

2 of 8

ENTERED

ANALYTICAL RESULTS
FOR
U.S. GEOLOGICAL SURVEY
ENSECO-RMAL NO. 018913



DECEMBER 16, 1991

Reviewed by:

Julie L. Kramer

Julie L. Kramer

Mark Dymerski

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KAFB1186





I. OVERVIEW

On November 15, 1991, Enseco-Rocky Mountain Analytical Laboratory received seven aqueous samples from November 15, 1991.

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

GC/MS volatiles-samples 018913-0001, -0002, and -0005 were analyzed outside of holding times. Per discussions with Ms. Walker, these samples were cancelled at no charge to the client.

DCS 27 NOV 91-Z recovery for trichloroethane, benzene, toluene, and chlorobenzene were above QC limits for average percent recovery. The problem was traced to a slightly low calibration standard. A new standard was made immediately. Data was accepted based on the calibration standard meeting all CCS and SPCC calibration criteria as stated in SW-846. This QC lot was associated to sample 018913-0007.



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		Received Date
			Date	Time	
018913-0001-SA	KAFB050412-2 - Sample	AQUEOUS	14 NOV 91	14:30	15 NOV 91
018913-0002-SA	KAFB050313-2 - Sample	AQUEOUS	13 NOV 91	12:15	15 NOV 91
018913-0003-SA	KAFB090214-2	AQUEOUS	14 NOV 91	13:50	15 NOV 91
018913-0004-SA	KAFB090215-2	AQUEOUS	14 NOV 91	12:15	15 NOV 91
018913-0005-SA	KAFB050119-2 - Sample	AQUEOUS	13 NOV 91	13:32	15 NOV 91
018913-0006-SA	KAFB050411-2 - Trip Blank	AQUEOUS	14 NOV 91	07:25	15 NOV 91
018913-0007-SA	KAFB050118-2 - Trip Blank	AQUEOUS	13 NOV 91	06:55	15 NOV 91

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Lab ID: 018913	Group Code	Analysis Description	Custom Test?
0001 - 0002, 0005	A	Nitrate Plus Nitrite	N
		Chromium VI (Dissolved)	N
		Volatile Organics	N
		Appendix IX List	N
		Screen - Volatile Organics	N
		Chromium, Furnace AA (Total)	N
		Prep - Total Metals, ICP	N
		Chromium, Furnace AA	N
		Chromium VI (Total)	N
		Volatiles Library Search (10 Compound TID)	N
		Chloride, Ion Chromatography, for Air Force Contracts	N
0006 - 0007	B	Volatiles Library Search (10 Compound TID)	N
		Volatile Organics	N
		Appendix IX List	N
		Screen - Volatile Organics	N
0003 - 0004	C	Nitrate Plus Nitrite	N
		Chromium VI (Dissolved)	N
		Chromium, Furnace AA (Total)	N
		Prep - Total Metals, ICP	N
		Chromium, Furnace AA	N
		Chromium VI (Total)	N
		Halogenated Volatile Organics	N
		Halogenated Volatile Organics-2nd Column Analysis	N
		Chloride, Ion Chromatography, for Air Force Contracts	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.

Volatile Organics
Appendix IX List
Method 8240

Client Name: U.S. Geological Survey
 Client ID: KAFB050411-2
 Lab ID: 018913-0006-SA
 Matrix: AQUEOUS
 Authorized: 15 NOV 91

Trip Blank

Sampled: 14 NOV 91
 Prepared: 20 NOV 91

Received: 15 NOV 91
 Analyzed: 28 NOV 91

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

(continued on following page)

ND = Not detected
 NA = Not applicable

Reported By: Cesar Rojas

Approved By: Mark Dymerski

Volatile Organics
 Appendix IX List
 Method 8240

Client Name: U.S. Geological Survey
 Client ID: KAFB050411-2
 Lab ID: 018913-0006-SA
 Matrix: AQUEOUS
 Authorized: 15 NOV 91

Sampled: 14 NOV 91
 Prepared: 20 NOV 91

Received: 15 NOV 91
 Analyzed: 28 NOV 91

Parameter	Result	Units	Reporting Limit
Methyl methacrylate	ND	ug/L	20
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Propionitrile	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	133	%	
4-Bromofluorobenzene	92	%	
1,2-Dichloroethane-d4	83	%	

ND = Not detected
 NA = Not applicable

Reported By: Cesar Rojas

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS
FOR
U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 018913-0006

<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.

Volatile Organics
Appendix IX List
Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB050118-2

Lab ID: 018913-0007-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 13 NOV 91

Prepared: 20 NOV 91

Received: 15 NOV 91

Analyzed: 27 NOV 91

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Stephanie Boehnke

Approved By: Mark Dymerski

Volatile Organics
 Appendix IX List
 Method 8240

Client Name: U.S. Geological Survey
 Client ID: KAFB050118-2
 Lab ID: 018913-0007-SA
 Matrix: AQUEOUS
 Authorized: 15 NOV 91

Sampled: 13 NOV 91
 Prepared: 20 NOV 91

Received: 15 NOV 91
 Analyzed: 27 NOV 91

Parameter	Result	Units	Reporting Limit
Methyl methacrylate	ND	ug/L	20
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Propionitrile	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	116	%	
4-Bromofluorobenzene	102	%	
1,2-Dichloroethane-d4	104	%	

ND = Not detected
 NA = Not applicable

Reported By: Stephanie Boehnke

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS

FOR

U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 018913-0007

<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.

