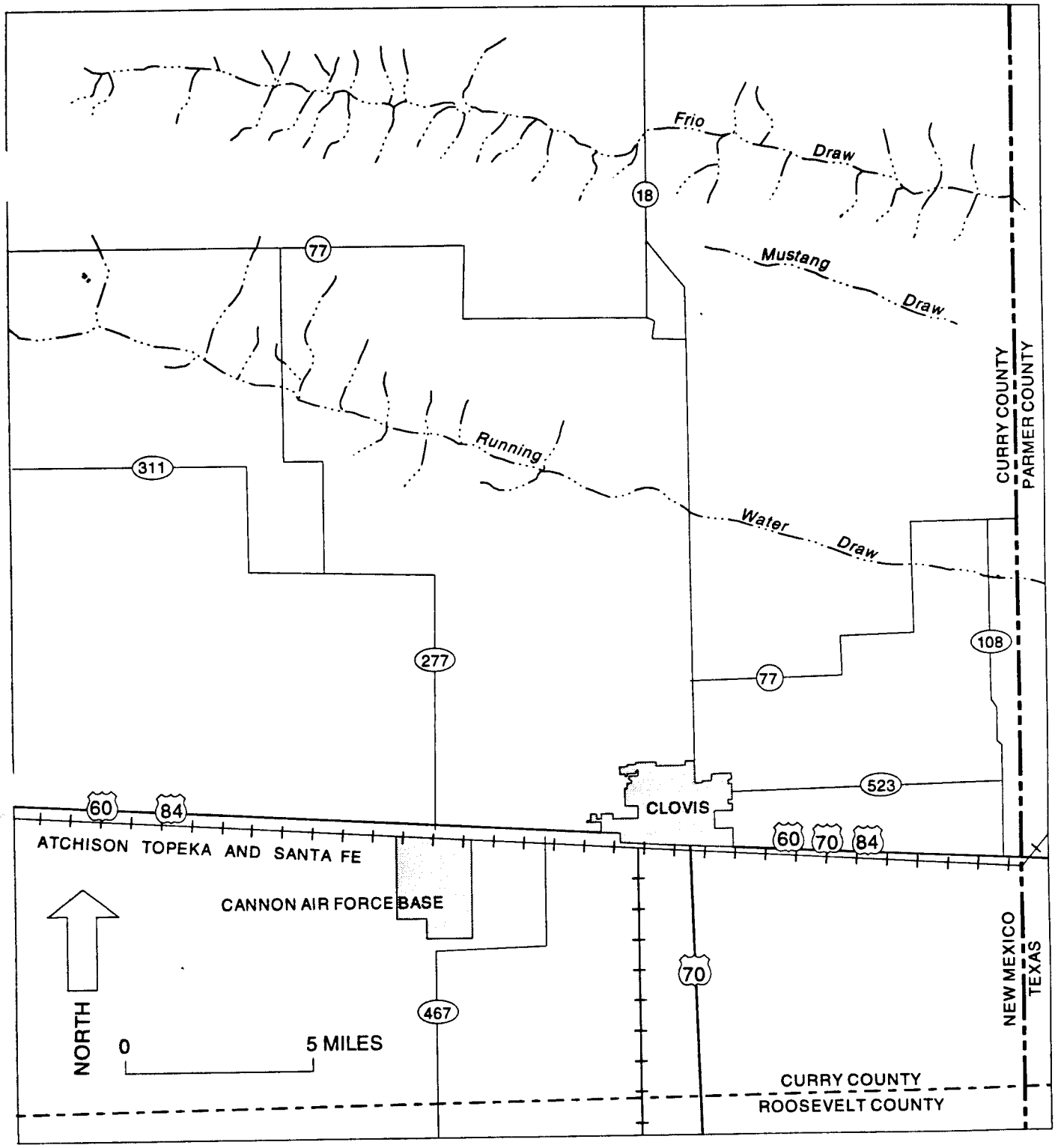
This report presents the water-quality data for samples collected from four wells around the sewage lagoons and one well at the Playa lake (figure 2), CAFB on June 24-26, 1996. The monitoring wells sampled at the sewage lagoons are well E (upgradient), and downgradient wells F, G, and H as shown in figure 3. Only one well (Well P) was sampled near the Playa Lake. All five wells were sampled for nitrate (method E353.2/ E354.1), total and dissolved metals for twenty-three metals (aluminum, barium, beryllium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, molybdenum, nickel, potassium, silver, sodium, vanadium and zinc by method SW6010; antimony, arsenic cadmium, lead, selenium, and thallium by method SW6010-Trace).

Concentrations of detected analytes in ground-water from wells E, F, G, H around the sewage lagoons, and well P at the Playa Lake are summarized in table 1. The monitoring well identification report are presented in appropriate NMED forms following table 1. Quanterra Environmental Services is the USGS contract laboratory in Arvada, Colorado. The analytical results from Quanterra Environmental Services Laboratory are listed in Appendix I. The Quality Control Report for the analytical results from Quanterra is in Appendix II. Field activities, observations, and water-quality measurements for the June 24-26, 1996 ground-water monitoring are in Appendix III.

As shown in table 1, the largest concentration (27.9 mg/L) of nitrate was detected in water from well P (downgradient from the sewage lagoons). Water from well G had 13.5 mg/L, and water from rest of the wells had concentrations less than 10 mg/L of nitrate. The maximum contaminant level (MCL) for EPA National Primary Drinking Water Regulation for nitrate is 10 mg/L. Lead (total or dissolved) was not

detected in water from any wells for this sampling round. The MCL for lead is 0.015 mg/L.

As part of the quality assurance and quality control (QA/QC) procedures for the sewage lagoons and the Playa Lake sites, equipment blank, and duplicate samples were collected. 0.013 mg/L of antimony (dissolved) was detected in an equipment blank for this sampling period. The data results of associated samples that are similar to the equipment blank should be used with caution and note that similar results were detected also in the equipment blank. No other target parameters other than the parameters associated with the duplicate analysis were detected in the QA/QC samples mentioned above.



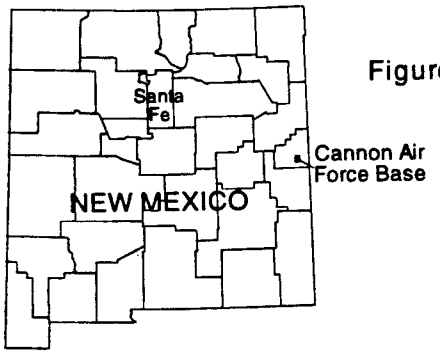


Figure 1.--Location of Cannon Air Force Base, New Mexico.

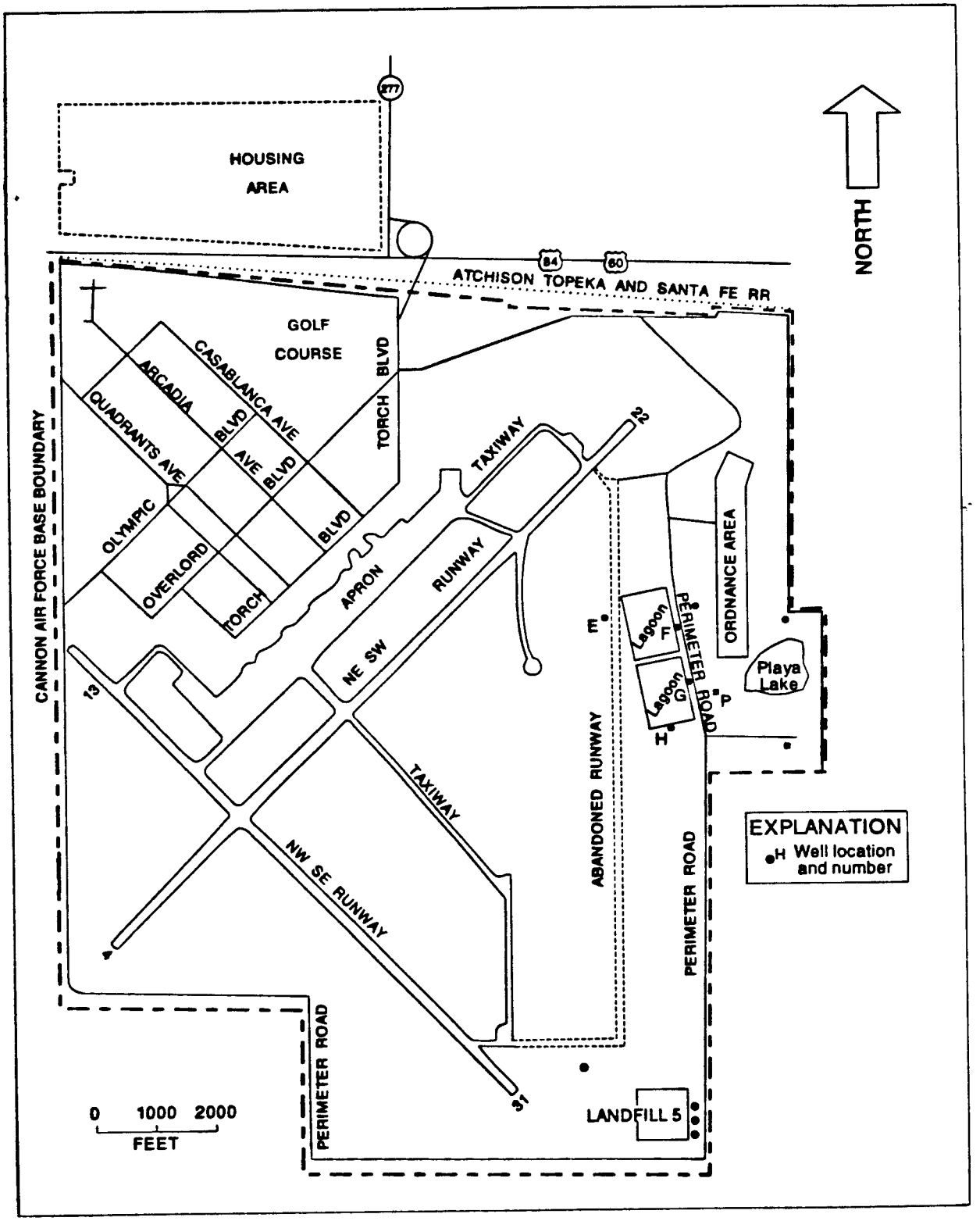


Figure 2.--Cannon Air Force Base and location of sewage lagoons and Playa Lake.

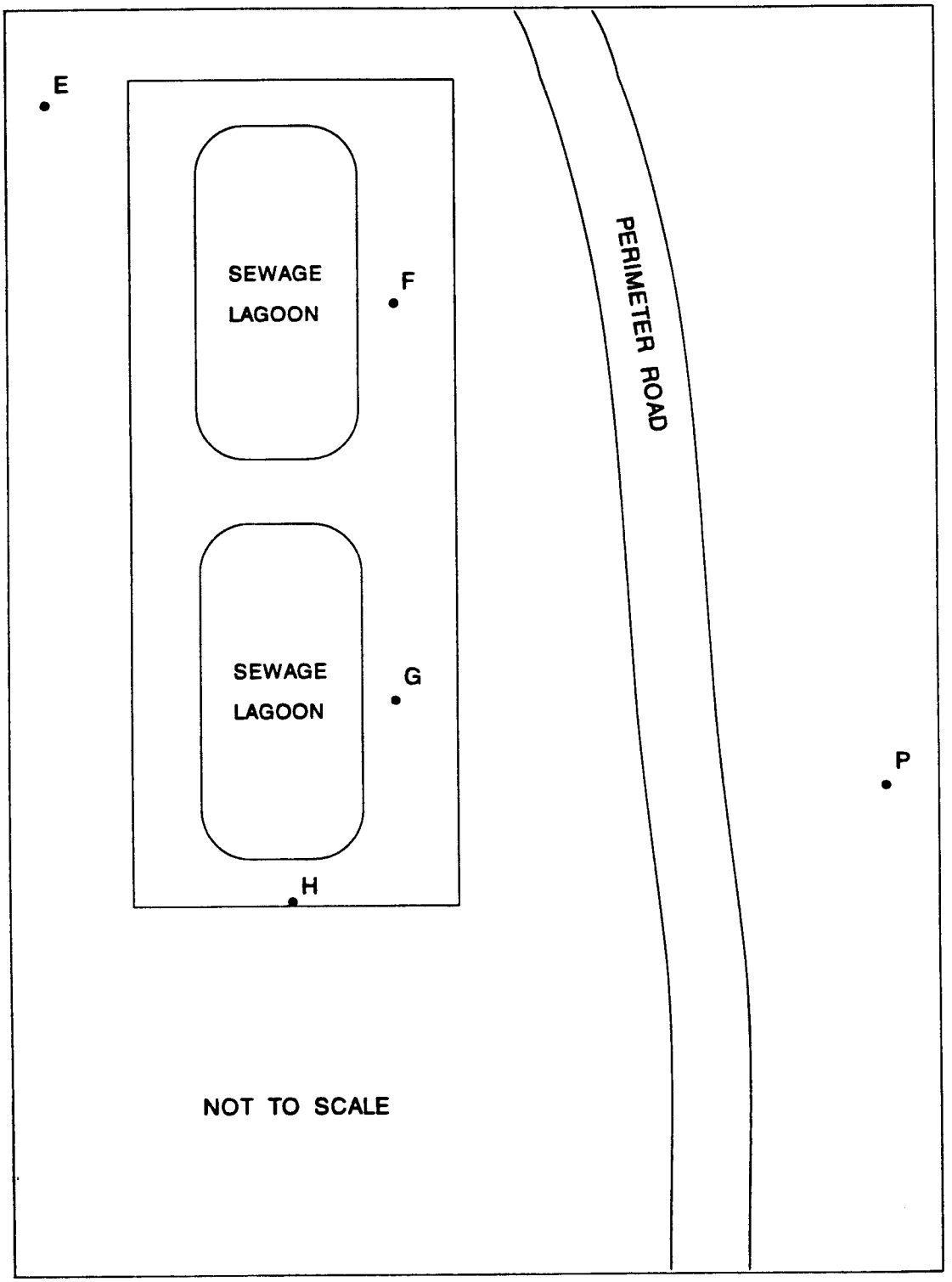


Figure 3.--Location of monitoring wells around the sewage lagoons and well P of Playa Lake.

Table 1. Summary of concentrations of analytes in ground-water from wells E, F, G, H around the sewage lagoons, and well P at Playa Lake for samples collected on June 24-26, 1996, Cannon Air Force Base, New Mexico. [ND, Not Detected; RL, Reporting Limit; t, Sample diluted due to the concentration of target compounds.]

