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Enseco

ANALYTICAL RESULTS
FOR
U.S. GEOLOGICAL SURVEY
ENSECO-RMAL NO. 015173

JUNE 13, 1991

Reviewed by:



Randall Thompson



Lindsay Breyer

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KAFB1128


One

I. OVERVIEW

On May 30, 1991, Enseco-Rocky Mountain Analytical Laboratory received five aqueous samples from 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

As directed by Dill Dam, Chloride has been added to the analysis of samples 015173-0001, -0002, and -0005.

Due to laboratory error, the analytical holding time was exceeded for the total hexavalent chromium analysis of sample 015173-0001 and the dissolved hexavalent chromium analysis of sample 015173-0001 and -0005.

Two

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 Enseco - RMAL 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.

SAMPLE DESCRIPTION INFORMATION
 for
 U.S. Geological Survey

Lab ID	Client ID	Matrix	Sampled Date	Time	Received Date
015173-0001-SA	KAFB050114-2	AQUEOUS	29 MAY 91	13:45	30 MAY 91
015173-0002-SA	KAFB050115-2	AQUEOUS	29 MAY 91	13:00	30 MAY 91
015173-0003-SA	KAFB050116-2	AQUEOUS	29 MAY 91	13:00	30 MAY 91
015173-0004-SA	KAFB050117-2	AQUEOUS	29 MAY 91	07:28	30 MAY 91
015173-0005-SA	KAFB050312-2	AQUEOUS	29 MAY 91	16:00	30 MAY 91

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Lab ID: 015173	Group Code	Analysis Description	Custom Test?
0001 - 0002	A	Chromium, Furnace AA (Total)	N
		Prep - Total Metals, ICP	N
		Chromium, Furnace AA	N
		Chromium VI (Total)	N
		Chromium VI (Dissolved)	N
		Nitrate Plus Nitrite	N
		Purgeable Volatile Organics	N
		AFIR Volatile Screen	N
		Volatiles Library Search (10 Compound TID)	N
		Total Organic Halogen (TOX)	N
		Total Organic Carbon (TOC)	N
0003 - 0004	B	Purgeable Volatile Organics	N
		AFIR Volatile Screen	N
		Volatiles Library Search (10 Compound TID)	N
0005	C	Chromium, Furnace AA (Total)	N
		Prep - Total Metals, ICP	N
		Chromium, Furnace AA	N
		Chromium VI (Total)	N
		Chromium VI (Dissolved)	N
		Nitrate Plus Nitrite	N
		Total Organic Halogen (TOX)	N
Total Organic Carbon (TOC)	N		

Three

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 data 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 Enseco 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.

Enseco-RMAL is no longer routinely blank-correcting 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. This policy is described in detail in the Enseco Incorporated Quality Assurance Program Plan for Environmental Chemical Monitoring, Revision 3.3, May, 1989.

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 results from the Standard Enseco QA/QC Program, which generates data which are independent of matrix effects, is given in Section IV.

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

Tentatively Identified Compounds

This report presents results for the "identification" of unknown compounds that were detected in the GC/MS analysis. The results from this work are presented as "tentatively identified compounds" (TIC). The approach used for reporting TICs was based on the protocol established for this purpose in the EPA Superfund methods and on guidelines established by the American Chemical Society (ACS).

In summary, the mass spectrum of chromatographic peaks in concentrations in excess of 10% of the internal standard were obtained. Normally, the number of unknown compounds identified is limited to 10 compounds in the volatile fraction and 20 compounds in the semivolatile fraction. Each mass spectrum was then compared to a library of over 30,000 reference spectra in a computerized "library search." The three "best" matches obtained by the computer were hardcopied along with the mass spectrum of the unknown peak. This information was then reviewed by an analyst who "identified" the compound based on the available information.

All identifications were based on the "Guidelines for GC/MS Identification" developed by the American Chemical Society (Environmental Science and Technology, 1982, 16 143A). As recommended in these guidelines, identifications of unknown substances were reported with a level of confidence. The three levels of confidence cited in the ACS guidelines and used in this report are as follows:

Level 3: Confirmed Identification

The identification is based on the analysis of an authentic standard.

Level 2: Confident Identification

Good agreement was observed between the unknown compound and a specific library spectrum.

Level 1: Tentative Identification

The unknown compound is only indicative of a specific library spectrum.