Halogenated Volatile Organics

Method 8010

Client Name: U.S. Geological Survey

Client ID: KAFB090214-2

Lab ID: 018913-0003-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 14 NOV 91

Prepared: NA

Received: 15 NOV 91

Analyzed: 21 NOV 91

Parameter	Result	Units	Reporting Limit	
Chloromethane	ND	ug/L	1.1	T
Bromomethane	ND	ug/L	6.0	
Dichlorodifluoromethane	ND	ug/L	9.0	
Vinyl chloride	ND	ug/L	0.60	
Chloroethane	ND	ug/L	3.0	
Methylene chloride	ND	ug/L	2.0	
Trichlorofluoromethane	ND	ug/L	5.0	
1,1-Dichloroethene	ND	ug/L	0.70	
1,1-Dichloroethane	ND	ug/L	0.40	
trans-1,2-Dichloroethene	ND	ug/L	0.50	
Chloroform	ND	ug/L	0.30	
1,2-Dichloroethane	ND	ug/L	0.50	
1,1,1-Trichloroethane	ND	ug/L	0.20	
Carbon tetrachloride	ND	ug/L	0.60	
Bromodichloromethane	ND	ug/L	0.50	
1,2-Dichloropropane	ND	ug/L	0.50	
trans-1,3-Dichloropropene	ND	ug/L	2.0	
Trichloroethene	ND	ug/L	0.60	
Dibromochloromethane	ND	ug/L	0.60	
1,1,2-Trichloroethane	ND	ug/L	0.20	
2-Chloroethyl vinyl ether	ND	ug/L	5.5	
Bromoform	ND	ug/L	1.0	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.4	
Tetrachloroethene	ND	ug/L	0.40	
Chlorobenzene	ND	ug/L	1.2	
1,3-Dichlorobenzene	ND	ug/L	1.0	
1,2-Dichlorobenzene	ND	ug/L	0.50	
1,4-Dichlorobenzene	ND	ug/L	0.50	
Benzyl chloride	ND	ug/L	6.8	
Bromobenzene	ND	ug/L	5.0	
bis(2-Chloroisopropyl)- ether	ND	ug/L	10	
1-Chlorohexane	ND	ug/L	5.0	
4-Chlorotoluene	ND	ug/L	23	
Dibromomethane	ND	ug/L	5.0	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	
1,2,3-Trichloropropane	ND	ug/L	5.0	

Surrogate

Recovery

Bromochloromethane

81 %

(continued on following page)

ND = Not detected

NA = Not applicable

Reported By: Bret Collins

Approved By: Robert Noga

Halogenated Volatile Organics (CONT.)



Method 8010

Client Name: U.S. Geological Survey

Client ID: KAFB090214-2

Lab ID: 018913-0003-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 14 NOV 91

Prepared: NA

Received: 15 NOV 91

Analyzed: 21 NOV 91

Note T : Preferred values unless footnoted on secondary column test.

ND = Not detected

NA = Not applicable

Reported By: Bret Collins

Approved By: Robert Noga

Halogenated Volatile Organics

Method 8010

Client Name: U.S. Geological Survey

Client ID: KAFB090215-2

Lab ID: 018913-0004-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 14 NOV 91

Prepared: NA

Received: 15 NOV 91

Analyzed: 21 NOV 91

Parameter	Result	Units	Reporting Limit	
Chloromethane	ND	ug/L	1.1	T
Bromomethane	ND	ug/L	6.0	
Dichlorodifluoromethane	ND	ug/L	9.0	
Vinyl chloride	ND	ug/L	0.60	
Chloroethane	ND	ug/L	3.0	
Methylene chloride	ND	ug/L	2.0	
Trichlorofluoromethane	ND	ug/L	5.0	
1,1-Dichloroethene	ND	ug/L	0.70	
1,1-Dichloroethane	ND	ug/L	0.40	
trans-1,2-Dichloroethene	ND	ug/L	0.50	
Chloroform	ND	ug/L	0.30	
1,2-Dichloroethane	ND	ug/L	0.50	
1,1,1-Trichloroethane	ND	ug/L	0.20	
Carbon tetrachloride	ND	ug/L	0.60	
Bromodichloromethane	ND	ug/L	0.50	
1,2-Dichloropropane	ND	ug/L	0.50	
trans-1,3-Dichloropropene	ND	ug/L	2.0	
Trichloroethene	ND	ug/L	0.60	
Dibromochloromethane	ND	ug/L	0.60	
1,1,2-Trichloroethane	ND	ug/L	0.20	
2-Chloroethyl vinyl ether	ND	ug/L	5.5	
Bromoform	ND	ug/L	1.0	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.4	
Tetrachloroethene	ND	ug/L	0.40	
Chlorobenzene	ND	ug/L	1.2	
1,3-Dichlorobenzene	ND	ug/L	1.0	
1,2-Dichlorobenzene	ND	ug/L	0.50	
1,4-Dichlorobenzene	ND	ug/L	0.50	
Benzyl chloride	ND	ug/L	6.8	
Bromobenzene	ND	ug/L	5.0	
bis(2-Chloroisopropyl)- ether	ND	ug/L	10	
1-Chlorohexane	ND	ug/L	5.0	
4-Chlorotoluene	ND	ug/L	23	
Dibromomethane	ND	ug/L	5.0	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	
1,2,3-Trichloropropane	ND	ug/L	5.0	

Surrogate

Recovery

Bromochloromethane

105 %

(continued on following page)

ND = Not detected

NA = Not applicable

Reported By: Bret Collins

Approved By: Robert Noga

Halogenated Volatile Organics (CONT.)