Well/sample ID: Date sampled:		E/CAFB-E-0696-1 6-24-96		F/CAFB-F-0696-1 6-26-96		G/CAFB-G-0696-1 6-25-96		H/CAFB-H-0696-1 6-25-96		P/CAFB-P-0696-1 6-25-96		P/CAFB-P-0696-2 6-25-96 Duplicate	
Analytes and Method		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Metals, Total (mg/L)													
Calcium	SW6010	41.0	5.0	80.8	5.0	102	5.0	49.5	5.0	113	5.0	112	5.0
Chromium	SW6010	0.043	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.03
Iron	SW6010	0.16	0.04	ND	0.04	0.2	0.04	0.47	0.04	0.063	0.04	0.1	0.04
Magnesium	SW6010	36.4	5.0	75.7	5.0	96.0	5.0	45.0	5.0	111	5.0	110	5.0
Potassium	SW6010	6.5	5.0	9.7	5.0	10.6	5.0	7.5	5.0	10.4	5.0	10.4	5.0
Selenium	SW6010-Trace	ND	0.005	0.011	0.005	0.0079	0.005	0.0077	0.005	ND	0.005	ND	0.005
Sodium	SW6010	55.3	5.0	49.0	5.0	71.6	5.0	57.3	5.0	142	5.0	147	5.0
Zinc	SW6010	ND	0.01	ND	0.01	0.018	0.01	0.021	0.01	0.012	0.01	0.013	0.01
Metals, Dissolved (mg/L)													
Arsenic	SW6010-Trace	ND	0.01	ND	0.01	ND	0.01	0.01	0.01	ND	0.01	ND	0.01
Calcium	SW6010	45.0	5.0	86.3	5.0	106	5.0	50.6	5.0	114	5.0	114	5.0
Magnesium	SW6010	41.1	5.0	82.7	5.0	103	5.0	48.2	5.0	115	5.0	116	5.0
Potassium	SW6010	7.3	5.0	10.3	5.0	10.9	5.0	7.6	5.0	10.5	5.0	10.5	5.0
Selenium	SW6010-Trace	ND	0.005	0.0092	0.005	0.01	0.005	0.0073	0.005	ND	0.005	ND	0.005
Sodium	SW6010	60.6	5.0	51.7	5.0	73.6	5.0	58.6	5.0	145	5.0	145	5.0
Zinc	SW6010	ND	0.01	ND	0.01	0.015	0.01	ND	0.01	0.012	0.01	0.015	0.01
General Inorganics (mg/L)													
Nitrate + Nitrite	E353.2	2.3	0.1	6.4 t	0.5	13.5 t	0.5	1.2	0.1	27.9 t	2.0	27.8 t	2.0
Nitrate	E353.2/354	2.3	0.1	6.4	0.5	13.5	0.5	1.2	0.1	27.9	2.0	27.8	2.0

MONITORING WELL IDENTIFICATION REPORT

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 NM 7572124454

COUNTY Curry

WELL NUMBER E

WELL LOCATION (LONGITUDE) 103 ° 18 ' 24.5 ''

WELL LOCATION (LATITUDE) 34 ° 23 ' 28.8 ''

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 111785

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4"

BOREHOLE DIAMETER 8"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3908.12

ELEV BOTTOM OF WELL CASING 3911.12

ELEV BOTTOM OF SCREENED INT 3911.12

ELEV OF TOP OF SCREENED INT 3926.12

SURVEYED ELEV OF CASING TOP 4281.12

DATE OF REPORT 14 Feb 89 SIGNATURE _____

MONITORING WELL IDENTIFICATION REPORT

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 NM 7572124454

COUNTY Curry

WELL NUMBER F

WELL LOCATION (LONGITUDE) 103 ° 18 ' 10.5 ''

WELL LOCATION (LATITUDE) 34 ° 23 ' 21.4 ''

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 111985

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4"

BOREHOLE DIAMETER 8"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3902.32

ELEV BOTTOM OF WELL CASING 3907.32

ELEV BOTTOM OF SCREENED INT 3907.32

ELEV OF TOP OF SCREENED INT 3922.32

SURVEYED ELEV OF CASING TOP 4277.32

DATE OF REPORT 24 Feb 89 SIGNATURE _____

MONITORING WELL IDENTIFICATION REPORT

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 Nm 7572124454

COUNTY Curry

WELL NUMBER G

WELL LOCATION (LONGITUDE) 103 ° 18 ' 08 ''

WELL LOCATION (LATITUDE) 34 ° 23 ' 13.4 ''

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 111085

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4"

BOREHOLE DIAMETER 8"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3907.99

ELEV BOTTOM OF WELL CASING 3907.90

ELEV BOTTOM OF SCREENED INT 3907.99

ELEV OF TOP OF SCREENED INT 3922.99

SURVEYED ELEV OF CASING TOP 4279.99

DATE OF REPORT 24 Feb 89 SIGNATURE _____

MONITORING WELL IDENTIFICATION REPORT

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 NM 7572124454

COUNTY Curry

WELL NUMBER H

WELL LOCATION (LONGITUDE) 103 ° 18 ' 16.8 ''

WELL LOCATION (LATITUDE) 34 ° 23 ' 07 ''

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 111885

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4"

BOREHOLE DIAMETER 8"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3901.15

ELEV BOTTOM OF WELL CASING 3901.15

ELEV BOTTOM OF SCREENED INT 3901.15

ELEV OF TOP OF SCREENED INT 3921.15

SURVEYED ELEV OF CASING TOP 4276.15

DATE OF REPORT 24 Feb 89 SIGNATURE _____

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUES, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER

COUNTY Curry

WELL NUMBER P

WELL LOCATION (LONGITUDE) 103° 18' 06"

WELL LOCATION (LATITUDE) 34° 23' 09"

AQUIFER NAME Ogalalla

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 07-16-95

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4"

BOREHOLE DIAMETER 8"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3971.90

ELEV BOTTOM OF WELL CASING 3976.90

ELEV BOTTOM OF SCREENED INT 3981.90

ELEV OF TOP OF SCREENED INT 4001.90

SURVEYED ELEV OF CASING TOP 4273.39

DATE OF REPORT 10-30-95 SIGNATURE Jerry D Larson

NAME (TYPED) Jerry D. Larson

APPENDIX I

Analytical Results from Quanterra Environmental Services Laboratory
for Ground-Water Samples Collected on June 24-26, 1996

Quanterra Environmental Services

Quanterra Incorporated
4955 Yarrow Street
Arvada, Colorado 80002

303 421-6611 Telephone
303 431-7171 Fax

ANALYTICAL RESULTS

FOR

U.S. GEOLOGICAL SURVEY

QUANTERRA NO. 048926

JULY 24, 1996

Prepared by: Mark D. Stella

Reviewed by: Lindsay Breyer

Quanterra
Environmental Services

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Standard Deliverables With Supporting Documentation

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• 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	NA
Semivolatile GC/MS	C	NA
Volatile GC	D	NA
Semivolatile GC	E	NA
LC/MS	F	NA
Metals	G	94
General Chemistry	H	13
Subcontracted Data	I	NA

I. OVERVIEW

On June 25, 1996, Quanterra Environmental Services, Denver received one aqueous sample from the U.S. Geological Survey.

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:

I. Overview
II. Sample Description Information/Analytical Test Requests
III. Analytical Results
IV. Quality Control Report

Standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory QC samples analyzed in conjunction with the samples in this project were within established control limits.

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

II. SAMPLE DESCRIPTION INFORMATION/ANALYTICAL TEST REQUESTS

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.

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
U.S. Geological Survey

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
049826-0001-SA	CAFB-E-0696-1	AQUEOUS	24 JUN 96	14:40	25 JUN 96

Quanterra
Environmental Services

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Lab ID: 049826	Group Code	Analysis Description	Custom Test?
0001	A	Nitrate Plus Nitrite	N
		Nitrite, as Nitrogen	N
		ICP Suite: Air Force	Y
		Prep - Total Metals, ICP	N
		ICP Metals (Total) by Trace ICP	N
		ICP Suite: Air Force	Y
		ICP Metals (Dissolved) by Trace ICP	N
		Nitrate, as Nitrogen by Calculation	N
		ICP Metals (Dissolved by Digestion) by Trace ICP	N
		Prep - Filtered/Dissolved, ICP	N

III. 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. The date prepared is typically the date an extraction or digestion was initiated. For volatile organic compounds in water, the date prepared is the date the screening of the sample was performed.

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.

Quanterra does not routinely blank-correct analytical data. Uncorrected analytical results are reported, along with associated blank results, for all organic and metals analyses. Analytical results and blank results are reported for conventional inorganic parameters as specified in the method.

The analytical data reported are subject to the following limitations of the analytical methodology:

Metals:

•All nominal reporting limits for metals have been established from instrument detection limit (IDL) and method detection limit (MDL) evaluations and represent the level above which reliable data can be routinely obtained. On a periodic basis, low-level standards are analyzed seven times on three non-consecutive days on each instrument. The standard deviations of the three runs are summed to yield the IDL. MDL studies are performed on an annual basis in accordance with 40 CFR 136 Appendix B. Nominal reporting limits are generally 2-5 times the IDL or MDL (consistent with the American Chemical Society definition for the Limit of Quantification). IDL and MDL studies for metals are necessarily performed on reagent water and do not account for matrix effects. Elevation of the reporting limits above the nominal levels are sometimes required as discussed below.

Reporting limits for metals analyzed by Inductively Coupled Plasma (ICP) are typically raised only for dilution due to an analyte exceeding the instrument linear range. Background and interelement interferences are corrected automatically and do not require dilution.

Metals analyzed by Graphite Furnace Atomic Absorption (GFAA) are subject to matrix interferences. Consequently, Quanterra Environmental Services, Denver laboratory's protocol is to analyze a spiked aliquot with every sample. The severity of the interference, based upon analyte level and spike recovery, is assessed against specific criteria and the need for an elevated reporting limit or dilution is determined.

The analysis of mercury by Cold Vapor Atomic Absorption (CVAA) is generally free from matrix interferences. As with ICP, reporting limits are raised only for dilution due to a sample concentration exceeding the linear range of the instrument.

Footnotes and Data Qualifiers

The data sheets contained in this report may contain a variety of footnotes and data qualifiers. Those used to indicate the confidence level for Tenatively Identified Compounds (GC/MS methods) are described above. Other footnotes are used with specific tests; for example, footnotes used with the GC/FID Petroleum Hydrocarbon methods to indicate (in the analysts judgment) the product that appears to be present. Finally, there are a number of general qualifiers that serve to identify problems and pertinent observations made during sample analysis that are not discussed in the Overview. These are described below:

B Compound is also detected in the blank.

The indicated compound was detected in the sample as well as the method blank. Please note that the B flag is not used when the sample result is ND (Not Detected).

G Reporting limit raised due to the matrix of the sample.

Indicates that reporting limits were raised due to the presence of non-target compounds or other matrix interferences. The sample may or may not have been diluted. For inorganic methods, the footnote applies only to the flagged analyte. For organic methods, the footnote pertains to all analytes determined by the method.

T Preferred values unless footnoted on secondary column test.

This footnote is used with GC tests to indicate the primary column results. The footnote will be listed only for the first compound but pertains to all analytes determined by the method. It is used in conjunction the footnote V.

V Secondary column is the preferred value.

This footnote is used for GC tests in conjunction the T footnote. It indicates that the value from the second column is preferred over the primary column result and pertains only to the indicated compound.

t Sample diluted due to the concentration of target compounds.

Indicates that reporting limits were raised due to the presence of target analytes outside the calibration range of the method. For multi-analyte methods, the footnote will appear only for the first analyte but pertains to all analytes determined by the method.

Quanterra
Environmental Services

Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-E-0696-1
Lab ID: 049826-0001-SA
Matrix: AQUEOUS
Authorized: 25 JUN 96

Sampled: 24 JUN 96
Prepared: See Below

Received: 25 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	23 JUL 96	23 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	23 JUL 96	23 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	23 JUL 96	23 JUL 96
Calcium	41.0		1.0	5.0	mg/L	6010	23 JUL 96	23 JUL 96
Chromium	0.043		1.0	0.030	mg/L	6010	23 JUL 96	23 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	23 JUL 96	23 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	23 JUL 96	23 JUL 96
Iron	0.16		1.0	0.040	mg/L	6010	23 JUL 96	23 JUL 96
Magnesium	36.4		1.0	5.0	mg/L	6010	23 JUL 96	23 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	23 JUL 96	23 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	23 JUL 96	23 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	23 JUL 96	23 JUL 96
Potassium	6.5		1.0	5.0	mg/L	6010	23 JUL 96	23 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	23 JUL 96	23 JUL 96
Sodium	55.3		1.0	5.0	mg/L	6010	23 JUL 96	23 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	23 JUL 96	23 JUL 96
Zinc	ND		1.0	0.010	mg/L	6010	23 JUL 96	23 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Trace ICP Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-E-0696-1
Lab ID: 049826-0001-SA
Matrix: AQUEOUS
Authorized: 25 JUN 96

Sampled: 24 JUN 96
Prepared: See Below

Received: 25 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	15 JUL 96	16 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	15 JUL 96	16 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	15 JUL 96	16 JUL 96
Lead	ND		1.0	0.0030	mg/L	6010	15 JUL 96	16 JUL 96
Selenium	ND		1.0	0.0050	mg/L	6010	15 JUL 96	16 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	15 JUL 96	16 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Metals
Dissolved Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-E-0696-1
Lab ID: 049826-0001-SA
Matrix: AQUEOUS
Authorized: 25 JUN 96

Sampled: 24 JUN 96
Prepared: See Below

Received: 25 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	NA	09 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	NA	09 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	NA	09 JUL 96
Calcium	45.0		1.0	5.0	mg/L	6010	NA	09 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Iron	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Magnesium	41.1		1.0	5.0	mg/L	6010	NA	09 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Potassium	7.3		1.0	5.0	mg/L	6010	NA	09 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Sodium	60.6		1.0	5.0	mg/L	6010	NA	09 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Zinc	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Trace ICP Metals
Dissolved Metals

C[illegible]t Name: U.S. Geological Survey
C[illegible]t ID: CAFB-E-0696-1
La[illegible]D: 049826-0001-SA
Matrix: AQUEOUS
Authorized: 25 JUN 96

Sampled: 24 JUN 96
Prepared: See Below

Received: 25 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Lead	ND	G	1.0	0.0037	mg/L	6010	10 JUL 96	16 JUL 96
Selenium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96

G = Reporting limit raised due to the matrix of the sample.
ND = Not Detected

Reported By: Doug Gomer

Approved By: Richard Persichitte

Quanterra Environmental Services

General Inorganics

Client Name: U.S. Geological Survey
Client ID: CAFB-E-0696-1
ID: 049826-0001-SA
Matrix: AQUEOUS
Authorized: 25 JUN 96

Sampled: 24 JUN 96
Prepared: See Below

Received: 25 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Nitrite as N	ND		1.0	0.010	mg/L	354.1	NA	25 JUN 96
Nitrate plus Nitrite as N	2.3		1.0	0.10	mg/L	353.2	NA	27 JUN 96
Nitrate as N	2.3		1.0	0.10	mg/L	353.2/354.1	NA	05 JUL 96

ND = Not Detected

Reported By: Lavon Trujillo

Approved By: Roxanne Sullivan

Quanterra
Environmental
Services

Quanterra Incorporated
4955 Yarrow Street
Arvada, Colorado 80002

303 421-6611 Telephone
303 431-7171 Fax

ANALYTICAL RESULTS

FOR

U.S. GEOLOGICAL SURVEY

QUANTERRA NO. 049884

JULY 19, 1996

Prepared by: Mark D. Stella

Reviewed by: Lindsay Breyer

Quanterra
Environmental Services

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I. OVERVIEW

On June 27, 1996, Quanterra Environmental Services, Denver received one aqueous sample from the U.S. Geological Survey.

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:

I. Overview
II. Sample Description Information/Analytical Test Requests
III. Analytical Results
IV. Quality Control Report

With the exceptions noted on the data sheets, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory QC samples analyzed in conjunction with the samples in this project were within established control limits.