Class Identification

The unknown compound was not similar to a specific library spectrum, but it did contain ions characteristic of a class of compounds (saturated hydrocarbon, chlorinated hydrocarbon, etc.).

If there were no library spectra similar to the unknown, and it could not be assigned to a particular class of compounds, the compound is reported as "unknown."

Quantitation of TICs is based on the total ionization peak area relative to an internal standard, assuming a response factor of one. Accordingly, the reported concentration is an estimate.

In general, mass spectrometry cannot distinguish isomers (compounds with the same molecular formula). Therefore, an identified compound may be any one of several different isomers.

Purgeable Volatile Organics

Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050114-2

Lab ID: 015173-0001-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: 31 MAY 91

Received: 30 MAY 91

Analyzed: 05 JUN 91

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10

(continued on following page)

ND = Not detected

NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

Purgeable Volatile Organics (CONT.)

Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050114-2

Lab ID: 015173-0001-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: 31 MAY 91

Received: 30 MAY 91

Analyzed: 05 JUN 91

Parameter	Result	Units	Reporting Limit
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro-2-butene	ND	ug/L	50
Surrogate	Recovery		
Toluene-d8	98	%	
4-Bromofluorobenzene	97	%	
1,2-Dichloroethane-d4	105	%	

ND = Not detected
 NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS
FOR
U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 015173-0001

<u>Compound Name</u>	<u>Fraction</u>	<u>Confidence Level</u>	<u>Estimated Concentration ug/L</u>
Hexane	VOA	3	13
Cyclopentane, methyl-	VOA	2	9.1

NOTES:

Confidence Levels

- Level 3 - Confirmed Identification
- Level 2 - Confident Identification
- Level 1 - Tentative Identification

Please refer to the discussion for further details.

Purgeable Volatile Organics

Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050115-2

Lab ID: 015173-0002-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: 31 MAY 91

Received: 30 MAY 91

Analyzed: 03 JUN 91

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10

(continued on following page)

ND = Not detected

NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

Purgeable Volatile Organics (CONT.)

Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050115-2

Lab ID: 015173-0002-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: 31 MAY 91

Received: 30 MAY 91

Analyzed: 03 JUN 91

Parameter	Result	Units	Reporting Limit
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro-2-butene	ND	ug/L	50
Surrogate	Recovery		
Toluene-d8	102	%	
4-Bromofluorobenzene	101	%	
1,2-Dichloroethane-d4	103	%	

ND = Not detected

NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS
 FOR
 U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 015173-0002

<u>Compound Name</u>	<u>Fraction</u>	<u>Confidence Level</u>	<u>Estimated Concentration ug/L</u>
Pentane, 3-methyl-	VOA	2	9.0
Hexane	VOA	3	180
Cyclopentane, methyl-	VOA	2	74

NOTES:

Confidence Levels

- Level 3 - Confirmed Identification
- Level 2 - Confident Identification
- Level 1 - Tentative Identification

Please refer to the discussion for further details.

Purgeable Volatile Organics

Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050116-2

Lab ID: 015173-0003-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: 31 MAY 91

Received: 30 MAY 91

Analyzed: 03 JUN 91

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10

(continued on following page)

ND = Not detected

NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

Purgeable Volatile Organics (CONT.)

Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050116-2

Lab ID: 015173-0003-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: 31 MAY 91

Received: 30 MAY 91

Analyzed: 03 JUN 91

Parameter	Result	Units	Reporting Limit
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro-2-butene	ND	ug/L	50
Surrogate	Recovery		
Toluene-d8	106	%	
4-Bromofluorobenzene	100	%	
1,2-Dichloroethane-d4	102	%	

ND = Not detected
NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS

FOR

U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 015173-0003

<u>Compound Name</u>	<u>Fraction</u>	<u>Confidence Level</u>	<u>Estimated Concentration ug/L</u>
None Detected	VOA		

NOTES:

Confidence Levels

- Level 3 - Confirmed Identification
- Level 2 - Confident Identification
- Level 1 - Tentative Identification

Please refer to the discussion for further details.

Purgeable Volatile Organics

Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050117-2

Lab ID: 015173-0004-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: 31 MAY 91

Received: 30 MAY 91

Analyzed: 04 JUN 91

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

Purgeable Volatile Organics (CONT.)

Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050117-2

Lab ID: 015173-0004-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: 31 MAY 91

Received: 30 MAY 91

Analyzed: 04 JUN 91

Parameter	Result	Units	Reporting Limit
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro-2-butene	ND	ug/L	50
Surrogate	Recovery		
Toluene-d8	100	%	
4-Bromofluorobenzene	100	%	
1,2-Dichloroethane-d4	102	%	

ND = Not detected

NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS
FOR
U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 015173-0004

<u>Compound Name</u>	<u>Fraction</u>	<u>Confidence Level</u>	<u>Estimated Concentration ug/L</u>
None Detected	VOA		

NOTES:

Confidence Levels

- Level 3 - Confirmed Identification
- Level 2 - Confident Identification
- Level 1 - Tentative Identification

Please refer to the discussion for further details.

Metals

Total Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB050114-2
 Lab ID: 015173-0001-SA
 Matrix: AQUEOUS
 Authorized: 30 MAY 91

Sampled: 29 MAY 91
 Prepared: See Below

Received: 30 MAY 91
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	05 JUN 91
Chromium	ND	mg/L	0.0040	7191	01 JUN 91	03 JUN 91

*Analysis of
 holding line
 successful*

ND = Not detected
 NA = Not applicable

Reported By: Bill McCall

Approved By: Sandra Jones

Metals

Total Metals

Client Name: U.S. Geological Survey

Client ID: KAFB050115-2

Lab ID: 015173-0002-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: See Below

Received: 30 MAY 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	30 MAY 91
Chromium	ND	mg/L	0.0020	7191	01 JUN 91	03 JUN 91

ND = Not detected
NA = Not applicable

Reported By: Bill McCall

Approved By: Sandra Jones

Metals

Total Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB050312-2
 Lab ID: 015173-0005-SA
 Matrix: AQUEOUS
 Authorized: 30 MAY 91

Sampled: 29 MAY 91
 Prepared: See Below

Received: 30 MAY 91
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	0.020	mg/L	0.010	7196	NA	30 MAY 91
Chromium	0.024	mg/L	0.0020	7191	07 JUN 91	11 JUN 91

ND = Not detected
 NA = Not applicable

Reported By: Carla Owen

Approved By: Sandra Jones

Metals

Dissolved Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB050114-2
 Lab ID: 015173-0001-SA
 Matrix: AQUEOUS
 Authorized: 30 MAY 91

Sampled: 29 MAY 91
 Prepared: See Below

Received: 30 MAY 91
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	05 JUN 91
Chromium	ND	mg/L	0.0040	7191	NA	03 JUN 91

*analytical
holding time
exceeded*

ND = Not detected
 NA = Not applicable

Reported By: Bill McCall

Approved By: Sandra Jones

Metals

Dissolved Metals

Client Name: U.S. Geological Survey

Client ID: KAFB050115-2

Lab ID: 015173-0002-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: See Below

Received: 30 MAY 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	30 MAY 91
Chromium	ND	mg/L	0.0020	7191	NA	03 JUN 91

ND = Not detected

NA = Not applicable

Reported By: Bill McCall

Approved By: Sandra Jones

Metals

Dissolved Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB050312-2
 Lab ID: 015173-0005-SA
 Matrix: AQUEOUS
 Authorized: 30 MAY 91

Sampled: 29 MAY 91
 Prepared: See Below

Received: 30 MAY 91
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	05 JUN 91
Chromium	ND	mg/L	0.0020	7191	NA	03 JUN 91

*Analytical blank
has exceeded*

ND = Not detected
 NA = Not applicable

Reported By: Bill McCall

Approved By: Sandra Jones

General Inorganics

Client Name: U.S. Geological Survey

Client ID: KAFB050114-2

Lab ID: 015173-0001-SA

Matrix: AQUEOUS

Authorized: 30 MAY 91

Sampled: 29 MAY 91

Prepared: See Below

Received: 30 MAY 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	ND	mg/L	0.50	A429	NA	06 JUN 91
Nitrate plus Nitrite	ND	mg/L	0.050	353.2	NA	04 JUN 91
Total Organic Carbon	1.6	mg/L	0.50	9060	NA	03 JUN 91
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 JUN 91