Method 8010

Client Name: U.S. Geological Survey

Client ID: KAFB090215-2

Lab ID: 018913-0004-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 14 NOV 91

Prepared: NA

Received: 15 NOV 91

Analyzed: 21 NOV 91

Note T : Preferred values unless footnoted on secondary column test.

ND = Not detected

NA = Not applicable

Reported By: Bret Collins

Approved By: Robert Noga

Metals

Total Metals

Client Name: U.S. Geological Survey

Client ID: KAFB050412-2

Lab ID: 018913-0001-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 14 NOV 91

Prepared: See Below

Received: 15 NOV 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	18 NOV 91
Chromium	0.0033	mg/L	0.0020	7191	26 NOV 91	05 DEC 91

*Sample*ND = Not detected
NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals

Total Metals

Sample

Client Name: U.S. Geological Survey
 Client ID: KAFB050313-2
 Lab ID: 018913-0002-SA
 Matrix: AQUEOUS
 Authorized: 15 NOV 91

Sampled: 13 NOV 91
 Prepared: See Below

Received: 15 NOV 91
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	18 NOV 91
Chromium	0.055	mg/L	0.0020	7191	26 NOV 91	05 DEC 91

ND = Not detected
 NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals
Total Metals

Client Name: U.S. Geological Survey

Client ID: KAFB090214-2

Lab ID: 018913-0003-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 14 NOV 91

Prepared: See Below

Received: 15 NOV 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	18 NOV 91
Chromium	0.0031	mg/L	0.0020	7191	26 NOV 91	05 DEC 91

 ND = Not detected
 NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals

Total Metals

Client Name: U.S. Geological Survey
Client ID: KAFB090215-2
Lab ID: 018913-0004-SA
Matrix: AQUEOUS
Authorized: 15 NOV 91

Sampled: 14 NOV 91
Prepared: See Below

Received: 15 NOV 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	18 NOV 91
Chromium	0.043	mg/L	0.0020	7191	26 NOV 91	05 DEC 91

ND = Not detected
NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals

Total Metals

Client Name: U.S. Geological Survey

Client ID: KAFB050119-2

Lab ID: 018913-0005-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 13 NOV 91

Prepared: See Below

Received: 15 NOV 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	18 NOV 91
Chromium	0.0075	mg/L	0.0020	7191	26 NOV 91	05 DEC 91

Sample

ND = Not detected
NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals

Dissolved Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB050412-2
 Lab ID: 018913-0001-SA
 Matrix: AQUEOUS
 Authorized: 15 NOV 91

Sampled: 14 NOV 91
 Prepared: See Below

Received: 15 NOV 91
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	15 NOV 91
Chromium	ND	mg/L	0.0020	7191	NA	09 DEC 91

ND = Not detected
 NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals

Dissolved Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB050313-2
 Lab ID: 018913-0002-SA
 Matrix: AQUEOUS
 Authorized: 15 NOV 91

Sampled: 13 NOV 91
 Prepared: See Below

Received: 15 NOV 91
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	15 NOV 91
Chromium	0.0030	mg/L	0.0020	7191	NA	09 DEC 91

ND = Not detected
 NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals**Dissolved Metals**

Client Name: U.S. Geological Survey
Client ID: KAFB090214-2
Lab ID: 018913-0003-SA
Matrix: AQUEOUS
Authorized: 15 NOV 91

Sampled: 14 NOV 91
Prepared: See Below

Received: 15 NOV 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	15 NOV 91
Chromium	ND	mg/L	0.0020	7191	NA	09 DEC 91

ND = Not detected
NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals**Dissolved Metals**

Client Name: U.S. Geological Survey

Client ID: KAFB090215-2

Lab ID: 018913-0004-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 14 NOV 91

Prepared: See Below

Received: 15 NOV 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	15 NOV 91
Chromium	ND	mg/L	0.0020	7191	NA	09 DEC 91

ND = Not detected
NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

Metals

Dissolved Metals

Client Name: U.S. Geological Survey

Client ID: KAFB050119-2

Lab ID: 018913-0005-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 13 NOV 91

Prepared: See Below

Received: 15 NOV 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	15 NOV 91
Chromium	ND	mg/L	0.0020	7191	NA	09 DEC 91

ND = Not detected
NA = Not applicable

Reported By: David Patterson

Approved By: Sandra Jones

General Inorganics



Client Name: U.S. Geological Survey
Client ID: KAFB050412-2
Lab ID: 018913-0001-SA
Matrix: AQUEOUS
Authorized: 15 NOV 91