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

II. SAMPLE DESCRIPTION INFORMATION/ANALYTICAL TEST REQUESTS

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.

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
U.S. Geological Survey

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
049884-0001-SA	CAFB-F-0696-1	AQUEOUS	26 JUN 96	09:30	27 JUN 96

Quanterra
Environmental Services

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Lab ID: 049884	Group Code	Analysis Description	Custom Test?
0001	A	Nitrate Plus Nitrite	N
		Nitrite, as Nitrogen	N
		ICP Suite: Air Force	Y
		Prep - Total Metals, ICP	N
		ICP Metals (Total) by Trace ICP	N
		Nitrate, as Nitrogen by Calculation	N
		ICP Metals (Dissolved by Digestion) by Trace ICP	N
		Prep - Filtered/Dissolved, ICP	N
		ICP Suite: Air Force	Y

III. 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. The date prepared is typically the date an extraction or digestion was initiated. For volatile organic compounds in water, the date prepared is the date the screening of the sample was performed.

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.

Quanterra does not routinely blank-correct analytical data. Uncorrected analytical results are reported, along with associated blank results, for all organic and metals analyses. Analytical results and blank results are reported for conventional inorganic parameters as specified in the method.

In addition, surrogate recovery data is presented for all GC/MS analyses. The surrogate recovery is an indication of the affect of the sample matrix on the performance of the method.

Metals:

All nominal reporting limits for metals have been established from instrument detection limit (IDL) and method detection limit (MDL) evaluations and represent the level above which reliable data can be routinely obtained. On a periodic basis, low-level standards are analyzed seven times on three non-consecutive days on each instrument. The standard deviations of the three runs are summed to yield the IDL. MDL studies are performed on an annual basis in accordance with 40 CFR 136 Appendix B. Nominal reporting limits are generally 2-5 times the IDL or MDL (consistent with the American Chemical Society definition for the Limit of Quantification). IDL and MDL studies for metals are necessarily performed on reagent water and do not account for matrix effects. Elevation of the reporting limits above the nominal levels are sometimes required as discussed below.

Reporting limits for metals analyzed by Inductively Coupled Plasma (ICP) are typically raised only for dilution due to an analyte exceeding the instrument linear range. Background and interelement interferences are corrected automatically and do not require dilution.

Metals analyzed by Graphite Furnace Atomic Absorption (GFAA) are subject to matrix interferences. Consequently, Quanterra Environmental Services, Denver laboratory's protocol is to analyze a spiked aliquot with every sample. The severity of the interference, based upon analyte level and spike recovery, is assessed against specific criteria and the need for an elevated reporting limit or dilution is determined.

The analysis of mercury by Cold Vapor Atomic Absorption (CVAA) is generally free from matrix interferences. As with ICP, reporting limits are raised only for dilution due to a sample concentration exceeding the linear range of the instrument.

Footnotes and Data Qualifiers

The data sheets contained in this report may contain a variety of footnotes and data qualifiers. Those used to indicate the confidence level for Tenatively Identified Compounds (GC/MS methods) are described above. Other footnotes are used with specific tests; for example, footnotes used with the GC/FID Petroleum Hydrocarbon methods to indicate (in the analysts judgment) the product that appears to be present. Finally, there are a number of general qualifiers that serve to identify problems and pertinent observations made during sample analysis that are not discussed in the Overview. These are described below:

B Compound is also detected in the blank.

The indicated compound was detected in the sample as well as the method blank. Please note that the B flag is not used when the sample result is ND (Not Detected).

G Reporting limit raised due to the matrix of the sample.

Indicates that reporting limits were raised due to the presence of non-target compounds or other matrix interferences. The sample may or may not have been diluted. For inorganic methods, the footnote applies only to the flagged analyte. For organic methods, the footnote pertains to all analytes determined by the method.

T Preferred values unless footnoted on secondary column test.

This footnote is used with GC tests to indicate the primary column results. The footnote will be listed only for the first compound but pertains to all analytes determined by the method. It is used in conjunction the footnote V.

V Secondary column is the preferred value.

This footnote is used for GC tests in conjunction the T footnote. It indicates that the value from the second column is preferred over the primary column result and pertains only to the indicated compound.

t Sample diluted due to the concentration of target compounds.

Indicates that reporting limits were raised due to the presence of target analytes outside the calibration range of the method. For multi-analyte methods, the footnote will appear only for the first analyte but pertains to all analytes determined by the method.

Quanterra Environmental Services

Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-F-0696-1
Lab ID: 049884-0001-SA
Matrix: AQUEOUS
Authorized: 27 JUN 96

Sampled: 26 JUN 96
Prepared: See Below

Received: 27 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	01 JUL 96	03 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	01 JUL 96	03 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	01 JUL 96	03 JUL 96
Calcium	80.8		1.0	5.0	mg/L	6010	01 JUL 96	03 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	01 JUL 96	03 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	01 JUL 96	03 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	01 JUL 96	03 JUL 96
Iron	ND		1.0	0.040	mg/L	6010	01 JUL 96	03 JUL 96
Magnesium	75.7		1.0	5.0	mg/L	6010	01 JUL 96	03 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	01 JUL 96	03 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	01 JUL 96	03 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	01 JUL 96	03 JUL 96
Potassium	9.7		1.0	5.0	mg/L	6010	01 JUL 96	03 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	01 JUL 96	03 JUL 96
Sodium	49.0		1.0	5.0	mg/L	6010	01 JUL 96	03 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	01 JUL 96	03 JUL 96
Zinc	ND		1.0	0.010	mg/L	6010	01 JUL 96	03 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Trace ICP Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-F-0696-1
Lab ID: 049884-0001-SA
Matrix: AQUEOUS
Authorized: 27 JUN 96

Sampled: 26 JUN 96
Prepared: See Below

Received: 27 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	01 JUL 96	17 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	01 JUL 96	17 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	01 JUL 96	17 JUL 96
Lead	ND		1.0	0.0030	mg/L	6010	01 JUL 96	17 JUL 96
Selenium	0.011		1.0	0.0050	mg/L	6010	01 JUL 96	17 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	01 JUL 96	17 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Metals
Dissolved Metals

C[illegible]t Name: U.S. Geological Survey
[illegible]t ID: CAFB-F-0696-1
La[illegible]D: 049884-0001-SA
Matrix: AQUEOUS
Authorized: 27 JUN 96

Sampled: 26 JUN 96
Prepared: See Below

Received: 27 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	NA	09 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	NA	09 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	NA	09 JUL 96
Calcium	86.3		1.0	5.0	mg/L	6010	NA	09 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Iron	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Magnesium	82.7		1.0	5.0	mg/L	6010	NA	09 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Potassium	10.3		1.0	5.0	mg/L	6010	NA	09 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Sodium	51.7		1.0	5.0	mg/L	6010	NA	09 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Zinc	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Trace ICP Metals
Dissolved Metals

C[illegible]t Name: U.S. Geological Survey
C[illegible] ID: CAFB-F-0696-1
La[illegible]D: 049884-0001-SA
Matrix: AQUEOUS
Authorized: 27 JUN 96

Sampled: 26 JUN 96
Prepared: See Below

Received: 27 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Lead	ND	G	1.0	0.0064	mg/L	6010	10 JUL 96	16 JUL 96
Selenium	0.0092		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96

G = Reporting limit raised due to the matrix of the sample.
ND = Not Detected

Reported By: Doug Gomer

Approved By: Richard Persichitte

Quanterra Environmental Services

General Inorganics

Client Name: U.S. Geological Survey
Client ID: CAFB-F-0696-1
Lab ID: 049884-0001-SA
Matrix: AQUEOUS
Authorized: 27 JUN 96

Sampled: 26 JUN 96
Prepared: See Below

Received: 27 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Nitrite as N	ND		1.0	0.010	mg/L	354.1	NA	27 JUN 96
Nitrate plus Nitrite as N	6.4	t	5.0	0.50	mg/L	353.2	NA	02 JUL 96
Nitrate as N	6.4		5.0	0.50	mg/L	353.2/354.1	NA	05 JUL 96

t = Sample diluted due to the concentration of target compounds.
ND = Not Detected

Reported By: Lavon Trujillo

Approved By: Roxanne Sullivan

Quanterra
Environmental
Services

ANALYTICAL RESULTS

FOR

U.S. GEOLOGICAL SURVEY

QUANTERRA NO. 049850

JULY 19, 1996

Prepared by: _____
Lindsay Breyer

Reviewed by: _____
Mark D. Stella

Quanterra
Environmental Services

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• 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	NA
Semivolatile GC/MS	C	NA
Volatile GC	D	NA
Semivolatile GC	E	NA
LC/MS	F	NA
Metals	G	104
General Chemistry	H	15
Subcontracted Data	I	NA

I. OVERVIEW

On June 26, 1996, Quanterra Environmental Services, Denver received five aqueous samples from the U.S. Geological Survey.

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:

I. Overview
II. Sample Description Information/Analytical Test Requests
III. Analytical Results
IV. Quality Control Report

Metals by Trace ICP

Lead was detected above the reporting limit in one of the continuing calibration blanks analyzed with the samples. Lead was not detected in the method blank that was digested with the samples. Since a potential positive bias is indicated, and lead was not detected in any of the affected samples, the data were accepted.

With the exceptions noted above or on the data sheets, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory QC samples analyzed in conjunction with the samples in this project were within established control limits.

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

II. SAMPLE DESCRIPTION INFORMATION/ANALYTICAL TEST REQUESTS

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.

Quanterra Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
U.S. Geological Survey

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
049850-0001-SA	CAFB-H-0696-1	AQUEOUS	25 JUN 96	10:00	26 JUN 96
049850-0002-EB	CAFB-H-0696-2	AQUEOUS	25 JUN 96	08:00	26 JUN 96
049850-0003-SA	CAFB-G-0696-1	AQUEOUS	25 JUN 96	13:05	26 JUN 96
049850-0004-SA	CAFB-P-0696-1	AQUEOUS	25 JUN 96	14:21	26 JUN 96
049850-0005-SA	CAFB-P-0696-2	AQUEOUS	25 JUN 96	14:21	26 JUN 96

Quanterra Environmental Services

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Lab ID: 049850	Group Code	Analysis Description	Custom Test?
0001 - 0005	A	Nitrate Plus Nitrite	N
		Nitrite, as Nitrogen	N
		ICP Suite: Air Force	Y
		Prep - Total Metals, ICP	N
		ICP Metals (Total) by Trace ICP	N
		Nitrate, as Nitrogen by Calculation	N
		ICP Metals (Dissolved by Digestion) by Trace ICP	N
		Prep - Filtered/Dissolved, ICP	N
		ICP Suite: Air Force	Y

III. 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. The date prepared is typically the date an extraction or digestion was initiated. For volatile organic compounds in water, the date prepared is the date the screening of the sample was performed.

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.

Quanterra does not routinely blank-correct analytical data. Uncorrected analytical results are reported, along with associated blank results, for all organic and metals analyses. Analytical results and blank results are reported for conventional inorganic parameters as specified in the method. In addition, surrogate recovery data is presented for all GC/MS analyses. The surrogate recovery is an indication of the affect of the sample matrix on the performance of the method.

The analytical data reported are subject to the following limitations of the analytical methodology:

Metals

All nominal reporting limits for metals have been established from instrument detection limit (IDL) and method detection limt (MDL) evaluations and represent the level above which reliable data can be routinely obtained. On a periodic basis, low-level standards are analyzed seven times on three non-consecutive days on each instrument. The standard deviations of the three runs are summed to yield the IDL. MDL studies are performed on an annual basis in accordance with 40 CFR 136 Appendix B. Nominal reporting limits are generally 2-5 times the IDL or MDL (consistent with the American Chemical Society definition for the Limit of Quantification). IDL and MDL studies for metals are necessarily performed on reagent water and

do not account for matrix effects. Elevation of the reporting limits above the nominal levels are sometimes required as discussed below.

Reporting limits for metals analyzed by Inductively Coupled Plasma (ICP) are typically raised only for dilution due to an analyte exceeding the instrument linear range. Background and interelement interferences are corrected automatically and do not usually require dilution.

Metals analyzed by Graphite Furnace Atomic Absorption (GFAA) are subject to matrix interferences. Consequently, Quanterra Environmental Services, Denver laboratory's protocol is to analyze a spiked aliquot with every sample. The severity of the interference, based upon analyte level and spike recovery, is assessed against specific criteria and the need for an elevated reporting limit or dilution is determined.

The analysis of mercury by Cold Vapor Atomic Absorption (CVAA) is generally free from matrix interferences. As with ICP, reporting limits are raised only for dilution due to a sample concentration exceeding the linear range of the instrument.

Footnotes and Data Qualifiers

The data sheets contained in this report may contain a variety of footnotes and data qualifiers. Those used to indicate the confidence level for Tentatively Identified Compounds (GC/MS methods) are described above. Other footnotes are used with specific tests; for example, footnotes used with the GC/FID Petroleum Hydrocarbon methods to indicate (in the analysts judgment) the product that appears to be present. Finally, there are a number of general qualifiers that serve to identify problems and pertinent observations made during sample analysis that are not discussed in the Overview. These are described below:

B Compound is also detected in the blank.

The indicated compound was detected in the sample as well as the method blank. Please note that the B flag is not used when the sample result is ND (Not Detected).

G Reporting limit raised due to the matrix of the sample.

Indicates that reporting limits were raised due to the presence of non-target compounds or other matrix interferences. The sample may or may not have been diluted. For inorganic methods, the footnote applies only to the flagged analyte. For organic methods, the footnote pertains to all analytes determined by the method.

T Preferred values unless footnoted on secondary column test.

This footnote is used with GC tests to indicate the primary column results. The footnote will be listed only for the first compound but pertains to all analytes determined by the method. It is used in conjunction the footnote V.

V Secondary column is the preferred value.

This footnote is used for GC tests in conjunction the T footnote. It indicates that the value from the second column is preferred over the primary column result and pertains only to the indicated compound.

t Sample diluted due to the concentration of target compounds.

Indicates that reporting limits were raised due to the presence of target analytes outside the calibration range of the method. For multi-analyte methods, the footnote will appear only for the first analyte but pertains to all analytes determined by the method.