ND = Not detected

NA = Not applicable

Reported By: Dan Appelhans

Approved By: Toni Stovall

General Inorganics

Client Name: U.S. Geological Survey
Client ID: KAFB050115-2
Lab ID: 015173-0002-SA
Matrix: AQUEOUS
Authorized: 30 MAY 91

Sampled: 29 MAY 91
Prepared: See Below

Received: 30 MAY 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	14.3	mg/L	0.50	A429	NA	06 JUN 91
Nitrate plus Nitrite	1.6	mg/L	0.050	353.2	NA	04 JUN 91
Total Organic Carbon	ND	mg/L	0.50	9060	NA	03 JUN 91
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 JUN 91

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans

Approved By: Toni Stovall

General Inorganics

Client Name: U.S. Geological Survey
Client ID: KAFB050312-2
Lab ID: 015173-0005-SA
Matrix: AQUEOUS
Authorized: 30 MAY 91

Sampled: 29 MAY 91
Prepared: See Below

Received: 30 MAY 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	14.0	mg/L	0.50	A429	NA	06 JUN 91
Nitrate plus Nitrite	7.4	mg/L	0.25	353.2	NA	04 JUN 91
Total Organic Carbon	ND	mg/L	0.50	9060	NA	03 JUN 91
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 JUN 91

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans

Approved By: Toni Stovall

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IV. QUALITY CONTROL REPORT

The Enseco 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.

In addition, the Enseco laboratories maintain a comprehensive set of certifications from both state and federal governmental agencies which require frequent analyses of blind audit samples. Enseco - Rocky Mountain Analytical Laboratory is certified by the EPA under the EPA/CLP program for both Organic and Inorganic analyses, under the USATHAMA (U.S. Army) program, by the Army Corps of Engineers, and the states of Colorado, New Jersey, New York, Utah, and Florida, among others.

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 Enseco 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.

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
015173-0001-SA	AQUEOUS	624-A	04 JUN 91-H	05 JUN 91-H
015173-0002-SA	AQUEOUS	624-A	28 MAY 91-H	03 JUN 91-H
015173-0003-SA	AQUEOUS	624-A	28 MAY 91-H	03 JUN 91-H
015173-0004-SA	AQUEOUS	624-A	28 MAY 91-H	04 JUN 91-H

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average(%)		Precision (RPD)		
		DCS1	DCS2		DCS	Limits	DCS	Limit	
Category: 624-A									
Matrix: AQUEOUS									
QC Lot: 04 JUN 91-H									
Concentration Units: ug/L									
1,1-Dichloroethene	50	48.8	50.8	49.8	100	61-145	4.0	14	
Trichloroethene	50	45.6	46.4	46.0	92	71-120	1.7	14	
Benzene	50	50.4	48.7	49.6	99	76-127	3.4	11	
Toluene	50	51.2	51.8	51.5	103	76-125	1.2	13	
Chlorobenzene	50	47.8	48.8	48.3	97	75-130	2.1	13	

Category: 624-A
Matrix: AQUEOUS
QC Lot: 28 MAY 91-H
Concentration Units: ug/L

1,1-Dichloroethene	50	32.0	39.3	35.6	71	61-145	20	14
Trichloroethene	50	42.0	45.4	43.7	87	71-120	7.8	14
Benzene	50	46.0	50.2	48.1	96	76-127	8.7	11
Toluene	50	43.2	47.3	45.2	91	76-125	9.1	13
Chlorobenzene	50	46.3	47.0	46.6	93	75-130	1.5	13

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

SINGLE CONTROL SAMPLE REPORT
 Volatile Organics by GC/MS

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 04 JUN 91-H QC Run: 05 JUN 91-H				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	51.4	103	76-114
4-Bromofluorobenzene	50.0	49.0	98	86-115
Toluene-d8	50.0	49.2	98	88-110

Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 28 MAY 91-H QC Run: 03 JUN 91-H				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	51.0	102	76-114
4-Bromofluorobenzene	50.0	47.0	94	86-115
Toluene-d8	50.0	48.8	98	88-110

Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 28 MAY 91-H QC Run: 04 JUN 91-H				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	50.5	101	76-114
4-Bromofluorobenzene	50.0	47.3	95	86-115
Toluene-d8	50.0	46.6	93	88-110