Sampled: 14 NOV 91
Prepared: See Below

Received: 15 NOV 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	12.8	mg/L	0.50	A429	NA	03 DEC 91
Nitrate plus Nitrite	2.0	mg/L	0.050	353.2	NA	27 NOV 91

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey

Approved By: Eileen Burke

General Inorganics



Client Name: U.S. Geological Survey

Client ID: KAFB050313-2

Lab ID: 018913-0002-SA

Matrix: AQUEOUS

Authorized: 15 NOV 91

Sampled: 13 NOV 91

Prepared: See Below

Received: 15 NOV 91

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	12.8	mg/L	0.50	A429	NA	03 DEC 91
Nitrate plus Nitrite	5.6	mg/L	0.50	353.2	NA	27 NOV 91

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey

Approved By: Eileen Burke

General Inorganics



Client Name: U.S. Geological Survey
Client ID: KAFB090214-2
Lab ID: 018913-0003-SA
Matrix: AQUEOUS
Authorized: 15 NOV 91

Sampled: 14 NOV 91
Prepared: See Below

Received: 15 NOV 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	ND	mg/L	0.50	A429	NA	03 DEC 91
Nitrate plus Nitrite	ND	mg/L	0.050	353.2	NA	27 NOV 91

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey

Approved By: Eileen Burke

General Inorganics



Client Name: U.S. Geological Survey
Client ID: KAFB090215-2
Lab ID: 018913-0004-SA
Matrix: AQUEOUS
Authorized: 15 NOV 91

Sampled: 14 NOV 91
Prepared: See Below

Received: 15 NOV 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	14.7	mg/L	0.50	A429	NA	03 DEC 91
Nitrate plus Nitrite	1.1	mg/L	0.050	353.2	NA	27 NOV 91

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey

Approved By: Eileen Burke

General Inorganics



Client Name: U.S. Geological Survey
Client ID: KAFB050119-2
Lab ID: 018913-0005-SA
Matrix: AQUEOUS
Authorized: 15 NOV 91

Sampled: 13 NOV 91
Prepared: See Below

Received: 15 NOV 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	13.2	mg/L	0.50	A429	NA	03 DEC 91
Nitrate plus Nitrite	1.2	mg/L	0.050	353.2	NA	27 NOV 91

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey

Approved By: Eileen Burke

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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)
018913-0006-SA	AQUEOUS	624-A	27 NOV 91-L	27 NOV 91-L
018913-0007-SA	AQUEOUS	624-A	27 NOV 91-Z	27 NOV 91-Z

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: 27 NOV 91-L									
Concentration Units: ug/L									
1,1-Dichloroethene	50	39.7	40.7	40.2	80	56-138	2.5	20	
Trichloroethene	50	42.6	42.0	42.3	85	76-109	1.4	13	
Benzene	50	49.0	49.2	49.1	98	78-119	0.4	12	
Toluene	50	54.2	54.8	54.5	109	82-114	1.1	13	
Chlorobenzene	50	50.8	53.3	52.0	104	84-117	4.8	10	

Category: 624-A
Matrix: AQUEOUS
QC Lot: 27 NOV 91-Z
Concentration Units: ug/L

1,1-Dichloroethene	50	61.4	57.0	59.2	118	56-138	7.4	20
Trichloroethene	50	59.0	55.6	57.3	115	76-109	5.9	13
Benzene	50	62.9	60.9	61.9	124	78-119	3.2	12
Toluene	50	58.7	56.9	57.8	116	82-114	3.1	13
Chlorobenzene	50	66.5	66.0	66.2	133	84-117	0.8	10

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: 27 NOV 91-L QC Run: 27 NOV 91-L
Concentration Units: ug/L

1,2-Dichloroethane-d4	50.0	42.5	85	82-112
4-Bromofluorobenzene	50.0	51.7	103	83-113
Toluene-d8	50.0	53.7	107	90-112

Category: 624-A
Matrix: AQUEOUS
QC Lot: 27 NOV 91-Z QC Run: 27 NOV 91-Z
Concentration Units: ug/L

1,2-Dichloroethane-d4	50.0	48.5	97	82-112
4-Bromofluorobenzene	50.0	49.7	99	83-113
Toluene-d8	50.0	50.3	101	90-112

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: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 27 NOV 91-L	QC Run: 27 NOV 91-L		
Acetone	ND	ug/L	10
Acetonitrile	ND	ug/L	200
Acrolein	ND	ug/L	100
Acrylonitrile	ND	ug/L	100
Allyl chloride	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Chloroprene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,2-Dibromo-3-chloro- propane (DBCP)	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	10
Dibromomethane	ND	ug/L	5.0
trans-1,4-Dichloro- 2-butene	ND	ug/L	5.0
Dichlorodifluoromethane	ND	ug/L	20
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
1,4-Dioxane	ND	ug/L	500
Ethylbenzene	ND	ug/L	5.0
Ethyl methacrylate	ND	ug/L	20
Iodomethane	ND	ug/L	5.0
Isobutanol	ND	ug/L	200
2-Hexanone	ND	ug/L	10
Methacrylonitrile	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0

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

Analyte	Result	Units	Reporting Limit
Test: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 27 NOV 91-L QC Run: 27 NOV 91-L			
Methyl methacrylate	ND	ug/L	20
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Propionitrile	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0