Quanterra Environmental Services

Metals
Total Metals

C[illegible]t Name: U.S. Geological Survey
([illegible]t ID: CAFB-H-0696-1
La[illegible]D: 049850-0001-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	10 JUL 96	11 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	10 JUL 96	11 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	10 JUL 96	11 JUL 96
Calcium	49.5		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Iron	0.47		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Magnesium	45.0		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Potassium	7.5		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Sodium	57.3		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Zinc	0.021		1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Trace ICP Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-H-0696-1
Lab ID: 049850-0001-SA
Matrix: AQUEOUS — Sampled: 25 JUN 96 — Received: 26 JUN 96
Authorized: 26 JUN 96 — Prepared: See Below — Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Lead	ND		1.0	0.0030	mg/L	6010	10 JUL 96	17 JUL 96
Selenium	0.0077		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96

ND = Not Detected

Reported By: Mark Woolley — Approved By: Richard Persichitte

Quanterra Environmental Services

Metals
Dissolved Metals

·t Name:	U.S. Geological Survey
t ID:	CAFB-H-0696-1
ab ID:	049850-0001-SA
atrix:	AQUEOUS
uthorized:	26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	NA	09 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	NA	09 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	NA	09 JUL 96
Calcium	50.6		1.0	5.0	mg/L	6010	NA	09 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Iron	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Magnesium	48.2		1.0	5.0	mg/L	6010	NA	09 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Potassium	7.6		1.0	5.0	mg/L	6010	NA	09 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Sodium	58.6		1.0	5.0	mg/L	6010	NA	09 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Zinc	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Trace ICP Metals
Dissolved Metals

C[illegible]t Name: U.S. Geological Survey
[illegible] ID: CAFB-H-0696-1
La[illegible]D: 049850-0001-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Arsenic	0.010		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Lead	ND	G	1.0	0.0043	mg/L	6010	10 JUL 96	16 JUL 96
Selenium	0.0073		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96

G = Reporting limit raised due to the matrix of the sample.
ND = Not Detected

Reported By: Doug Gomer

Approved By: Richard Persichitte

Quanterra
Environmental Services

Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-H-0696-2
Lab ID: 049850-0002-EB
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND	1.0	0.20	mg/L	6010	10 JUL 96	11 JUL 96
Barium	ND	1.0	0.10	mg/L	6010	10 JUL 96	11 JUL 96
Beryllium	ND	1.0	0.0020	mg/L	6010	10 JUL 96	11 JUL 96
Calcium	ND	1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Chromium	ND	1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Cobalt	ND	1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Copper	ND	1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Iron	ND	1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Magnesium	ND	1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Manganese	ND	1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96
Molybdenum	ND	1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Nickel	ND	1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Potassium	ND	1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Silver	ND	1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Sodium	ND	1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Vanadium	ND	1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Zinc	ND	1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Trace ICP Metals
Total Metals

C[illegible]t Name: U.S. Geological Survey
C[illegible]t ID: CAFB-H-0696-2
La[illegible]D: 049850-0002-EB
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Lead	ND		1.0	0.0030	mg/L	6010	10 JUL 96	17 JUL 96
Selenium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Metals
Dissolved Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-H-0696-2
Lab ID: 049850-0002-EB
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	NA	09 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	NA	09 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	NA	09 JUL 96
Calcium	ND		1.0	5.0	mg/L	6010	NA	09 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Iron	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Magnesium	ND		1.0	5.0	mg/L	6010	NA	09 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Potassium	ND		1.0	5.0	mg/L	6010	NA	09 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Sodium	ND		1.0	5.0	mg/L	6010	NA	09 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Zinc	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Trace ICP Metals
Dissolved Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-H-0696-2
Lab ID: 049850-0002-EB
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	0.013		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Lead	ND		1.0	0.0030	mg/L	6010	10 JUL 96	16 JUL 96
Selenium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96

ND = Not Detected

Reported By: Doug Gomer

Approved By: Richard Persichitte

Quanterra
Environmental Services

Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-G-0696-1
Lab ID: 049850-0003-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	10 JUL 96	11 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	10 JUL 96	11 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	10 JUL 96	11 JUL 96
Calcium	102		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Iron	0.20		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Magnesium	96.0		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Potassium	10.6		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Sodium	71.6		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Zinc	0.018		1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Trace ICP Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-G-0696-1
Lab ID: 049850-0003-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Lead	ND		1.0	0.0030	mg/L	6010	10 JUL 96	17 JUL 96
Selenium	0.0079		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Metals
Dissolved Metals

Client Name: U.S. Geological Survey
t ID: CAFB-G-0696-1
D: 049850-0003-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	NA	09 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	NA	09 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	NA	09 JUL 96
Calcium	106		1.0	5.0	mg/L	6010	NA	09 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Iron	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Magnesium	103		1.0	5.0	mg/L	6010	NA	09 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Potassium	10.9		1.0	5.0	mg/L	6010	NA	09 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Sodium	73.6		1.0	5.0	mg/L	6010	NA	09 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Zinc	0.015		1.0	0.010	mg/L	6010	NA	09 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Trace ICP Metals
Dissolved Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-G-0696-1
Lab ID: 049850-0003-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Lead	ND	G	1.0	0.0063	mg/L	6010	10 JUL 96	16 JUL 96
Selenium	0.010		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96

G = Reporting limit raised due to the matrix of the sample.
ND = Not Detected

Reported By: Doug Gomer

Approved By: Richard Persichitte

Quanterra Environmental Services

Metals
Total Metals

Client Name: U.S. Geological Survey
t ID: CAFB-P-0696-1
D: 049850-0004-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	10 JUL 96	11 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	10 JUL 96	11 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	10 JUL 96	11 JUL 96
Calcium	113		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Iron	0.063		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Magnesium	111		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Potassium	10.4		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Sodium	142		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Zinc	0.012		1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Trace ICP Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-P-0696-1
Lab ID: 049850-0004-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Lead	ND	G	1.0	0.0041	mg/L	6010	10 JUL 96	17 JUL 96
Selenium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96

G = Reporting limit raised due to the matrix of the sample.
ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Metals
Dissolved Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-P-0696-1
Lab ID: 049850-0004-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	NA	09 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	NA	09 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	NA	09 JUL 96
Calcium	114		1.0	5.0	mg/L	6010	NA	09 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Iron	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Magnesium	115		1.0	5.0	mg/L	6010	NA	09 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Potassium	10.5		1.0	5.0	mg/L	6010	NA	09 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Sodium	145		1.0	5.0	mg/L	6010	NA	09 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Zinc	0.012		1.0	0.010	mg/L	6010	NA	09 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Trace ICP Metals
Dissolved Metals

Client Name: U.S. Geological Survey
C[illegible] ID: CAFB-P-0696-1
L[illegible]: 049850-0004-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Lead	ND	G	1.0	0.0049	mg/L	6010	10 JUL 96	16 JUL 96
Selenium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96

G = Reporting limit raised due to the matrix of the sample.
ND = Not Detected

Reported By: Doug Gomer

Approved By: Richard Persichitte

Quanterra Environmental Services

Metals
Total Metals

Client Name: U.S. Geological Survey
Client ID: CAFB-P-0696-2
Lab ID: 049850-0005-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	10 JUL 96	11 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	10 JUL 96	11 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	10 JUL 96	11 JUL 96
Calcium	112		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Iron	0.10		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Magnesium	110		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Potassium	10.4		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	10 JUL 96	11 JUL 96
Sodium	147		1.0	5.0	mg/L	6010	10 JUL 96	11 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	10 JUL 96	11 JUL 96
Zinc	0.013		1.0	0.010	mg/L	6010	10 JUL 96	11 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra
Environmental Services

Trace ICP Metals
Total Metals

C[illegible]t Name: U.S. Geological Survey
C[illegible]t ID: CAFB-P-0696-2
La[illegible]D: 049850-0005-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Lead	ND	G	1.0	0.0037	mg/L	6010	10 JUL 96	17 JUL 96
Selenium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	17 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	17 JUL 96

G = Reporting limit raised due to the matrix of the sample.
ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Metals
Dissolved Metals

C[illegible]t Name: U.S. Geological Survey
C[illegible] ID: CAFB-P-0696-2
Lab ID: 049850-0005-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Aluminum	ND		1.0	0.20	mg/L	6010	NA	09 JUL 96
Barium	ND		1.0	0.10	mg/L	6010	NA	09 JUL 96
Beryllium	ND		1.0	0.0020	mg/L	6010	NA	09 JUL 96
Calcium	114		1.0	5.0	mg/L	6010	NA	09 JUL 96
Chromium	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Cobalt	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Copper	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Iron	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Magnesium	116		1.0	5.0	mg/L	6010	NA	09 JUL 96
Manganese	ND		1.0	0.010	mg/L	6010	NA	09 JUL 96
Molybdenum	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Nickel	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Potassium	10.5		1.0	5.0	mg/L	6010	NA	09 JUL 96
Silver	ND		1.0	0.030	mg/L	6010	NA	09 JUL 96
Sodium	145		1.0	5.0	mg/L	6010	NA	09 JUL 96
Vanadium	ND		1.0	0.040	mg/L	6010	NA	09 JUL 96
Zinc	0.015		1.0	0.010	mg/L	6010	NA	09 JUL 96

ND = Not Detected

Reported By: Mark Woolley

Approved By: Richard Persichitte

Quanterra Environmental Services

Trace ICP Metals
Dissolved Metals

Client Name: U.S. Geological Survey
C ID: CAFB-P-0696-2
La J: 049850-0005-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Antimony	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Arsenic	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96
Cadmium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Lead	ND	G	1.0	0.0056	mg/L	6010	10 JUL 96	16 JUL 96
Selenium	ND		1.0	0.0050	mg/L	6010	10 JUL 96	16 JUL 96
Thallium	ND		1.0	0.010	mg/L	6010	10 JUL 96	16 JUL 96

G = Reporting limit raised due to the matrix of the sample.
ND = Not Detected

Reported By: Doug Gomer

Approved By: Richard Persichitte

Quanterra Environmental Services

General Inorganics

Client Name: U.S. Geological Survey
Client ID: CAFB-H-0696-1
ID: 049850-0001-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Nitrite as N	ND		1.0	0.010	mg/L	354.1	NA	26 JUN 96
Nitrate plus Nitrite as N	1.2		1.0	0.10	mg/L	353.2	NA	27 JUN 96
Nitrate as N	1.2		1.0	0.10	mg/L	353.2/354.1	NA	05 JUL 96

ND = Not Detected

Reported By: Lavon Trujillo

Approved By: Roxanne Sullivan

Quanterra Environmental Services

General Inorganics

Client Name: U.S. Geological Survey
Client ID: CAFB-H-0696-2
L[illegible]D: 049850-0002-EB
M[illegible]X: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Nitrite as N	ND		1.0	0.010	mg/L	354.1	NA	26 JUN 96
Nitrate plus Nitrite as N	ND		1.0	0.10	mg/L	353.2	NA	27 JUN 96
Nitrate as N	ND		1.0	0.10	mg/L	353.2/354.1	NA	05 JUL 96

ND = Not Detected

Reported By: Lavon Trujillo

Approved By: Roxanne Sullivan

Quanterra Environmental Services

General Inorganics

Client Name: U.S. Geological Survey
Client ID: CAFB-G-0696-1
ID: 049850-0003-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Nitrite as N	ND		1.0	0.010	mg/L	354.1	NA	26 JUN 96
Nitrate plus Nitrite as N	13.5	t	5.0	0.50	mg/L	353.2	NA	27 JUN 96
Nitrate as N	13.5		1.0	0.50	mg/L	353.2/354.1	NA	05 JUL 96

t = Sample diluted due to the concentration of target compounds.
ND = Not Detected

Reported By: Lavon Trujillo

Approved By: Roxanne Sullivan

Quanterra Environmental Services

General Inorganics

Client Name: U.S. Geological Survey
Client ID: CAFB-P-0696-1
Lab ID: 049850-0004-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Nitrite as N	ND		1.0	0.010	mg/L	354.1	NA	26 JUN 96
Nitrate plus Nitrite as N	27.9	t	20	2.0	mg/L	353.2	NA	27 JUN 96
Nitrate as N	27.9		1.0	2.0	mg/L	353.2/354.1	NA	05 JUL 96

t = Sample diluted due to the concentration of target compounds.
ND = Not Detected

Reported By: Lavon Trujillo

Approved By: Roxanne Sullivan

Quanterra Environmental Services

General Inorganics

Client Name: U.S. Geological Survey
Client ID: CAFB-P-0696-2
Lab ID: 049850-0005-SA
Matrix: AQUEOUS
Authorized: 26 JUN 96

Sampled: 25 JUN 96
Prepared: See Below

Received: 26 JUN 96
Analyzed: See Below

Parameter	Result	Qual	Dil	RL	Units	Test Method	Prepared Date	Analyzed Date
Nitrite as N	ND		1.0	0.010	mg/L	354.1	NA	26 JUN 96
Nitrate plus Nitrite as N	27.8	t	20	2.0	mg/L	353.2	NA	27 JUN 96
Nitrate as N	27.8		1.0	2.0	mg/L	353.2/354.1	NA	05 JUL 96

t = Sample diluted due to the concentration of target compounds.
ND = Not Detected

Reported By: Lavon Trujillo

Approved By: Roxanne Sullivan

APPENDIX II

Laboratory Quality Assurance / Quality Control Results

DODEC LABORATORY DATA REVIEW WORKSHEET

1.0 GENERAL INFORMATION

Data reviewer: BOB BECK
Date of review: 8/5/96
Sample project number: 48926
Project name: NM-CANNON
Sample collection date: 6/24/96
Sample matrix and number: 1 AGLEAS

Type and number of samples in project:

Type	Number
Environmental	1
Trip blank	
Equipment blank	
Ambient blank	
MS/MSD	
Other	

2.0 DATA REPORT

Date of Analytical Results Report: 7/24/96
Number of volumes in Raw Data Report: 1
Raw Data Report reviewed? Yes____ No X

Were all analyses requested on the COC form performed by the laboratory?
Yes X No____

If no, list canceled analyses and reason for non-performance:

Were the samples properly preserved upon receipt by the laboratory?
Yes X No____

If no, list laboratory ID for samples that were not properly preserved.

3.0 ANALYTICAL METHODS

Analytical methods used in this project

	VOC by GC/MS (SW 8240, SW 8260, E524, E624)
	Halogenated VOC by GC (SW 8010)
	Aromatic VOC by GC (SW 8020)
	SVOC by GC/MS (SW 8270)
	PAH by HPLC (SW 8310)
	Organochlorine pesticides and PCB (SW 8080)
	Organophosphorous pesticides (SW 8140)
	Chlorinated herbicides (SW 8150)
	Dioxins and Furans (SW 8280)
	Explosives (8330)
	TOC (E415.1 or SW 9060)
	TPH (E418.1)
	Oil and Grease (E413.2)
	TOX (SW9020)
X	ICP screen for metals (SW 6010)
	ICP/MS screen for metals (SW 6020)
X	Trace ICP screen for metals (SW 6010 modified)
	Antimony by GFAA (SW 7041)
	Arsenic by GFAA (SW 7060)
	Chromium (SW 7191 or 7196)
	Lead by GFAA (SW 7421)
	Mercury by CVAA (SW 7470 or 7471)
	Selenium by GFAA (SW 7740)
	Thallium by GFAA (SW 7841)
	Inorganic anions (E300.0)
	Alkalinity (310.1)
	Cyanide, total and amenable (SW 9010/9012)
	Nitrogen, ammonia (E350.1)
	Nitrogen, TKN (E351.2)
X	Nitrogen, nitrate (E353.2)
X	Nitrogen, nitrate plus nitrite (E353.2)
X	Nitrogen, nitrite (E354.1)
	Phosphorous, total or ortho (E365.3)
	Sulfate (E375.4)
	Sulfide (E376.2)
	TDS (E160.1)
	pH (SW 9040 or 9045)
	Percent moisture (D2216)
	Gross alpha and gross beta radioactivity (SW 9310)
	Alpha-emitting radium isotopes (SW 9315)
	Radium-228 (SW 9320)
	Uranium (908.1)
	Other analyses :

Were analytical holding times met? Yes X No _____

If no, list analytical method and laboratory ID for samples that exceeded holding time:

_____

_____

_____

_____

_____

_____

Did surrogate recoveries meet QC acceptance criteria?
Yes_____ No _____ NA

If no, list analytical method, laboratory ID, and surrogates that did not meet acceptance criteria:

_____

_____

_____

_____

_____

Did actual reporting limits meet project detection limits? NA
Organic analyses.: Yes_____ No_____

If no, list analytical method, laboratory ID, and reason for non-conformance:

_____

_____

_____

_____

_____

_____

Inorganic analyses: Yes_____ No X Pb: -ccal, TRACE, DISSOLVED

Reporting limits for GFAA metals and inorganic anions may be raised when: (1) sample concentrations exceed the instrument linear range and (2) target analytes are subject to matrix interferences. Reporting limits for ICP metals and mercury by CVAA are typically only raised when the sample concentration exceeds the instrument linear range.