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

METHOD BLANK REPORT
Volatile Organics by GC/MS

Analyte	Result	Units	Reporting Limit
Test: 624-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 04 JUN 91-H	QC Run: 05 JUN 91-H		
Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10

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

Analyte	Result	Units	Reporting Limit
Test: 624-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 04 JUN 91-H QC Run: 05 JUN 91-H			
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro-2-butene	ND	ug/L	50

Test: 624-AFIR-A
Matrix: AQUEOUS
QC Lot: 28 MAY 91-H QC Run: 03 JUN 91-H

Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0

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

Analyte	Result	Units	Reporting Limit
Test: 624-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 28 MAY 91-H QC Run: 03 JUN 91-H			
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro-2-butene	ND	ug/L	50

Test: 624-AFIR-A
Matrix: AQUEOUS
QC Lot: 28 MAY 91-H QC Run: 03 JUN 91-H

Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0

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

Analyte	Result	Units	Reporting Limit
Test: 624-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 28 MAY 91-H QC Run: 03 JUN 91-H			
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro- 2-butene	ND	ug/L	50

Test: 624-AFIR-A
Matrix: AQUEOUS
QC Lot: 28 MAY 91-H QC Run: 04 JUN 91-H

Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0

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

Analyte	Result	Units	Reporting Limit
Test: 624-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 28 MAY 91-H QC Run: 04 JUN 91-H			
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro- 2-butene	ND	ug/L	50

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
015173-0001-SA	AQUEOUS	CR-FAA-AT	01 JUN 91-L	01 JUN 91-L
015173-0001-SA	AQUEOUS	CR-FAA-AD	03 JUN 91-E	-
015173-0001-SA	AQUEOUS	CR6-AT	05 JUN 91-R	-
015173-0001-SA	AQUEOUS	CR6-A	05 JUN 91-R	-
015173-0002-SA	AQUEOUS	CR-FAA-AT	01 JUN 91-L	01 JUN 91-L
015173-0002-SA	AQUEOUS	CR-FAA-AD	03 JUN 91-E	-
015173-0002-SA	AQUEOUS	CR6-AT	30 MAY 91-A	-
015173-0002-SA	AQUEOUS	CR6-A	30 MAY 91-A	-
015173-0005-SA	AQUEOUS	CR-FAA-AT	07 JUN 91-R	07 JUN 91-R
015173-0005-SA	AQUEOUS	CR-FAA-AD	03 JUN 91-E	-
015173-0005-SA	AQUEOUS	CR6-AT	30 MAY 91-A	-
015173-0005-SA	AQUEOUS	CR6-A	05 JUN 91-R	-

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Spiked	Concentration		AVG	Accuracy		Precision		
		DCS1	Measured DCS2		Average(%) DCS	Limits	(RPD) DCS	Limit	
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 01 JUN 91-L Concentration Units: mg/L									
Chromium	0.20	0.163	0.177	0.170	85	75-125	8.2	20	
Category: CR-FAA-AD Matrix: AQUEOUS QC Lot: 03 JUN 91-E Concentration Units: mg/L									
Chromium	0.20	0.172	0.178	0.175	88	75-125	3.4	20	
Category: CR6-AT Matrix: AQUEOUS QC Lot: 05 JUN 91-R Concentration Units: mg/L									
Chromium (VI)	0.05	0.0478	0.0508	0.0493	99	75-125	6.1	20	
Category: CR6-A Matrix: AQUEOUS QC Lot: 05 JUN 91-R Concentration Units: mg/L									
Chromium (VI)	0.05	0.0478	0.0508	0.0493	99	75-125	6.1	20	
Category: CR6-AT Matrix: AQUEOUS QC Lot: 30 MAY 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0530	0.0490	0.0510	102	75-125	7.8	20	

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

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

Analyte	Spiked	Concentration		AVG	Accuracy		Precision		
		DCS1	Measured DCS2		Average(%) DCS	Limits	(RPD) DCS	Limit	
Category: CR6-A Matrix: AQUEOUS QC Lot: 30 MAY 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0530	0.0490	0.0510	102	75-125	7.8	20	
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 07 JUN 91-R Concentration Units: mg/L									
Chromium	0.20	0.197	0.206	0.202	101	75-125	4.5	20	

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

METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
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Test: CR-FAA-AT
Matrix: AQUEOUS
QC Lot: 01 JUN 91-L QC Run: 01 JUN 91-L