Test: 8240CP-AP9-AP
 Matrix: AQUEOUS
 QC Lot: 27 NOV 91-Z QC Run: 27 NOV 91-Z

Acetone	ND	ug/L	10
Acetonitrile	ND	ug/L	200
Acrolein	ND	ug/L	100
Acrylonitrile	ND	ug/L	100
Allyl chloride	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Chloroprene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0

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

Analyte	Result	Units	Reporting Limit
Test: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 27 NOV 91-Z QC Run: 27 NOV 91-Z			
1,2-Dibromo-3-chloro- propane (DBCP)	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	10
Dibromomethane	ND	ug/L	5.0
trans-1,4-Dichloro- 2-butene	ND	ug/L	5.0
Dichlorodifluoromethane	ND	ug/L	20
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
1,4-Dioxane	ND	ug/L	500
Ethylbenzene	ND	ug/L	5.0
Ethyl methacrylate	ND	ug/L	20
Iodomethane	ND	ug/L	5.0
Isobutanol	ND	ug/L	200
2-Hexanone	ND	ug/L	10
Methacrylonitrile	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
Methyl methacrylate	ND	ug/L	20
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Propionitrile	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0

QC LOT ASSIGNMENT REPORT
Organics by Chromatography

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
018913-0003-SA	AQUEOUS	601-A	19 NOV 91-J	21 NOV 91-J
018913-0004-SA	AQUEOUS	601-A	19 NOV 91-J	21 NOV 91-J

DUPLICATE CONTROL SAMPLE REPORT
Organics by Chromatography

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average(%)		Precision (RPD)	
		DCS1	DCS2		DCS	Limits	DCS	Limit
Category: 601-A								
Matrix: AQUEOUS								
QC Lot: 19 NOV 91-J								
Concentration Units: ug/L								
1,1-Dichloroethane	5.0	4.26	4.63	4.44	89	68-122	8.3	13
Chloroform	5.0	5.38	5.97	5.68	114	71-145	10	13
Bromodichloromethane	10	8.37	9.38	8.88	89	62-118	11	15
Trichloroethene	5.0	4.18	4.69	4.44	89	70-129	11	14
Chlorobenzene	5.0	4.21	4.79	4.50	90	62-115	13	19

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

SINGLE CONTROL SAMPLE REPORT
Organics by Chromatography

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Category: 601-A				
Matrix: AQUEOUS				
QC Lot: 19 NOV 91-J QC Run: 21 NOV 91-J				
Concentration Units: ug/L				
Bromochloromethane	5.00	5.70	114	50-144

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

METHOD BLANK REPORT
Organics by Chromatography

Analyte	Result	Units	Reporting Limit
Test: 601-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 19 NOV 91-J QC Run: 21 NOV 91-J			
Chloromethane	ND	ug/L	1.1
Bromomethane	ND	ug/L	6.0
Dichlorodifluoromethane	ND	ug/L	9.0
Vinyl chloride	ND	ug/L	0.60
Chloroethane	ND	ug/L	3.0
Methylene chloride	ND	ug/L	2.0
Trichlorofluoromethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.70
1,1-Dichloroethane	ND	ug/L	0.40
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.30
1,2-Dichloroethane	ND	ug/L	0.50
1,1,1-Trichloroethane	ND	ug/L	0.20
Carbon tetrachloride	ND	ug/L	0.60
Bromodichloromethane	ND	ug/L	0.50
1,2-Dichloropropane	ND	ug/L	0.50
trans-1,3-Dichloropropene	ND	ug/L	2.0
Trichloroethene	ND	ug/L	0.60
Dibromochloromethane	ND	ug/L	0.60
1,1,2-Trichloroethane	ND	ug/L	0.20
2-Chloroethyl vinyl ether	ND	ug/L	5.5
Bromoform	ND	ug/L	1.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.4
Tetrachloroethene	ND	ug/L	0.40
Chlorobenzene	ND	ug/L	1.2
1,3-Dichlorobenzene	ND	ug/L	1.0
1,2-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
Benzyl chloride	ND	ug/L	6.8
Bromobenzene	ND	ug/L	5.0
bis(2-Chloroisopropyl)- ether	ND	ug/L	10
1-Chlorohexane	ND	ug/L	5.0
4-Chlorotoluene	ND	ug/L	23
Dibromomethane	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
018913-0001-SA	AQUEOUS	CR6-A	15 NOV 91-A	-
018913-0001-SA	AQUEOUS	CR-FAA-AT	26 NOV 91-G	26 NOV 91-G
018913-0001-SA	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
018913-0001-SA	AQUEOUS	CR6-AT	15 NOV 91-A	-
018913-0002-SA	AQUEOUS	CR6-A	15 NOV 91-A	-
018913-0002-SA	AQUEOUS	CR-FAA-AT	26 NOV 91-G	26 NOV 91-G
018913-0002-SA	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
018913-0002-SA	AQUEOUS	CR6-AT	15 NOV 91-A	-
018913-0003-SA	AQUEOUS	CR6-A	15 NOV 91-A	-
018913-0003-SA	AQUEOUS	CR-FAA-AT	26 NOV 91-G	26 NOV 91-G
018913-0003-SA	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
018913-0003-SA	AQUEOUS	CR6-AT	15 NOV 91-A	-
018913-0004-SA	AQUEOUS	CR6-A	15 NOV 91-A	-
018913-0004-SA	AQUEOUS	CR-FAA-AT	26 NOV 91-G	26 NOV 91-G
018913-0004-SA	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
018913-0004-SA	AQUEOUS	CR6-AT	15 NOV 91-A	-
018913-0005-SA	AQUEOUS	CR6-A	15 NOV 91-A	-
018913-0005-SA	AQUEOUS	CR-FAA-AT	26 NOV 91-G	26 NOV 91-G
018913-0005-SA	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
018913-0005-SA	AQUEOUS	CR6-AT	15 NOV 91-A	-