Did DCS meet QC acceptance criteria? Yes X No_____

If no, list analytical method, laboratory ID, and reason for non-conformance:

_____

_____

_____

_____

_____

_____

Did SCS meet QC acceptance criteria? Yes_____ No_____ NA

If no, list analytical method, laboratory ID, and reason for non-conformance:

_____

Were any target compounds found in the method, trip, equipment, or ambient blanks above the RL? Yes _____ No Y

If yes, list the analytical method, laboratory ID, type of blank and compound:

_____

Did the MS/MSD meet QC acceptance criteria? Yes___ No___ NA

MS/MSD data are used to evaluate the effect of the sample matrix on the analytical process and should only be used in conjunction with other available laboratory QC information to evaluate precision and accuracy.

If no, list the analytical method, laboratory ID, and reason for non-conformance :

_____

Additional comments:

_____

IV. QUALITY CONTROL REPORT

The Quanterra laboratories operate under a vigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

The standard laboratory QC package is designed to:

1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data

2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix

3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4) provide a standard set of reportables which assures the client of the quality of his data.

The Quanterra QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of Duplicate Control Samples (DCS) at frequent, well-defined intervals. Each DCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the DCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g., metals or conventional analyses) a single DCS serves as the control sample. An SCS is prepared for each sample lot for which the DCS pair are not analyzed. The recovery of the SCS is charted in exactly the same manner as described for the DCS, and provides a daily check on the performance of the method.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, DCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
049826-0001-SA	AQUEOUS	ICP-AT	23 JUL 96-N4	23 JUL 96-N4
049826-0001-SA	AQUEOUS	ICP-TRA-AT	15 JUL 96-N2	15 JUL 96-N2
049826-0001-SA	AQUEOUS	ICP-TR-ADT	10 JUL 96-N6	10 JUL 96-N6
049826-0001-SA	AQUEOUS	ICP-AD	09 JUL 96-N1	09 JUL 96-N1

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: ICP-AT								
Matrix: AQUEOUS								
QC Lot: 23 JUL 96-N4								
Concentration Units: mg/L								
Aluminum	2.00	1.95	2.00	1.97	99	80-116	2.4	10
Antimony	0.500	0.470	0.487	0.479	96	80-115	3.6	14
Arsenic	2.00	1.90	1.93	1.92	96	80-115	1.3	17
Barium	2.00	1.91	1.95	1.93	96	80-114	2.2	10
Beryllium	0.0500	0.0475	0.0490	0.0483	97	80-120	3.2	10
Boron	1.00	1.06	1.09	1.08	108	80-120	2.5	10
Cadmium	0.0500	0.0487	0.0474	0.0481	96	80-119	2.5	16
Calcium	50.0	49.2	50.1	49.7	99	80-114	1.7	10
Chromium	0.200	0.178	0.182	0.180	90	80-116	2.4	11
Cobalt	0.500	0.475	0.487	0.481	96	80-114	2.5	10
Copper	0.250	0.240	0.245	0.242	97	80-120	1.9	10
Iron	1.00	0.980	0.997	0.988	99	80-120	1.7	11
Lead	0.500	0.478	0.474	0.476	95	80-119	0.96	10
Lithium	1.00	0.854	0.871	0.863	86	80-120	1.9	20
Magnesium	50.0	48.7	49.4	49.0	98	81-120	1.3	10
Manganese	0.500	0.474	0.480	0.477	95	80-116	1.2	10
Molybdenum	1.0	0.941	0.973	0.957	96	80-120	3.4	20
Nickel	0.500	0.477	0.479	0.478	96	80-114	0.40	10
Potassium	50.0	48.0	49.0	48.5	97	80-120	1.9	13
Selenium	2.0	1.92	1.98	1.95	97	80-120	3.3	20
Silver	0.050	0.0471	0.0486	0.0478	96	80-119	3.0	15
Sodium	50.0	49.8	51.3	50.6	101	80-120	2.9	10
Tin	2.00	2.01	2.06	2.04	102	80-120	2.6	20
Titanium	1.00	0.984	0.999	0.992	99	80-120	1.5	20
Vanadium	0.500	0.476	0.484	0.480	96	80-116	1.8	10
Zinc	0.500	0.462	0.479	0.471	94	80-120	3.6	13
Category: ICP-TRA-AT								
Matrix: AQUEOUS								
QC Lot: 15 JUL 96-N2								
Concentration Units: mg/L								
Antimony	0.50	0.499	0.516	0.508	102	80-120	3.2	20
Arsenic	2.0	1.96	2.00	1.98	99	80-120	1.7	20
Cadmium	0.050	0.0532	0.0539	0.0536	107	80-120	1.2	20
Lead	0.50	0.513	0.527	0.520	104	80-120	2.6	20
Selenium	2.0	1.91	1.96	1.93	97	80-120	2.6	20
Thallium	2.0	2.09	2.15	2.12	106	80-120	2.9	20

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

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: ICP-TR-ADT Matrix: AQUEOUS QC Lot: 10 JUL 96-N6 Concentration Units: mg/L								
Antimony	0.500	0.447	0.448	0.447	89	80-120	0.16	20
Arsenic	2.00	1.78	1.78	1.78	89	80-120	0.31	20
Cadmium	0.0500	0.0464	0.0467	0.0465	93	80-120	0.57	20
Lead	0.500	0.452	0.451	0.452	90	80-120	0.12	20
Selenium	2.00	1.85	1.84	1.85	92	80-120	0.31	20
Thallium	2.00	1.86	1.85	1.85	93	80-120	0.17	20
Category: ICP-AD Matrix: AQUEOUS QC Lot: 09 JUL 96-N1 Concentration Units: mg/L								
Aluminum	5.00	5.05	5.01	5.03	101	90-110	0.73	20
Antimony	0.500	0.503	0.509	0.506	101	90-110	1.2	20
Arsenic	0.500	0.496	0.523	0.509	102	90-110	5.2	20
Barium	0.500	0.508	0.504	0.506	101	90-110	0.75	20
Beryllium	0.500	0.487	0.496	0.491	98	90-110	1.8	20
Boron	0.500	0.503	0.509	0.506	101	90-110	1.2	20
Cadmium	0.500	0.485	0.485	0.485	97	90-110	0.086	20
Calcium	20.0	20.8	20.7	20.8	104	90-110	0.43	20
Chromium	0.500	0.496	0.497	0.497	99	90-110	0.083	20
Cobalt	0.500	0.498	0.502	0.500	100	90-110	0.69	20
Copper	0.500	0.495	0.500	0.497	99	90-110	1.1	20
Iron	5.00	5.04	5.08	5.06	101	90-110	0.66	20
Lead	0.500	0.519	0.503	0.511	102	90-110	3.1	20
Lithium	5.00	4.85	4.86	4.86	97	90-110	0.10	20
Magnesium	20.0	21.0	20.9	21.0	105	90-110	0.71	20
Manganese	0.500	0.502	0.505	0.504	101	90-110	0.60	20
Molybdenum	0.500	0.512	0.509	0.510	102	90-110	0.62	20
Nickel	0.500	0.492	0.494	0.493	99	90-110	0.44	20
Potassium	50.0	51.1	50.8	50.9	102	90-110	0.52	20
Selenium	5.00	5.05	5.28	5.16	103	90-110	4.5	20
Silica as SiO2	100	96.8	96.4	96.6	97	90-110	0.40	20
Silver	0.500	0.498	0.490	0.494	99	90-110	1.6	20
Sodium	200	208	206	207	104	90-110	0.80	20
Vanadium	0.500	0.503	0.506	0.504	101	90-110	0.59	20
Zinc	0.500	0.488	0.486	0.487	97	90-110	0.33	20

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

Quanterra
Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-AFIR-AT			
Matrix: AQUEOUS			
QC Lot: 23 JUL 96-N4 QC Run: 23 JUL 96-N4			
Aluminum	ND	mg/L	0.20
Barium	ND	mg/L	0.10
Beryllium	ND	mg/L	0.0020
Calcium	ND	mg/L	5.0
Chromium	ND	mg/L	0.030
Cobalt	ND	mg/L	0.040
Copper	ND	mg/L	0.030
Iron	ND	mg/L	0.040
Magnesium	ND	mg/L	5.0
Manganese	ND	mg/L	0.010
Molybdenum	ND	mg/L	0.040
Nickel	ND	mg/L	0.040
Potassium	ND	mg/L	5.0
Silver	ND	mg/L	0.030
Sodium	ND	mg/L	5.0
Vanadium	ND	mg/L	0.040
Zinc	ND	mg/L	0.010
Test: ICP-TRACE-AT			
Matrix: AQUEOUS			
QC Lot: 15 JUL 96-N2 QC Run: 15 JUL 96-N2			
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: ICP-TRACE-ADT			
Matrix: AQUEOUS			
QC Lot: 10 JUL 96-N6 QC Run: 10 JUL 96-N6			
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

Quanterra
Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation (cont.)

Test: ICP-AFIR-AD
Matrix: AQUEOUS
QC Lot: 09 JUL 96-N1 QC Run: 09 JUL 96-N1

Analyte	Result	Units	Reporting Limit
Aluminum	ND	mg/L	0.20
Barium	ND	mg/L	0.10
Beryllium	ND	mg/L	0.0020
Calcium	ND	mg/L	5.0
Chromium	ND	mg/L	0.030
Cobalt	ND	mg/L	0.040
Copper	ND	mg/L	0.030
Iron	ND	mg/L	0.040
Magnesium	ND	mg/L	5.0
Manganese	ND	mg/L	0.010
Molybdenum	ND	mg/L	0.040
Nickel	ND	mg/L	0.040
Potassium	ND	mg/L	5.0
Silver	ND	mg/L	0.030
Sodium	ND	mg/L	5.0
Vanadium	ND	mg/L	0.040
Zinc	ND	mg/L	0.010

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
049826-0001-SA	AQUEOUS	NO3+NO2-A	27 JUN 96-N1	27 JUN 96-N1
049826-0001-SA	AQUEOUS	NO2-A	25 JUN 96-N1	25 JUN 96-N1

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: NO3+NO2-A Matrix: AQUEOUS QC Lot: 27 JUN 96-N1 Concentration Units: mg/L								
Nitrate plus Nitrite as N	15.2	15.4	15.8	15.6	103	90-116	2.9	10
Category: NO2-A Matrix: AQUEOUS QC Lot: 25 JUN 96-N1 Concentration Units: mg/L								
Nitrite as N	0.100	0.103	0.102	0.102	103	91-113	0.98	10

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

Quanterra
Environmental Services

METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: NO3+NO2-TEC-A			
Matrix: AQUEOUS			
QC Lot: 27 JUN 96-N1 QC Run: 27 JUN 96-N1			
Nitrate plus Nitrite as N	ND	mg/L	0.10
Test: NO2-SPEC-A			
Matrix: AQUEOUS			
QC Lot: 25 JUN 96-N1 QC Run: 25 JUN 96-N1			
Nitrite as N	ND	mg/L	0.010

U.S. GEOLOGICAL SURVEY, WATER RESOURCES DIVISION, NEW MEXICO DISTRICT
ANALYTICAL REQUEST/CHAIN OF CUSTODY

Project Name & Number: Cannon Air Force Base, Ground Water Sampling 463536004	PACKING AND SHIPPING DETAILS
Sampling Location: Sewage Lagoons, Cannon Air Force Base, New Mexico	Packed and Sealed for Shipping by: Fr. Ellen Rosebal — Seal Number: 81501
Team Leader: Jerry Larson	Delivered to Shipper by: Fr. Ellen Rosebal — Airbill Number: 0255916220
	Sampling Status: ☐ Done ☒ Continuing

Sample Date	Sample Time	Field Sample Number	Sample Type	No. of Containers	Analytical Methods (Parameters)	Remarks
24UN96	1440	CAFB-E-0696-1	Groundwater	4	NITRATE (E353.2 / E354.1), APX-IX-SW3005/6010-ICP-TRACE-TOT.&DISS. METALS (Al,Sb,As,Ba,Be,Cd,Ca, Cr,Co,Cu,Fe, Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Tl,V,Zn)	ENVIRONMENTAL SAMPLE -01

Additional Comments

CHAIN OF CUSTODY RECORD				LABORATORY LOG-IN OF SAMPLE SHIPPING CONTAINER	
Relinquished by (signed)	Received by (signed)	Date	Time	Analytical Laboratory	Seal Intact upon Receipt: ☑ Yes ☐ No
	[signature]	6/25/96	830	Quanterra Environmental 4955 Yarrow Street Arvada, CO 80002 ph: (303) 421-6611 Attention: Lindsay Breyer	Condition of Contents: good
					Contents Temperature: 3.9
					Laboratory Project Number: 49826

Sample Checklist

Quanterra Environmental Services

Project #: 49826 Date/Time Received: 6/25/96 830

Company Name & Sampling Site: USGS Cincin

*Cooler #(s): _____ _____ _____ _____ _____ _____ _____ _____

Temperatures: 3.9 _____ _____ _____ _____ _____ _____ _____

*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)	JD
☑	☐	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. N/A	
☐	☐	11. Are VOA bottles preserved, check for labels.	
☐	☑	12. Sediment present in "D," dissolved, bottles.	
☑	☐	13. Are analyses with short holding times requested.	
☐	☑	14. Is extra sample volume provided for MS, MSD or matrix duplicates.	
☐	☑	15. Multiphase samples present, comment is yes.	
		PHOTOGRAPH MULTIPHASE SAMPLES	
☑	☐	16. 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. _____

Initials: _____

DODEC LABORATORY DATA REVIEW WORKSHEET

1.0 GENERAL INFORMATION

Data reviewer: BG Stock
Date of review: 8/5/96
Sample project number: 49854
Project name: NM - CANNON AFB
Sample collection date: 6/26/96
Sample matrix and number: 1 AQUEOUS

Type and number of samples in project:

Type	Number
Environmental	1
Trip blank	
Equipment blank	
Ambient blank	
MS/MSD	
Other	

2.0 DATA REPORT

Date of Analytical Results Report: 7/19/96
Number of volumes in Raw Data Report: 1
Raw Data Report reviewed? Yes____ No X

Were all analyses requested on the COC form performed by the laboratory?
Yes X No____

If no, list canceled analyses and reason for non-performance:

Were the samples properly preserved upon receipt by the laboratory?
Yes X No____

If no, list laboratory ID for samples that were not properly preserved.