Chromium	ND	mg/L	0.0050
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Test: CR-FAA-AT
Matrix: AQUEOUS
QC Lot: 07 JUN 91-R QC Run: 07 JUN 91-R

Chromium	ND	mg/L	0.0050
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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)
015173-0001-SA	AQUEOUS	NO3-A	04 JUN 91-E	-
015173-0001-SA	AQUEOUS	TOX-A	03 JUN 91-A	-
015173-0001-SA	AQUEOUS	TOC-A	03 JUN 91-B	-
015173-0001-SA	AQUEOUS	CL-IC-A	06 JUN 91-P	-
015173-0002-SA	AQUEOUS	NO3-A	04 JUN 91-E	-
015173-0002-SA	AQUEOUS	TOX-A	03 JUN 91-A	-
015173-0002-SA	AQUEOUS	TOC-A	03 JUN 91-B	-
015173-0002-SA	AQUEOUS	CL-IC-A	06 JUN 91-P	-
015173-0005-SA	AQUEOUS	NO3-A	04 JUN 91-E	-
015173-0005-SA	AQUEOUS	TOX-A	03 JUN 91-A	-
015173-0005-SA	AQUEOUS	TOC-A	03 JUN 91-B	-
015173-0005-SA	AQUEOUS	CL-IC-A	06 JUN 91-P	-

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Spiked	Concentration		AVG	Accuracy		Precision		
		DCS1	Measured DCS2		DCS	Average(%) Limits	(RPD) DCS Limit	DCS Limit	
Category: NO3-A Matrix: AQUEOUS QC Lot: 04 JUN 91-E Concentration Units: mg/L									
Nitrate as N	7.1	7.50	7.48	7.49	105	91-109	0.3	10	
Category: TOX-A Matrix: AQUEOUS QC Lot: 03 JUN 91-A Concentration Units: ug Cl/L									
Total Organic Halogen as Cl	100	101	102	102	102	80-120	1.0	20	
Category: TOC-A Matrix: AQUEOUS QC Lot: 03 JUN 91-B Concentration Units: mg/L									
Total Organic Carbon	25	26.0	25.0	25.5	102	91-109	3.9	20	
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 06 JUN 91-P Concentration Units: mg/L									
Chloride	20.0	21.1	21.3	21.2	106	92-108	0.9	20	

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

Appendix

ENSECO ANALYTICAL SERVICES REQUEST FORM

15173-01

Special Handling (Circle as appropriate and explain in record 5)

Hazardous material
EQUIPMENT BLANK
KAFB050/14-2
Station Name

Field ID
USGS/WRD/NEW MEX
Field Office

KIRTLAND AFB
IRP-SWMU'S
Project

Site Type (circle one)
SW - Surface Water
GW - Ground Water
ME - Meteorological
LK - Lake
ES - Estuary
SP - Spring
SS - Special Source
Collector: MIKO ROYBA
Phone (FTS): (505) 262-5341

File Deposition*
Circle one)
Q - WATSTORE
X - Lab File

Sample identification

For Laboratory Use Only

KAFB050/14-2
Station ID or Unique Number*

463536001
Project Account #

1991 05 29 1345 05 29 1400 N M 035 001
Year* Month* Day* Time* Month* Day* Time* State Code* District/User Code* County Code

Analysis level codes and schedules

Parameter	6 Sample Medium**	6 Geologic Unit	(H) or 9 Analysis Status**	9 Analysis Source**	9 Hydrologic Condition*	9 Sample Type**	9 Hydrologic Event**
PARAMETER:	CHROMIUM, TOTAL		CHROMIUM, DISS		CHROMIUM HEXAVALENT TOTAL	CHROMIUM HEXAVALENT DISS.	NITRATE & NITRITE
METHOD:	SW3020/SW7191		SW3005/SW7191		SW7196	SW7196	E353.2
PARAMETER:	URANIUM GROSS	ALPHA & BETA		VOC	VOC		TOC/TOX
METHOD:	A711B, E900			SW5030/SW8240	SW5030/SW8010		E415.1/SW9020
PARAMETER:							
METHOD:							

Chain-of-Custody Record

PROJECT NAME KIRTLAND AFB-IRP, SWMU'S PROJECT NO. 463536001 P.O. NO.