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Spiked	Concentration		Measured	AVG	Accuracy		Precision	
		DCS1	DCS2			DCS	Limits	(RPD)	DCS Limit
Category: CR6-A Matrix: AQUEOUS QC Lot: 15 NOV 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0500	0.0510	0.0505	101	75-125	2.0	20	
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 26 NOV 91-G Concentration Units: mg/L									
Chromium	0.20	0.209	0.215	0.212	106	75-125	2.8	20	
Category: CR-FAA-AD Matrix: AQUEOUS QC Lot: 09 DEC 91-G Concentration Units: mg/L									
Chromium	0.20	0.182	0.183	0.182	91	75-125	0.6	20	
Category: CR6-AT Matrix: AQUEOUS QC Lot: 15 NOV 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0500	0.0510	0.0505	101	75-125	2.0	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: 26 NOV 91-G QC Run: 26 NOV 91-G

Chromium	ND	mg/L	0.0050
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Test: CR-FAA-AT
Matrix: AQUEOUS
QC Lot: 26 NOV 91-G QC Run: 26 NOV 91-G

Chromium	ND	mg/L	0.0050
----------	----	------	--------

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)
018913-0001-SA	AQUEOUS	NO3-A	27 NOV 91-A	-
018913-0001-SA	AQUEOUS	CL-IC-A	03 DEC 91-N	-
018913-0002-SA	AQUEOUS	NO3-A	27 NOV 91-A	-
018913-0002-SA	AQUEOUS	CL-IC-A	03 DEC 91-N	-
018913-0003-SA	AQUEOUS	NO3-A	27 NOV 91-A	-
018913-0003-SA	AQUEOUS	CL-IC-A	03 DEC 91-N	-
018913-0004-SA	AQUEOUS	NO3-A	27 NOV 91-A	-
018913-0004-SA	AQUEOUS	CL-IC-A	03 DEC 91-N	-
018913-0005-SA	AQUEOUS	NO3-A	27 NOV 91-A	-
018913-0005-SA	AQUEOUS	CL-IC-A	03 DEC 91-N	-

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured		AVG	Accuracy Average (%)		Precision (RPD)		
		DCS1	DCS2		DCS	Limits	DCS	Limit	
Category: NO3-A Matrix: AQUEOUS QC Lot: 27 NOV 91-A Concentration Units: mg/L									
Nitrate as N	2.0	1.83	1.86	1.84	92	91-109	1.6	10	
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 03 DEC 91-N Concentration Units: mg/L									
Chloride	50	50.7	50.9	50.8	102	92-108	0.4	20	

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



Appendix

ENSECO ANALYTICAL SERVICES REQUEST FORM

1-18913

Special Handling (Circle as appropriate and explain in record 5)
 Hazardous material SAMPLE
 Station Name AFB 050412-2

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

Field ID USGS/WRD/NEW MEX
 Field Office KIRTLAND AFB RP-SWMU'S
 Project Miko Roybal
 Collector (505) 262-5344
 Phone (FTS)

Deposition* (Circle one)
 Q - WATSTORE
 Lab File

Sample identification
 Station ID or Unique Number* K A F B 050412-2
 Project Account # 463536001

Begin Date 9 9 1 11 14 1430
 Year* Month* Day* Time*
 Composite End Date 11 14 1443
 Month* Day* Time*

State Code* N M
 District/ User Code* 035
 County Code 001

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	CHROMIUM HEXAVALENT TOTAL		CHROMIUM HEXAVALENT DISSOLVED
METHOD: SW3020/SW7191		SW3005/SW7191	SW3005/SW7191	SW7196		SW7196
PARAMETER: NITRATE & NITRITE		CHLORIDE DISSOLVED	APPX IX-VOC	URANIUM		GROSS ALPHA & GROSS BETA
METHOD: E353.2		A429	SW5030/8240	A71NB		E908
PARAMETER: VOC						
METHOD: SW5030/8010						

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>Miko Roybal</u>	FEDERAL EXPRESS	<u>11/14/91</u>	<u>1630</u>
	<u>Heidi Lam</u>	<u>11/15/91</u>	<u>8:00</u>

Comments (Only 50 characters stored in NWIS)

Record 5 SAMPLE FROM WELL AT SW CNR OF SEWAGE LAGOON

Record 6 _____

Total number of sample bottles for this request: 9

SHIP TO: DEBBIE FAZIO/TONI STOVALL
 Enseco-Rocky Mountain Analytical
 4955 Yarrow Street
 Arvada, CO 80002