3.0 ANALYTICAL METHODS

Analytical methods used in this project

	VOC by GC/MS (SW 8240, SW 8260, E524, E624)
	Halogenated VOC by GC (SW 8010)
	Aromatic VOC by GC (SW 8020)
	SVOC by GC/MS (SW 8270)
	PAH by HPLC (SW 8310)
	Organochlorine pesticides and PCB (SW 8080)
	Organophosphorous pesticides (SW 8140)
	Chlorinated herbicides (SW 8150)
	Dioxins and Furans (SW 8280)
	Explosives (8330)
	TOC (E415.1 or SW 9060)
	TPH (E418.1)
	Oil and Grease (E413.2)
	TOX (SW9020)
X	ICP screen for metals (SW 6010)
	ICP/MS screen for metals (SW 6020)
X	Trace ICP screen for metals (SW 6010 modified)
	Antimony by GFAA (SW 7041)
	Arsenic by GFAA (SW 7060)
	Chromium (SW 7191 or 7196)
	Lead by GFAA (SW 7421)
	Mercury by CVAA (SW 7470 or 7471)
	Selenium by GFAA (SW 7740)
	Thallium by GFAA (SW 7841)
	Inorganic anions (E300.0)
	Alkalinity (310.1)
	Cyanide, total and amenable (SW 9010/9012)
	Nitrogen, ammonia (E350.1)
	Nitrogen, TKN (E351.2)
X	Nitrogen, nitrate (E353.2)
X	Nitrogen, nitrate plus nitrite (E353.2)
X	Nitrogen, nitrite (E354.1)
	Phosphorous, total or ortho (E365.3)
	Sulfate (E375.4)
	Sulfide (E376.2)
	TDS (E160.1)
	pH (SW 9040 or 9045)
	Percent moisture (D2216)
	Gross alpha and gross beta radioactivity (SW 9310)
	Alpha-emitting radium isotopes (SW 9315)
	Radium-228 (SW 9320)
	Uranium (908.1)
	Other analyses :

Were analytical holding times met? Yes X No _____

If no, list analytical method and laboratory ID for samples that exceeded holding time:

_____

Did surrogate recoveries meet QC acceptance criteria? NA
Yes_____ No _____

If no, list analytical method, laboratory ID, and surrogates that did not meet acceptance criteria:

_____

Did actual reporting limits meet project detection limits? NA
Organic analyses: Yes_____ No_____

If no, list analytical method, laboratory ID, and reason for non-conformance:

_____

Inorganic analyses: Yes_____ No X Pb: -CC01, TRACE ICP, DISSOLVED

Reporting limits for GFAA metals and inorganic anions may be raised when: (1) sample concentrations exceed the instrument linear range and (2) target analytes are subject to matrix interferences. Reporting limits for ICP metals and mercury by CVAA are typically only raised when the sample concentration exceeds the instrument linear range.

Did DCS meet QC acceptance criteria? Yes X No_____

If no,–list analytical method, laboratory ID, and reason for non-conformance:

_____

Did SCS meet QC acceptance criteria? Yes_____ No_____ NA

If no, list analytical method, laboratory ID, and reason for non-conformance:

_____

_____

_____

_____

_____

_____

_____

Were any target compounds found in the method, trip, equipment, or ambient blanks above the RL? Yes _____ No X

If yes, list the analytical method, laboratory ID, type of blank and compound:

_____

_____

_____

_____

_____

_____

_____

Did the MS/MSD meet QC acceptance criteria? Yes___ No____ NA

MS/MSD data are used to evaluate the effect of the sample matrix on the analytical process and should only be used in conjunction with other available laboratory QC information to evaluate precision and accuracy.

If no, list the analytical method, laboratory ID, and reason for non-conformance :

_____

_____

_____

_____

_____

_____

Additional comments:

_____

_____

_____

_____

_____

_____

_____

IV. QUALITY CONTROL REPORT

The Quanterra laboratories operate under a vigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

The standard laboratory QC package is designed to:

1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data

2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix

3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4) provide a standard set of reportables which assures the client of the quality of his data.

The Quanterra QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of Duplicate Control Samples (DCS) at frequent, well-defined intervals. Each DCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the DCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g., metals or conventional analyses) a single DCS serves as the control sample. An SCS is prepared for each sample lot for which the DCS pair are not analyzed. The recovery of the SCS is charted in exactly the same manner as described for the DCS, and provides a daily check on the performance of the method.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, DCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
049884-0001-SA	AQUEOUS	ICP-AT	01 JUL 96-MM	01 JUL 96-MM
049884-0001-SA	AQUEOUS	ICP-TRA-AT	01 JUL 96-MM	01 JUL 96-MM
049884-0001-SA	AQUEOUS	ICP-TR-ADT	10 JUL 96-N6	10 JUL 96-N6
049884-0001-SA	AQUEOUS	ICP-AD	09 JUL 96-N1	09 JUL 96-N1

Quanterra Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: ICP-AT								
Matrix: AQUEOUS								
QC Lot: 01 JUL 96-MM								
Concentration Units: mg/L								
Aluminum	2.00	2.08	1.89	1.98	99	80-116	9.4	10
Antimony	0.500	0.489	0.435	0.462	92	80-115	12	14
Arsenic	2.0	2.00	1.82	1.91	95	80-115	9.5	17
Barium	2.00	2.01	1.83	1.92	96	80-114	9.5	10
Beryllium	0.0500	0.0503	0.0457	0.0480	96	80-120	9.7	10
Boron	1.0	1.04	1.04	1.04	104	80-120	0.11	10
Cadmium	0.0500	0.0492	0.0439	0.0466	93	80-119	12	16
Calcium	50.0	51.8	47.1	49.5	99	80-114	9.5	10
Chromium	0.200	0.188	0.175	0.181	91	80-116	7.2	11
Cobalt	0.500	0.504	0.462	0.483	97	80-114	8.8	10
Copper	0.250	0.251	0.229	0.240	96	80-120	9.0	10
Iron	1.00	1.03	0.931	0.981	98	80-120	10	11
Lead	0.500	0.488	0.450	0.469	94	80-119	8.0	10
Lithium	1.0	0.881	0.883	0.882	88	80-120	0.24	20
Magnesium	50.0	51.8	47.1	49.5	99	81-120	9.6	10
Manganese	0.500	0.502	0.457	0.479	96	80-116	9.3	10
Molybdenum	1.0	0.960	0.878	0.919	92	80-120	9.0	20
ickel	0.500	0.495	0.451	0.473	95	80-114	9.3	10
otassium	50.0	51.0	46.4	48.7	97	80-120	9.5	13
Selenium	2.0	2.03	1.78	1.91	95	80-120	13	20
Silver	0.050	0.0517	0.0470	0.0493	99	80-119	9.6	15
Sodium	50.0	52.8	48.3	50.6	101	80-120	8.9	10
Tin	2.0	1.83	1.85	1.84	92	80-120	0.83	20
Titanium	1.0	0.954	0.944	0.949	95	80-120	1.0	20
Vanadium	0.500	0.499	0.451	0.475	95	80-116	10	10
Zinc	0.500	0.491	0.448	0.469	94	80-120	9.1	13
Category: ICP-TRA-AT								
Matrix: AQUEOUS								
QC Lot: 01 JUL 96-MM								
Concentration Units: mg/L								
Antimony	0.50	0.529	0.472	0.501	100	80-120	11	20
Arsenic	2.0	2.05	1.83	1.94	97	80-120	11	20
Cadmium	0.050	0.0550	0.0498	0.0524	105	80-120	9.9	20
Lead	0.50	0.540	0.481	0.511	102	80-120	12	20
Selenium	2.0	1.98	1.77	1.88	94	80-120	11	20
Thallium	2.0	2.21	1.97	2.09	105	80-120	11	20

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

Quanterra Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: ICP-TR-ADT								
Matrix: AQUEOUS								
QC Lot: 10 JUL 96-N6								
Concentration Units: mg/L								
Antimony	0.500	0.447	0.448	0.447	89	80-120	0.16	20
Arsenic	2.00	1.78	1.78	1.78	89	80-120	0.31	20
Cadmium	0.0500	0.0464	0.0467	0.0465	93	80-120	0.57	20
Lead	0.500	0.452	0.451	0.452	90	80-120	0.12	20
Selenium	2.00	1.85	1.84	1.85	92	80-120	0.31	20
Thallium	2.00	1.86	1.85	1.85	93	80-120	0.17	20
Category: ICP-AD								
Matrix: AQUEOUS								
QC Lot: 09 JUL 96-N1								
Concentration Units: mg/L								
Aluminum	5.00	5.05	5.01	5.03	101	90-110	0.73	20
Antimony	0.500	0.503	0.509	0.506	101	90-110	1.2	20
Arsenic	0.500	0.496	0.523	0.509	102	90-110	5.2	20
Barium	0.500	0.508	0.504	0.506	101	90-110	0.75	20
Beryllium	0.500	0.487	0.496	0.491	98	90-110	1.8	20
Boron	0.500	0.503	0.509	0.506	101	90-110	1.2	20
Cadmium	0.500	0.485	0.485	0.485	97	90-110	0.086	20
Calcium	20.0	20.8	20.7	20.8	104	90-110	0.43	20
Chromium	0.500	0.496	0.497	0.497	99	90-110	0.083	20
Cobalt	0.500	0.498	0.502	0.500	100	90-110	0.69	20
Copper	0.500	0.495	0.500	0.497	99	90-110	1.1	20
Iron	5.00	5.04	5.08	5.06	101	90-110	0.66	20
Lead	0.500	0.519	0.503	0.511	102	90-110	3.1	20
Lithium	5.00	4.85	4.86	4.86	97	90-110	0.10	20
Magnesium	20.0	21.0	20.9	21.0	105	90-110	0.71	20
Manganese	0.500	0.502	0.505	0.504	101	90-110	0.60	20
Molybdenum	0.500	0.512	0.509	0.510	102	90-110	0.62	20
Nickel	0.500	0.492	0.494	0.493	99	90-110	0.44	20
Potassium	50.0	51.1	50.8	50.9	102	90-110	0.52	20
Selenium	5.00	5.05	5.28	5.16	103	90-110	4.5	20
Silica as SiO2	100	96.8	96.4	96.6	97	90-110	0.40	20
Silver	0.500	0.498	0.490	0.494	99	90-110	1.6	20
Sodium	200	208	206	207	104	90-110	0.80	20
Vanadium	0.500	0.503	0.506	0.504	101	90-110	0.59	20
Zinc	0.500	0.488	0.486	0.487	97	90-110	0.33	20

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

Quanterra Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-AFIR-AT			
Matrix: AQUEOUS			
QC Lot: 01 JUL 96-MM QC Run: 01 JUL 96-MM			
Aluminum	ND	mg/L	0.20
Barium	ND	mg/L	0.10
Beryllium	ND	mg/L	0.0020
Calcium	ND	mg/L	5.0
Chromium	ND	mg/L	0.030
Cobalt	ND	mg/L	0.040
Copper	ND	mg/L	0.030
Iron	ND	mg/L	0.040
Magnesium	ND	mg/L	5.0
Manganese	ND	mg/L	0.010
Molybdenum	ND	mg/L	0.040
Nickel	ND	mg/L	0.040
Potassium	ND	mg/L	5.0
Silver	ND	mg/L	0.030
Sodium	ND	mg/L	5.0
Vanadium	ND	mg/L	0.040
Zinc	ND	mg/L	0.010
Test: ICP-TRACE-AT			
Matrix: AQUEOUS			
QC Lot: 01 JUL 96-MM QC Run: 01 JUL 96-MM			
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: ICP-TRACE-ADT			
Matrix: AQUEOUS			
QC Lot: 10 JUL 96-N6 QC Run: 10 JUL 96-N6			
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

Quanterra Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation (cont.)

Test: ICP-AFIR-AD
Matrix: AQUEOUS
QC Lot: 09 JUL 96-N1 QC Run: 09 JUL 96-N1

Analyte	Result	Units	Reporting Limit
Aluminum	ND	mg/L	0.20
Barium	ND	mg/L	0.10
Beryllium	ND	mg/L	0.0020
Calcium	ND	mg/L	5.0
Chromium	ND	mg/L	0.030
Cobalt	ND	mg/L	0.040
Copper	ND	mg/L	0.030
Iron	ND	mg/L	0.040
Magnesium	ND	mg/L	5.0
Manganese	ND	mg/L	0.010
Molybdenum	ND	mg/L	0.040
Nickel	ND	mg/L	0.040
Potassium	ND	mg/L	5.0
Silver	ND	mg/L	0.030
Sodium	ND	mg/L	5.0
Vanadium	ND	mg/L	0.040
Zinc	ND	mg/L	0.010

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
049884-0001-SA	AQUEOUS	NO3+NO2-A	02 JUL 96-S5	02 JUL 96-S5
049884-0001-SA	AQUEOUS	NO2-A	27 JUN 96-N1	27 JUN 96-N1

Quanterra Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: NO3+NO2-A Matrix: AQUEOUS QC Lot: 02 JUL 96-S5 Concentration Units: mg/L								
Nitrate plus Nitrite as N	15.2	16.0	15.5	15.8	104	90-116	3.2	10
Category: NO2-A Matrix: AQUEOUS QC Lot: 27 JUN 96-N1 Concentration Units: mg/L								
Nitrite as N	0.100	0.0977	0.0964	0.0970	97	91-113	1.3	10

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

Quanterra Environmental Services

METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: NO3+NO2-TEC-A			
Matrix: AQUEOUS			
QC Lot: 02 JUL 96-S5 QC Run: 02 JUL 96-S5			
Nitrate plus Nitrite as N	ND	mg/L	0.10
Test: NO2-SPEC-A			
Matrix: AQUEOUS			
QC Lot: 27 JUN 96-N1 QC Run: 27 JUN 96-N1			
Nitrite as N	ND	mg/L	0.010

U.S. GEOLOGICAL SURVEY, WATER RESOURCES DIVISION, NEW MEXICO DISTRICT
ANALYTICAL REQUEST/CHAIN OF CUSTODY

Project Name & Number	PACKING AND SHIPPING DETAILS	
Cannon Air Force Base, Ground Water Sampling 463536004	Packed and Sealed for Shipping by: H. Eileen Rogers	Seal Number: 081504
Sampling Location: Sewage Lagoons, Cannon Air Force Base, New Mexico	Delivered to Shipper by: H. Eileen Rogers	Airbill Number: 0255916323
Team Leader: Jerry Larson	Sampling Status: ☒ Done ☐ Continuing	

Sample Date	Sample Time	Field Sample Number	Sample Type	No. of Containers	Analytical Methods (Parameters)	Remarks
26JUN96	0930	CAFB-F-0696-1	Groundwater	4	NITRATE (E353.2 / E354.1), APX-IX-SW3005/6010-ICP TRACE-TOT. & DISS. METALS (Al,Sb,As,Ba,Be,Cd,Ca, Cr,Co,Cu,Fe, Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Tl,V,Zn)	ENVIRONMENTAL SAMPLE -01

Additional Comments

CHAIN OF CUSTODY RECORD				LABORATORY LOG-IN OF SAMPLE SHIPPING CONTAINER	
Relinquished by (signed)	Received by (signed)	Date	Time	Analytical Laboratory	Seal Intact upon Receipt: ☑ Yes ☐ No
H. Eileen Rogers		26JUN96	1030	Quanterra Environmental 4955 Yarrow Street Arvada, CO 80002 ph: (303) 421-6611 Attention: Lindsay Breyer	Condition of Contents: Good
	[illegible]	6/27/96	940		Contents Temperature: 3.5
					Laboratory Project Number: 49884

Sample Checklist

Quanterra Environmental Services

Project #: 49884 Date/Time Received: 6/27/96 940

Company Name & Sampling Site: USGS Camon

*Cooler #(s): _____ _____ _____ _____ _____ _____ _____ _____

Temperatures: 3.5 _____ _____ _____ _____ _____ _____ _____

*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)	JO
☑	☐	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. (NA)	
☐	☐	11. Are VOA bottles preserved, check for labels.	
☐	☑	12. Sediment present in "D," dissolved, bottles.	
☑	☐	13. Are analyses with short holding times requested.	
☐	☑	14. Is extra sample volume provided for MS, MSD or matrix duplicates.	
☐	☑	15. Multiphase samples present, comment is yes.	
		PHOTOGRAPH MULTIPHASE SAMPLES	
☑	☐	16. 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. _____

Initials: _____

DODEC LABORATORY DATA REVIEW WORKSHEET

1.0 GENERAL INFORMATION

Data reviewer: BOB BROCK
Date of review: 9/5/96
Sample project number: 49850
Project name: NM-CANNON AFB
Sample collection date: 6/25/96
Sample matrix and number: 5 AQUEOUS

Type and number of samples in project:

Type	Number
Environmental	4
Trip blank	
Equipment blank	1
Ambient blank	
MS/MSD	
Other	

2.0 DATA REPORT

Date of Analytical Results Report: 7/19/96
Number of volumes in Raw Data Report: 1
Raw Data Report reviewed? Yes____ No X

Were all analyses requested on the COC form performed by the laboratory?
Yes X No____

If no, list canceled analyses and reason for non-performance:

Were the samples properly preserved upon receipt by the laboratory?
Yes X No____

If no, list laboratory ID for samples that were not properly preserved.