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
<i>Miko Royba</i>	FEDERAL EXPRESS	5/29/91	1800
	<i>Justin Chappell</i>	5/30/91	0800

Comments (Only 50 characters stored in NWIS)

Record 5 SE SEWAGE LAGOON
Record 6

Total number of sample bottles for this request: 9

SHIP TO:
Enseco-Rocky Mountain Analytical
4955 Yarrow Street
Arvada, CO 80002
(303) 421-6611
LINDSAY BREYER

ENSECO ANALYTICAL SERVICES REQUEST FORM

15173-02

Special Handling (Circle as appropriate and explain in record 5)
Hazardous material
 SAMPLE
 KAFB050115-2
 Station Name

Field ID
 USGS/WRD/NEW MEX
 Field Office

Project
 KIRTLAND AFB RP-SWMU'S

Collector
 MILKO ROYBAL
 BILL DAM
 (505) 262-5341
 Phone (FTS)

Site Type (circle one)
 SW - Surface Water
 GW - Ground Water
 ME - Meteorological
 LK - Lake
 ES - Estuary
 SP - Spring
 SS - Special Source

File Deposition*
 Circle one)
 Q - WATSTORE
 X - Lab File

Sample identification

For Laboratory Use Only

Station ID or Unique Number*
 K A F B 050115-2

Project Account #
 463 53 600 1

Year* 91
 Month* 05
 Day* 29
 Time* 1300
 Begin Date

Month 05
 Day 29
 Time 1325
 Composite End Date

State Code* N M
 District/ User Code* 035
 County Code 00

Analysis level codes and schedules

Sample Medium**	Geologic Unit	(H) or 9 Analysis Status**	9 Analysis Source**	Hydrologic Condition**	9 Sample Type**	9 Hydrologic Event**
PARAMETER:	CHROMIUM, TOTAL	CHROMIUM, DISS	CHROMIUM, DISS	HEXAVALENT TOTAL	HEXAVALENT DISS.	NITRATE & NITRITE
METHOD:	SW3020/SW7191	SW3005/SW7191	SW3005/SW7191	SW7196	SW7196	E353.2
PARAMETER:	URANIUM, GROSS ALPHA & BETA	VOC	VOC	TOC/TOX		
METHOD:	A7118, E900	SW5030/SW8240	SW5030/SW8010	E415.1/SW9020		
PARAMETER:						
METHOD:						

Chain-of-Custody Record

PROJECT NAME KIRTLAND AFB-IRP, SWMU'S PROJECT NO. 463536001 P.O. NO.

Relinquished by: (Signature) Miko Royal	Received by: (Signature) FEDERAL EXPRESS	Date 5/29/91	Time 1800
Relinquished by: (Signature)	Received by: (Signature) Justin Chappell	Date 5/30/91	Time 0800
Relinquished by: (Signature)	Received at lab by: (Signature)	Date	Time
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

Comments (Only 50 characters stored in NWIS)

Record 5 SE SEWAGE LAGOON

Record 6

Total number of sample bottles for this request: 9

SHIP TO:
 Enseco-Rocky Mountain Analytical
 4955 Yarrow Street
 Arvada, CO 80002
 (303) 421-6611
 LINDSAY BREYER

ATTENTION:

ENSECO ANALYTICAL SERVICES REQUEST FORM

- 04

Special Handling (Circle as appropriate and explain in record 5)

Hazardous material
TRIP BLANK
KAFB 050117-2

Site Type (circle one)
 SW - Surface Water
GW - Ground Water
 ME - Meteorological
 LK - Lake
 ES - Estuary
 SP - Spring
 SS - Special Source
 (505) 262-5341
 Phone (FTS)

Field ID: USGS/WRD/NEW MEX
 Field Office: USGS/WRD/NEW MEX
 Project: KIRTLAND AFB RP-SWMU'S
 Collector: MIKE ROYBAL
BILL DAM