ENSECO ANALYTICAL SERVICES REQUEST FORM

18913-2

Special Handling

(Circle as appropriate and explain in record 5)

Site Type (circle one)

SW - Surface Water
 GW - Ground Water
 ME - Meteorological

LK - Lake
 ES - Estuary
 SP - Spring
 SS - Special Source

Hazardous material

SAMPLE

KAFB050313-2

Station Name

Field ID
 USGS/WRD/NEW MEX
 Field Office

Project
 KIRTLAND AFB
 IRP-SWMU'S

Collector
 Miko Rovbal

Phone (FTS)
 (505) 762-5344

Deposition*

(Circle one)

Q - WATSTORE

X - Lab File

Sample identification

[Empty box for Laboratory Use Only]

For Laboratory Use Only

K A F B 0 5 0 3 1 3 - 2

Station ID or Unique Number*

4 6 3 5 3 6 0 0 1

Project Account #

Year* 9 1

Month* 11 Day* 13

Begin Date

Time* 1215

Month* 11 Day* 13

Composite End Date

Time* 1230

State Code* N M

District/ User Code* 0 3 5

County Code* 0 0 1

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 DISSOLVED
METHOD:	SW3020/SW7191		SW3005/SW7191		SW7196		SW7196
PARAMETER:	NITRATE & NITRITE		CHLORIDE DISSOLVED		APPX IX-VOC		GROSS ALPHA & GROSS BETA
METHOD:	E353.2		A429		SW5030/8240		A711B, B900
PARAMETER:	VOX						
METHOD:	SW5030/8010						

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 Rovbal</i>	FEDERAL EXPRESS	11/13/91	1615
	<i>[Signature]</i>	11/15/91	8:00

Comments (Only 50 characters stored in NWIS)

Record 5 SAMPLE FROM WELL AT NW COR. OF SEWAGE LAGOON.

Record 6

Total number of sample bottles for this request: 9

SHIP TO: DEBBIE FAZIO/TONI STOVALL

Enseco-Rocky Mountain Analytical
 4955 Yarrow Street.
 Arvada, CO 80002

ENSECO ANALYTICAL SERVICES REQUEST FORM

18913-3

Special Handling (Circle as appropriate and explain in record 5)
 Hazardous material EQ, BLANK
 Station Name: KAFB090214-2
 Field ID: _____
 Field Office: USGS/WRD/NEW MEX
 Project: KIRTLAND AFB RP-SWMU'S
 Collector: Miko Rovbal
 Site Type (circle one): SS Special Source
 SW - Surface Water
 GW - Ground Water
 ME - Meteorological
 LK - Lake
 ES - Estuary
 SP - Spring
 Phone (FTS): (505) 262-5344

File Deposition* (Circle one)
 Q - WATSTORE
 X - Lab File
 Sample identification: KAFB090214-2
 Station ID or Unique Number: _____
 Project Account #: 463536001
 Begin Date: 9/9/91 11/14/1350
 Composite End Date: _____
 State Code: NM
 District/User Code: 035
 County Code: 001

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 HEXAVALENT TOTAL		CHROMIUM HEXAVALENT DISSOLVED
METHOD: SW3020/SW7191		SW3005/SW7191		SW7196		SW7196
PARAMETER: NITRATE & NITRITE		CHLORIDE DISSOLVED		APPX IX-VOC		GROSS ALPHA & GROSS BETA
METHOD: E353.2		A429		SW5030/8240		E900
PARAMETER: VOX						
METHOD: SW5030/8010						

Chain-of-Custody Record

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

Relinquished by: (Signature) <u>Miko Rovbal</u>	Received by: (Signature) _____	Date	Time
	FEDERAL EXPRESS	<u>11/14/91</u>	<u>1630</u>
Relinquished by: (Signature) _____	Received by: (Signature) _____	Date	Time
	<u>Anthony Turner</u>	<u>11/15/91</u>	<u>8:00</u>
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: EQUIPMENT BLANK
 Record 6: _____

Total number of sample bottles for this request: 9
 SHIP TO: DEBBIE FA 210/TONI STOVALL
 Enenco-Rocky Mountain Analytical
 4955 Yarrow Street
 Arvada, CO 80002

ENSECO ANALYTICAL SERVICES REQUEST FORM

5-18913

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

Hazardous material SAMPLE

Station Name: KAFB050119-2

Field ID: USGS/WRD/NEW MEX

Field Office: USGS/WRD/NEW MEX

Project: KIRTLAND AFB RP-SWMU'S

Collector: Miko Rovbal

Phone (FTS): (505) 262-5344

Site Type (circle one): GW - Ground Water

SW - Surface Water
LK - Lake
ES - Estuary
SP - Spring
SS - Special Source

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

Sample identification

Station ID or Unique Number: KAFB050119-2

Project Account #: 463536001

For Laboratory Use Only

Year: 99 Month: 11 Day: 13 Time: 1332

Month: 11 Day: 13 Time: 1344

State Code: NM District/User Code: 035 County Code: 001

Begin Date: 11/13/99 Composite End Date: 11/13/99

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 DISSOLVED
METHOD:	SW3020/SW7191		SW3005/SW7191		SW7196		SW7196
PARAMETER:	NITRATE & NITRITE		CHLORIDE DISSOLVED		APPX IX-VOC		GROSS ALPHA & GROSS BETA
METHOD:	E353.2		A429		SW5030/8240		E900
PARAMETER:	VOC						
METHOD:	SW5030/8010						