3.0 ANALYTICAL METHODS

Analytical methods used in this project

	VOC by GC/MS (SW 8240, SW 8260, E524, E624)
	Halogenated VOC by GC (SW 8010)
	Aromatic VOC by GC (SW 8020)
	SVOC by GC/MS (SW 8270)
	PAH by HPLC (SW 8310)
	Organochlorine pesticides and PCB (SW 8080)
	Organophosphorous pesticides (SW 8140)
	Chlorinated herbicides (SW 8150)
	Dioxins and Furans (SW 8280)
	Explosives (8330)
	TOC (E415.1 or SW 9060)
	TPH (E418.1)
	Oil and Grease (E413.2)
	TOX (SW9020)
X	ICP screen for metals (SW 6010)
	ICP/MS screen for metals (SW 6020)
X	Trace ICP screen for metals (SW 6010 modified)
	Antimony by GFAA (SW 7041)
	Arsenic by GFAA (SW 7060)
	Chromium (SW 7191 or 7196)
	Lead by GFAA (SW 7421)
	Mercury by CVAA (SW 7470 or 7471)
	Selenium by GFAA (SW 7740)
	Thallium by GFAA (SW 7841)
	Inorganic anions (E300.0)
	Alkalinity (310.1)
	Cyanide, total and amenable (SW 9010/9012)
	Nitrogen, ammonia (E350.1)
	Nitrogen, TKN (E351.2)
X	Nitrogen, nitrate (E353.2)
X	Nitrogen, nitrate plus nitrite (E353.2)
X	Nitrogen, nitrite (E354.1)
	Phosphorous, total or ortho (E365.3)
	Sulfate (E375.4)
	Sulfide (E376.2)
	TDS (E160.1)
	pH (SW 9040 or 9045)
	Percent moisture (D2216)
	Gross alpha and gross beta radioactivity (SW 9310)
	Alpha-emitting radium isotopes (SW 9315)
	Radium-228 (SW 9320)
	Uranium (908.1)
	Other analyses :

Were analytical holding times met? Yes X No _____

If no, list analytical method and laboratory ID for samples that exceeded holding time:

_____
_____
_____
_____
_____
_____

Did surrogate recoveries meet QC acceptance criteria? NA
Yes_____ No _____

If no, list analytical method, laboratory ID, and surrogates that did not meet acceptance criteria:

_____
_____
_____
_____
_____

Did actual reporting limits meet project detection limits? NA
Organic analyses: Yes_____ No_____

If no, list analytical method, laboratory ID, and reason for non-conformance:

_____
_____
_____
_____
_____
_____

Inorganic analyses: Yes_____ No X Pb: -CC01, -CC03, -CC04, -CC05 (TRACE ICP)

Reporting limits for GFAA metals and inorganic anions may be raised when: (1) sample concentrations exceed the instrument linear range and (2) target analytes are subject to matrix interferences. Reporting limits for ICP metals and mercury by CVAA are typically only raised when the sample concentration exceeds the instrument linear range.

Did DCS meet QC acceptance criteria? Yes X No_____

If no, list analytical method, laboratory ID, and reason for non-conformance:

_____
_____
_____
_____
_____
_____

Did SCS meet QC acceptance criteria? Yes_____ No_____ NA

If no, list analytical method, laboratory ID, and reason for non-conformance:

Were any target compounds found in the method, trip, equipment, or ambient blanks above the RL? Yes X No _____

If yes, list the analytical method, laboratory ID, type of blank and compound:

ANTIMONY BY 6010 - TRACE WAS DETECTED ABOVE THE RL IN SAMPLE -0002 (EB)

Did the MS/MSD meet QC acceptance criteria? Yes___ No____ NA

MS/MSD data are used to evaluate the effect of the sample matrix on the analytical process and should only be used in conjunction with other available laboratory QC information to evaluate precision and accuracy.

If no, list the analytical method, laboratory ID, and reason for non-conformance :

Additional comments:

IV. QUALITY CONTROL REPORT

The Quanterra laboratories operate under a vigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

The standard laboratory QC package is designed to:

1. establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data,

2. assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix,

3. establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4. provide a standard set of reportables which assures the client of the quality of his data.

The Quanterra QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of Duplicate Control Samples (DCS) at frequent, well-defined intervals. Each DCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the DCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g., metals or conventional analyses) a single DCS serves as the control sample. An SCS is prepared for each sample lot for which the DCS pair are not analyzed. The recovery of the SCS is charted in exactly the same manner as described for the DCS, and provides a daily check on the performance of the method.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, DCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

Quanterra Environmental Services

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
049850-0001-SA	AQUEOUS	ICP-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0001-SA	AQUEOUS	ICP-TRA-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0001-SA	AQUEOUS	ICP-TR-ADT	10 JUL 96-N6	10 JUL 96-N6
049850-0001-SA	AQUEOUS	ICP-AD	09 JUL 96-N1	09 JUL 96-N1
049850-0002-EB	AQUEOUS	ICP-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0002-EB	AQUEOUS	ICP-TRA-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0002-EB	AQUEOUS	ICP-TR-ADT	10 JUL 96-N6	10 JUL 96-N6
049850-0002-EB	AQUEOUS	ICP-AD	09 JUL 96-N1	09 JUL 96-N1
049850-0003-SA	AQUEOUS	ICP-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0003-SA	AQUEOUS	ICP-TRA-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0003-SA	AQUEOUS	ICP-TR-ADT	10 JUL 96-N6	10 JUL 96-N6
049850-0003-SA	AQUEOUS	ICP-AD	09 JUL 96-N1	09 JUL 96-N1
049850-0004-SA	AQUEOUS	ICP-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0004-SA	AQUEOUS	ICP-TRA-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0004-SA	AQUEOUS	ICP-TR-ADT	10 JUL 96-N6	10 JUL 96-N6
049850-0004-SA	AQUEOUS	ICP-AD	09 JUL 96-N1	09 JUL 96-N1
049850-0005-SA	AQUEOUS	ICP-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0005-SA	AQUEOUS	ICP-TRA-AT	10 JUL 96-N8	10 JUL 96-N8
049850-0005-SA	AQUEOUS	ICP-TR-ADT	10 JUL 96-N6	10 JUL 96-N6
049850-0005-SA	AQUEOUS	ICP-AD	09 JUL 96-N1	09 JUL 96-N1

Quanterra Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Category: ICP-AT
Matrix: AQUEOUS
QC Lot: 10 JUL 96-N8
Concentration Units: mg/L

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Aluminum	2.00	2.12	2.12	2.12	106	80-116	0.11	10
Antimony	0.500	0.501	0.506	0.504	101	80-115	0.87	14
Arsenic	2.00	2.09	2.02	2.06	103	80-115	3.4	17
Barium	2.00	2.07	2.07	2.07	103	80-114	0.071	10
Beryllium	0.0500	0.0540	0.0535	0.0537	107	80-120	0.87	10
Boron	1.00	1.15	1.13	1.14	114	80-120	1.4	10
Cadmium	0.0500	0.0486	0.0504	0.0495	99	80-119	3.6	16
Calcium	50.0	52.7	52.8	52.7	105	80-114	0.086	10
Chromium	0.200	0.198	0.199	0.198	99	80-116	0.20	11
Cobalt	0.500	0.523	0.529	0.526	105	80-114	1.2	10
Copper	0.250	0.262	0.265	0.264	105	80-120	1.1	10
Iron	1.00	1.07	1.06	1.06	106	80-120	1.5	11
Lead	0.500	0.508	0.503	0.505	101	80-119	1.0	10
Lithium	1.00	0.973	0.975	0.974	97	80-120	0.22	20
Magnesium	50.0	52.3	52.2	52.3	105	81-120	0.038	10
Manganese	0.500	0.519	0.514	0.517	103	80-116	0.81	10
Molybdenum	1.0	1.02	1.03	1.02	102	80-120	0.49	20
Nickel	0.500	0.520	0.518	0.519	104	80-114	0.39	10
Potassium	50.0	52.6	52.7	52.6	105	80-120	0.11	13
Selenium	2.0	2.06	2.07	2.07	103	80-120	0.51	20
Silver	0.050	0.0470	0.0495	0.0482	96	80-119	5.2	15
Sodium	50.0	54.0	54.4	54.2	108	80-120	0.66	10
Tin	2.00	2.12	2.11	2.11	106	80-120	0.58	20
Titanium	1.00	1.05	1.05	1.05	105	80-120	0.0029	20
Vanadium	0.500	0.520	0.518	0.519	104	80-116	0.24	10
Zinc	0.500	0.500	0.502	0.501	100	80-120	0.48	13

Category: ICP-TRA-AT
Matrix: AQUEOUS
QC Lot: 10 JUL 96-N8
Concentration Units: mg/L

Antimony	0.50	0.499	0.509	0.504	101	80-120	2.0	20
Arsenic	2.0	1.93	1.97	1.95	98	80-120	2.2	20
Cadmium	0.050	0.0525	0.0535	0.0530	106	80-120	1.9	20
Lead	0.50	0.510	0.519	0.514	103	80-120	1.7	20
Selenium	2.0	1.88	1.92	1.90	95	80-120	1.9	20
Thallium	2.0	2.06	2.11	2.08	104	80-120	2.4	20

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

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Limits	Precision (RPD) DCS	Limit
Category: ICP-TR-ADT								
Matrix: AQUEOUS								
QC Lot: 10 JUL 96-N6								
Concentration Units: mg/L								
Antimony	0.500	0.447	0.448	0.447	89	80-120	0.16	20
Arsenic	2.00	1.78	1.78	1.78	89	80-120	0.31	20
Cadmium	0.0500	0.0464	0.0467	0.0465	93	80-120	0.57	20
Lead	0.500	0.452	0.451	0.452	90	80-120	0.12	20
Selenium	2.00	1.85	1.84	1.85	92	80-120	0.31	20
Thallium	2.00	1.86	1.85	1.85	93	80-120	0.17	20
Category: ICP-AD								
Matrix: AQUEOUS								
QC Lot: 09 JUL 96-N1								
Concentration Units: mg/L								
Aluminum	5.00	5.05	5.01	5.03	101	90-110	0.73	20
Antimony	0.500	0.503	0.509	0.506	101	90-110	1.2	20
Arsenic	0.500	0.496	0.523	0.509	102	90-110	5.2	20
Barium	0.500	0.508	0.504	0.506	101	90-110	0.75	20
Beryllium	0.500	0.487	0.496	0.491	98	90-110	1.8	20
Boron	0.500	0.503	0.509	0.506	101	90-110	1.2	20
Cadmium	0.500	0.485	0.485	0.485	97	90-110	0.086	20
Calcium	20.0	20.8	20.7	20.8	104	90-110	0.43	20
Chromium	0.500	0.496	0.497	0.497	99	90-110	0.083	20
Cobalt	0.500	0.498	0.502	0.500	100	90-110	0.69	20
Copper	0.500	0.495	0.500	0.497	99	90-110	1.1	20
Iron	5.00	5.04	5.08	5.06	101	90-110	0.66	20
Lead	0.500	0.519	0.503	0.511	102	90-110	3.1	20
Lithium	5.00	4.85	4.86	4.86	97	90-110	0.10	20
Magnesium	20.0	21.0	20.9	21.0	105	90-110	0.71	20
Manganese	0.500	0.502	0.505	0.504	101	90-110	0.60	20
Molybdenum	0.500	0.512	0.509	0.510	102	90-110	0.62	20
Nickel	0.500	0.492	0.494	0.493	99	90-110	0.44	20
Potassium	50.0	51.1	50.8	50.9	102	90-110	0.52	20
Selenium	5.00	5.05	5.28	5.16	103	90-110	4.5	20
Silica as SiO2	100	96.8	96.4	96.6	97	90-110	0.40	20
Silver	0.500	0.498	0.490	0.494	99	90-110	1.6	20
Sodium	200	208	206	207	104	90-110	0.80	20
Vanadium	0.500	0.503	0.506	0.504	101	90-110	0.59	20
Zinc	0.500	0.488	0.486	0.487	97	90-110	0.33	20

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

Quanterra Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-AFIR-AT			
Matrix: AQUEOUS			
QC Lot: 10 JUL 96-N8 QC Run: 10 JUL 96-N8			
Aluminum	ND	mg/L	0.20
Barium	ND	mg/L	0.10
Beryllium	ND	mg/L	0.0020
Calcium	ND	mg/L	5.0
Chromium	ND	mg/L	0.030
Cobalt	ND	mg/L	0.040
Copper	ND	mg/L	0.030
Iron	ND	mg/L	0.040
Magnesium	ND	mg/L	5.0
Manganese	ND	mg/L	0.010
Molybdenum	ND	mg/L	0.040
Nickel	ND	mg/L	0.040
Potassium	ND	mg/L	5.0
Silver	ND	mg/L	0.030
Sodium	ND	mg/L	5.0
Vanadium	ND	mg/L	0.040
Zinc	ND	mg/L	0.010
Test: ICP-TRACE-AT			
Matrix: AQUEOUS			
QC Lot: 10 JUL 96-N8 QC Run: 10 JUL 96-N8			
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: ICP-TRACE-ADT			
Matrix: AQUEOUS			
QC Lot: 10 JUL 96-N6 QC Run: 10 JUL 96-N6			
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

Quanterra Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation (cont.)