File Deposition*
 Circle one)
 Q - WATSTORE
 X - Lab File

Sample identification

For Laboratory Use Only

KAFB 050117-2 Station ID or Unique Number*
463 53 600 1 Project Account #

1991 Year* 05 Month* 29 Day* 0728 Time* Month Day Time NM State Code* 035 District/User Code* 001 County Code

Analysis level codes and schedules

PARAMETER:	6 Sample Medium**	Geologic Unit	(H) or 9 Analysis Status**	9 Analysis Source**	Hydrologic Condition*	9 Sample Type**	9 Hydrologic Event**
CHROMIUM, TOTAL	SW3020/SW7191		CHROMIUM DISS	SW3005/SW7191	CHROMIUM HEXAVALENT TOTAL	CHROMIUM HEXAVALENT DISS.	NITRATE & NITRITE
METHOD:	SW3020/SW7191		SW3005/SW7191	SW7196	SW7196	SW7196	E353.2
PARAMETER:	URANIUM, GROSS	ALPHA & BETA	VOC	SW5030/SW8010	VOX	FOC/TOX	E415.1/SW9020
METHOD:	A711B, E900		SW5030/SW8240	SW5030/SW8010			
PARAMETER:							
METHOD:							

Chain-of-Custody Record

PROJECT NAME KIRTLAND AFB-IRP, SWMU'S PROJECT NO. 463536001 P.O. NO.

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
<u>Mike Roybal</u>	FEDERAL EXPRESS	<u>5/29/91</u>	<u>1800</u>
	<u>Justin Chapel</u>	<u>5/30/91</u>	<u>0800</u>

Comments (Only 50 characters stored in NWIS)

Record 5 SE SEWAGE LAGOON

Record 6

Total number of sample bottles for this request: 3

SHIP TO:
 Enseco-Rocky Mountain Analytical
 4955 Yarrow Street
 Arvada, CO 80002
 (303) 421-6611
 ATTENTION: LINDSAY BREYER

SS-034

ENSECO ANALYTICAL SERVICES REQUEST FORM

15173-05

Special Handling (Circle as appropriate and explain in record 5)

Hazardous material
SAMPLE

KAFB050312-2
Station Name

Site Type (circle one)

SW - Surface Water
 GW - Ground Water
 ME - Meteorological
 LK - Lake
 ES - Estuary
 SP - Spring
 SS - Special Source
 (505) 262-5341
 Phone (FTS)

Field ID
 USGS/WRD/NEW MEX
 Field Office

Project
 KIRTLAND AFB
 IRP-SWMU'S

Collector
 MIKO ROYBAL
 BILL DAM

File Deposition*
 Circle one)

Q - WATSTORE
 X - Lab File

Sample identification

KAFB050312-2
 Station ID or Unique Number*

463536001
 Project Account #

1991 05 29 1600 05 29 1612 N M 035 001
 Year* Month* Day* Time* Month Day Time State District/ County
 Code* User Code* Code
 Begin Date Composite End Date

Analysis level codes and schedules

PARAMETER:	6 Sample Medium**	Geologic Unit	(H) or 9 Analysis Status**	9 Analysis Source**	Hydrologic Condition**	9 Sample Type**	9 Hydrologic Event**
PARAMETER:	CHROMIUM, TOTAL		CHROMIUM, DISS		CHROMIUM HEXAVALENT TOTAL	CHROMIUM HEXAVALENT DISS.	NITRATE & NITRITE
METHOD:	SW3020/SW7191		SW3005/SW7191		SW7196	SW7196	E353.2
PARAMETER:	URANIUM, GROSS BETA	ALPHA &	VOC	VOC	SW5030/SW8240	SW5030/SW8010	TOC/TOX
METHOD:	A711B, E900						E415.1/SW9020
PARAMETER:							
METHOD:							

Chain-of-Custody Record

PROJECT NAME KIRTLAND AFB-IRP, SWMU'S PROJECT NO. 463536001 P.O. NO. _____

Relinquished by: (Signature) <i>Miko Roybal</i>	Received by: (Signature) FEDERAL EXPRESS	Date 5/29/91	Time 1800
Relinquished by: (Signature)	Received by: (Signature) <i>Justin Chappell</i>	Date 5/30/91	Time 0800
Relinquished by: (Signature)	Received at lab by: (Signature)	Date	Time
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

Comments (Only 50 characters stored in NWIS)

Record 5 N.W. SEWAGE LAGOON

Record 6 _____

Total number of sample bottles for this request: 6

SHIP TO:
 Enenco-Rocky Mountain Analytical
 4955 Yarrow Street
 Arvada, CO 80002
 (303) 421-6611
 ATTENTION: LINDSAY BREYER