Chain-of-Custody Record

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

Relinquished by: (Signature) <u>Miko Rovbal</u>	Received by: (Signature) FEDERAL EXPRESS	Date <u>11/13/91</u>	Time <u>1615</u>
Relinquished by: (Signature)	Received by: (Signature) <u>Halt...</u>	Date <u>11/15/91</u>	Time <u>8:00</u>
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 SAMPLE FR WELL AT SEWAGE LAGOON. SE

Record 6 _____

Total number of sample bottles for this request: 9

SHIP TO: DEBBIE FA 210/TONI STOVALL
Enseco-Rocky Mountain Analytical
4955 Yarrow Street
Arvada, CO 80002

ENSECO ANALYTICAL SERVICES REQUEST FORM

6-18943

Special Handling (Circle as appropriate and explain in record 5)
 Hazardous material TRIP
KAFB0504 11-Z
 Station Name

Field ID
USGS/WRD/NEW MEX
 Field Office

Project
KIRTLAND AFB RP-SWMU'S
 Project

Collector
Miko Rovbal
 Collector

Site Type (circle one)
 SW - Surface Water
~~GW~~ Ground Water
 ME - Meteorological
 LK - Lake
 ES - Estuary
 SP - Spring
SS - Special Source
 (505) 262-5344
 Phone (FTS)

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

Sample identification
K A F B 0 5 0 4 1 1 - Z
 Station ID or Unique Number*

4 6 3 5 3 . 6 0 0 . 1
 Project Account #

9 9 1 Year*
1 1 Month*
1 4 Day*
0 7 2 5 Time*
 Begin Date

Month*
 Day*
 Time*

Composite End Date

N M State Code*
0 3 5 District/ User Code*
0 0 1 County Code

Analysis level codes and schedules

	6 Sample Medium**	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 DISSOLVED
METHOD:	SW3020/SW7191		SW3005/SW7191		/SW7196		SW7196
PARAMETER:	NITRATE & NITRITE		CHLORIDE DISSOLVED		APPX IX-VOC	URANIUM	GROSS ALPHA & GROSS BETA
METHOD:	E353.2		A429		<u>SW5030/8240</u>	A711B	E900
PARAMETER:	VOL						
METHOD:	SW5030/8010						

Chain-of-Custody Record

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

Relinquished by: (Signature) <u>Miko Rovbal</u>	Received by: (Signature) FEDERAL EXPRESS	Date <u>11/14/91</u>	Time <u>1630</u>
Relinquished by: (Signature)	Received by: (Signature) <u>[Signature]</u>	Date <u>11/15/91</u>	Time <u>8:00</u>
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 TRIP BLANK

Record 6 _____

Total number of sample bottles for this request: 3

SHIP TO: DEBBIE FAZIO/TONI STOVALL
 Enseco-Rocky Mountain Analytical
 4955 Yarrow Street
 Arvada, CO 80002

ENSECO ANALYTICAL SERVICES REQUEST FORM

7-18913

Special Handling

(Circle as appropriate and explain in record 5)

Site Type (circle one)

Hazardous material

SW - Surface Water
 GW - Ground Water
 ME - Meteorological

LK - Lake
 ES - Estuary
 SP - Spring
 SS - Special Source
 Phone (FTS) (505) 262-5344

TRIP
 KAFB050118-2

Station Name

Field ID

USGS/WRD/NEW MEX
 Field Office

KIRTLAND AFB
 RP-SWMU'S
 Project

Miko Rovbal
 Collector

Deposition*
 (Circle one)

Sample identification

Q - WATSTORE
 X - Lab File

[Empty box]

KAFB050118-2

Station ID or Unique Number*

463536001

Project Account #

1991
 Year*

11
 Month*

13
 Day*

0655
 Time*

Month

Day

Time

Composite End Date

N M
 State Code*

035
 District/ User Code*

001
 County Code

Begin Date

Analysis level codes and schedules

	6 Sample Medium**	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 DISSOLVED
METHOD:	SW3020/SW7191		SW3005/SW7191		SW7196		SW7196
PARAMETER:	NITRATE & NITRITE		CHLORIDE DISSOLVED		APPX IX-VOC		GROSS ALPHA & GROSS BETA
METHOD:	E353.2		A429		SW5030/8240		E980
PARAMETER:	VOX						
METHOD:	SW5030/8010						

Chain-of-Custody Record

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

Relinquished by: (Signature) Miko Rovbal	Received by: (Signature) FEDERAL EXPRESS	Date 11/13/91	Time 1615
Relinquished by: (Signature)	Received by: (Signature) [Signature]	Date 11/15/91	Time 8:00
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 TRIP BLANK

Record 6

Total number of sample bottles for this request: 3

SHIP TO: DEBBIE FAZIO/TONI STOVALL
 Enseco-Rocky Mountain Analytical
 4955 Yarrow Street
 Arvada, CO 80002