Test: ICP-AFIR-AD
Matrix: AQUEOUS
QC Lot: 09 JUL 96-N1 QC Run: 09 JUL 96-N1

Analyte	Result	Units	Reporting Limit
Aluminum	ND	mg/L	0.20
Barium	ND	mg/L	0.10
Beryllium	ND	mg/L	0.0020
Calcium	ND	mg/L	5.0
Chromium	ND	mg/L	0.030
Cobalt	ND	mg/L	0.040
Copper	ND	mg/L	0.030
Iron	ND	mg/L	0.040
Magnesium	ND	mg/L	5.0
Manganese	ND	mg/L	0.010
Molybdenum	ND	mg/L	0.040
Nickel	ND	mg/L	0.040
Potassium	ND	mg/L	5.0
Silver	ND	mg/L	0.030
Sodium	ND	mg/L	5.0
Vanadium	ND	mg/L	0.040
Zinc	ND	mg/L	0.010

Quanterra Environmental Services

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
049850-0001-SA	AQUEOUS	NO3+NO2-A	27 JUN 96-N1	27 JUN 96-N1
049850-0001-SA	AQUEOUS	NO2-A	26 JUN 96-N1	26 JUN 96-N1
049850-0002-EB	AQUEOUS	NO3+NO2-A	27 JUN 96-N1	27 JUN 96-N1
049850-0002-EB	AQUEOUS	NO2-A	26 JUN 96-N1	26 JUN 96-N1
049850-0003-SA	AQUEOUS	NO3+NO2-A	27 JUN 96-N1	27 JUN 96-N1
049850-0003-SA	AQUEOUS	NO2-A	26 JUN 96-N1	26 JUN 96-N1
049850-0004-SA	AQUEOUS	NO3+NO2-A	27 JUN 96-N1	27 JUN 96-N1
049850-0004-SA	AQUEOUS	NO2-A	26 JUN 96-N1	26 JUN 96-N1
049850-0005-SA	AQUEOUS	NO3+NO2-A	27 JUN 96-N1	27 JUN 96-N1
049850-0005-SA	AQUEOUS	NO2-A	26 JUN 96-N1	26 JUN 96-N1

Quanterra Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: NO3+NO2-A Matrix: AQUEOUS QC Lot: 27 JUN 96-N1 Concentration Units: mg/L								
Nitrate plus Nitrite as N	15.2	15.4	15.8	15.6	103	90-116	2.9	10
Category: NO2-A Matrix: AQUEOUS QC Lot: 26 JUN 96-N1 Concentration Units: mg/L								
Nitrite as N	0.100	0.108	0.109	0.108	109	91-113	0.92	10

Calculations are performed before rounding to avc -ound-off errors in calculated results.

Quanterra Environmental Services

METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: NO3+NO2-TEC-A Matrix: AQUEOUS QC Lot: 27 JUN 96-N1 QC Run: 27 JUN 96-N1			
Nitrate plus Nitrite as N	ND	mg/L	0.10
Test: NO2-SPEC-A Matrix: AQUEOUS QC Lot: 26 JUN 96-N1 QC Run: 26 JUN 96-N1			
Nitrite as N	ND	mg/L	0.010

U.S. GEOLOGICAL SURVEY, WATER RESOURCES DIVISION, NEW MEXICO DISTRICT
ANALYTICAL REQUEST/CHAIN OF CUSTODY

Project Name & Number: Cannon Air Force Base, Ground Water Sampling 463536004	PACKING AND SHIPPING DETAILS
	Packed and Sealed for Shipping by: F. Eileen Royal — Seal Number: 081502
Sampling Location: Sewage Lagoons, Cannon Air Force Base, New Mexico	Delivered to Shipper by: F. Eileen Royal — Airbill Number: 0255916334
Team Leader: Jerry Larson	Sampling Status: ☐ Done ☒ Continuing

Sample Date	Sample Time	Field Sample Number	Sample Type	No. of Containers	Analytical Methods (Parameters)	Remarks
25JUN96	1000	CAFB-H-0696-1	Groundwater	4	NITRATE (E353.2 / E354.1), APX-IX-SW3005/6010-ICP-TRACAE-TOT. & DISS.METALS (Al,Sb,As,Ba,Be,Cd,Ca Cr,Co,Cu,Fe, Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Tl,V,Zn)	ENVIRONMENTAL SAMPLE -01
25JUN96	0800	CAFB-H-0696-2	ASTM-TYPE-II WATER	4	NITRATE (E353.2 / E354.1), APX-IX-SW3005/6010-ICP-TRACE-TOT. & DISS. METALS (Al,Sb,As,Ba,Be,Cd,Ca, Cr,Co,Cu,Fe, Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Tl,V,Zn)	EQUIPMENT BLANK -02

Additional Comments

CHAIN OF CUSTODY RECORD				LABORATORY LOG-IN OF SAMPLE SHIPPING CONTAINER	
Relinquished by (signed)	Received by (signed)	Date	Time	Analytical Laboratory	Seal Intact upon Receipt ☑ Yes ☐ No
	[signature]	4/26/96	915	Quanterra Environmental 4955 Yarrow Street Arvada, CO 80002 ph: (303) 421-6611 Attention: Lindsay Breyer	Condition of Contents: good
					Contents Temperature: 3.7
					Laboratory Project Number: 49850

U.S. GEOLOGICAL SURVEY, WATER RE[illegible]IRCES DIVISION, NEW MEXICO DISTRICT
ANALYTICAL REQU[illegible]./CHAIN OF CUSTODY

Project Name & Number: Cannon Air Force Base, Ground Water Sampling 463536004	PACKING AND SHIPPING DETAILS
	Packed and Sealed for Shipping by: M. Eileen Roybal — Seal Number: 081502
Sampling Location: Sewage Lagoons, Cannon Air Force Base, New Mexico	Delivered to Shipper by: M. Eileen Roybal — Airbill Number: 0255916334
Team Leader: Jerry Larson	Sampling Status: ☐ Done ☒ Continuing

Sample Date	Sample Time	Field Sample Number	Sample Type	No. of Containers	Analytical Methods (Parameters)	Remarks
25JUN96	1305	CAFB-G-0696-1	Groundwater	4	NITRATE (E353.2 / E354.1), APX-IX-SW3005/6010-ICP TRACE-TOT. & DISS. METALS (Al,Sb,As,Ba,Be,Cd,Ca, Cr,Co,Cu,Fe, Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Tl,V,Zn)	ENVIRONMENTAL SAMPLE -03

Additional Comments

CHAIN OF CUSTODY RECORD				LABORATORY LOG-IN OF SAMPLE SHIPPING CONTAINER	
Relinquished by (signed)	Received by (signed)	Date	Time	Analytical Laboratory	Seal Intact upon Receipt ☑ Yes ☐ No
	[illegible]	6/26/96	915	Quanterra Environmental 4955 Yarrow Street Arvada, CO 80002 ph: (303) 421-6611 Attention: Lindsay Breyer	Condition of Contents: Good
					Contents Temperature: 3.7
					Laboratory Project Number: 49850

U.S. GEOLOGICAL SURVEY, WATER RESOURCES DIVISION, NEW MEXICO DISTRICT
ANALYTICAL REQUEST/CHAIN OF CUSTODY

Project Name & Number: Cannon Air Force Base, Ground Water Sampling 463536004	PACKING AND SHIPPING DETAILS
Sampling Location: Playa Lake, Cannon Air Force Base, New Mexico	Packed and Sealed for Shipping by: F. Eileen Roybal; Seal Number: 081503
Team Leader: Jerry Larson	Delivered to Shipper by: F. Eileen Roybal; Airbill Number: 0255916334
	Sampling Status: ☐ Done ☒ Continuing

Sample Date	Sample Time	Field Sample Number	Sample Type	No. of Containers	Analytical Methods (Parameters)	Remarks
25JUN96	1421	CAFB-P-0696-1	Groundwater	4	NITRATE (E353.2 / E354.1), APX-IX-SW3005/6010-ICP-TRACE-TOT.&DISS. METALS (Al,Sb,As,Ba,Be,Cd,Ca,Cr,Co,Cu,Fe, Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Tl,V,Zn)	ENVIRONMENTAL SAMPLE -04
25JUN96	1421	CAFB-P-0696-2	Groundwater	4	NITRATE (E353.2 / E354.1), APX-IX-SW3005/6010-ICP-TRACE-TOT.&DISS. METALS (Al,Sb,As,Ba,Be,Cd,Ca,Cr,Co,Cu,Fe, Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Tl,V,Zn)	ENVIRONMENTAL SAMPLE -05

Additional Comments

CHAIN OF CUSTODY RECORD				LABORATORY LOG-IN OF SAMPLE SHIPPING CONTAINER	
Relinquished by (signed)	Received by (signed)	Date	Time	Analytical Laboratory	Seal Intact upon Receipt: ☑ Yes ☐ No
	[signature]	6/26/96	915	Quanterra Environmental 4955 Yarrow Street Arvada, CO 80002 ph: (303) 421-6611 Attention: Lindsay Breyer	Condition of Contents: Good
					Contents Temperature: 2.5
					Laboratory Project Number: 49850

Sample Checklist

Quanterra Environmental Services

Project #: 49850 Date/Time Received: 6/26/96 915

mpany Name & Sampling Site: USGS Cannon

*Cooler #(s): _____ _____ _____ _____ _____ _____ _____ _____

Temperatures: 3.7 2.5 _____ _____ _____ _____ _____ _____

*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)	
☑	☐	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. (N/A)	
☐	☐	11. Are VOA bottles preserved, check for labels.	
☐	☑	12. Sediment present in "D," dissolved, bottles.	
☑	☐	13. Are analyses with short holding times requested.	
☐	☑	14. Is extra sample volume provided for MS, MSD or matrix duplicates.	
☐	☑	15. Multiphase samples present, comment is yes.	
		PHOTOGRAPH MULTIPHASE SAMPLES	
☑	☐	16. 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. _____

Initials: _____

APPENDIX III

Field Data

Sample container and preservation requirements

Parameters and Methods	Bottle Size and Type	Preservatives
23 Metals, total and dissolved: (Al, Ba, Be, Ca, Cr, Co, Cu, Fe, Mg, Mn, Mo, Ni, K, Ag, Na, V, Zn by SW6010); (Sb, As, Cd, Pb, Se, Tl by SW6010-Trace)	16 oz. polyethylene	10 mL 20% Nitric Acid, pH<2
Nitrate, E353.2	16 oz. glass	2 mL 50% Sulfuric Acid,pH<2, Chilled
Nitrite , E354.1	16 oz. polyethylene	None, Chilled

24 Jun 96

1230 – J. Larson, M. Roybal R.K Dewees arrive on site E. Partly cloudy, sunny, warm ~ 95°F. Slightly breezy

1239 – WL 287.23 BLW MP

1241 – PID = 0.0

1239 – M. Roybal (note taker) calibrate PH meter with ~~SPC~~ Buffers 7, 10 slope = 99.2
PH 7 = 6.98 PH 10 = 9.96 Temp = 30.7°C
SPC calibrated with 763 µs/cm standard

1252 – Begin purging WELL-E

3500 PSI BEGIN

TIME	VOL (gal)	Temp °C	PH	COND (µs/cm)
1252	0	23.1	8.00	762
1305	10	21.9	7.83	751
1318	20	21.0	7.72	756
1330	30	20.8	7.74	749
1342	40	20.7	7.74	746
1354	50	20.4	7.73	747
1403	60	20.4	7.73	747
1411	70	20.6	7.73	750
1419	80	20.6	7.72	746
1427	90	20.5	7.72	747
1435	100	20.3	7.73	745

1440 Collect environmental sample CAFB0696-1-E

1500 call Fed Ex and leave for today

400 PSI left in the tank.

25 Jun 96 Well-H

0740 - J. Larson, M. Roybal, RK Demaes arrive on well H.
cloudy, cool, windy, rain

0750 - Calibrate PH meter PH7 = 7.01
PH10 = 10.05 slope = 101.4 Temp = 21.6 °C
calibrate spc. meter with 763 µs/cm standard

0751 - PID = 0.0
- Get ready for Equipment blank.
0755 - W.L. = 285.15' below TOC
0800 - Collect equipment blank - CAFB-H-0696-2
0834 - Begin purging well-H

	TIME	VOL (gal)	TEMP °C	PH	COND (µs/cm)	
2200 lbs	0834	0	20.5	7.37	775	
	0844	10	19.5	7.48	820	
	0854	20	18.9	7.53	822	
	0902	30	18.6	7.56	815	
	0913	40	18.3	7.63	799	
200 lbs new tank 2300 lbs	0922	50	18.3	7.65	802	
	0930	60	18.3	7.64	801	- RKD changed to new tank
	0944	70	18.4	7.64	801	- RKD leave site for more nitrogen.
	0953	80	18.5	7.64	802	

1000 collect environmental Sample CAFB-H-0696-1
1005 - J. Larson Decon pump for well G.
1040 - Go to well G

25JUN96 Well-G

1045 - RK Dawes back with 3 more nitrogen gas tanks.
Stopped raining.

1048 - PID = 0.0

1053 - Calibrate pH meter - PH 7 = 7.01 PH 10 = 10.04
Slope = 100.5 Temp = 22.4 °C
calibrate SPC meter with 1020 µS/cm standard

1101 - W.L. = 285.95' below TOC

1111 - Begin purging from well-G

	TIME	VOL (gal)	TEMP (°C)	PH	COND (µS/cm)
	1111	0.0	22.9	7.10	1432
	1120	10	21.3	7.23	1494
	1129	20	20.2	7.26	1497
	1139	30	20.5	7.30	1477
start new tank 2500 lbs	1149	40	20.4	7.38	1432
	1159	50	20.4	7.39	1453
	1207	60	20.6	7.38	1468
	1216	70	20.7	7.37	1486
	1225	80	20.6	7.36	1497
	1234	90	20.5	7.35	1512
NEW TANK # 2100	1243	100	20.3	7.34	1515
	1252	110	20.4	7.34	1533
	1302	120	20.7	7.33	1541

1305 collect environmental Sample CAFB-G-0696-1

Go to well P

25JUN96 well-P

1330 - RK Dewees and M. Roybal arrive ~~at~~ well-P
J. Larson is setting up at well F for tomorrow's sample.

- PID = 0.0

1335 - Calibrate PH meter - PH7 = 6.99 PH10 = 9.99
Slope = 100.6 Temp = 27.5 °C
Calibrate SPC meter with 1020 us/cm standard

1350 - WL = 279.30 ft below TOC

1355 Begin purging from well-P

	TIME	VOL (gal)	TEMP °C	PH	COND (us/cm)
1100 lbs	1355	0	19.9	7.02	2000
	1402	5	19.5	7.14	1990
	1406	10	19.2	7.19	1990
	1411	15	18.9	7.21	2000
	1415	20	18.9	7.20	2000
	1420	25	19.0	7.20	2000

1421 collect environmental sample CAFB-P-0696-1 and duplicate CAFB-P-0696-2

26 JUN96 WELL-F

0730 - J. Larson, M. Roybal, RK Dewees arrive at well F. Clear, warm, no wind; cloudy @ 0900

0740 - WL = 284.07 ft below TOC
- PID =

0750 - M. Roybal calibrate PH meter PH 7 = 7.01
PH 10 = 10.05 SPC = 101.2 Temp = 21.8 °C
Calibrate SPC with 1020 us/cm Standard

0800 - Begin purging well-F

TIME	VOL (gal)	TEMP °C	PH	COND (us/cm)
0800	0	20.8	7.21	1105
0810	10	19.8	7.33	1126
0821	20	19.3	7.38	1131
0831	30	19.3	7.38	1127
0842	40	19.4	7.39	1145
0853	50	19.6	7.39	1159
0903	60	19.2	7.39	1168
0914	70	19.3	7.38	1181
0924	80	19.4	7.38	1181

0930 collect environmental sample CAFB-F-0696-1