

4 of 5

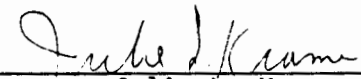
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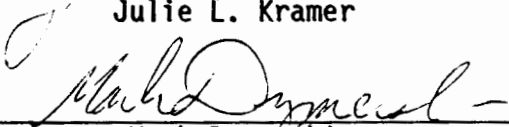
ANALYTICAL RESULTS
FOR
U.S. GEOLOGICAL SURVEY
ENSECO-RMAL NO. 019028



JANUARY 16, 1992

Reviewed by:



Julie L. Kramer


Mark Dymerski





I. OVERVIEW

On November 19, 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

GC/MS volatile analysis holding times were exceeded for samples 019028-0001 and -0003. Data was accepted per Ms. Walker.



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		Received
			Date	Time	Date
019028-0001-SA	KAFB061010-2 - Equip. Blank	AQUEOUS	18 NOV 91	13:30	19 NOV 91
019028-0002-SA	KAFB061011-2 - SAMPLE	AQUEOUS	18 NOV 91	12:05	19 NOV 91
019028-0002-MS	KAFB061012-2 - matrix spike	AQUEOUS	18 NOV 91	12:05	19 NOV 91
019028-0002-SD	KAFB061013-2 - " " Duplicate	AQUEOUS	18 NOV 91	12:05	19 NOV 91
019028-0003-TB	KAFB061009-2 - Trip Blank	AQUEOUS	18 NOV 91	07:22	19 NOV 91

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Lab ID: 019028	Group Code	Analysis Description	Custom Test?
0001 - 0002	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
0003	B	Volatiles Library Search (10 Compound TID)	N
		Volatile Organics	N
		Appendix IX List	N
		Screen - Volatile Organics	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: KAFB061010-2
Lab ID: 019028-0001-SA
Matrix: AQUEOUS
Authorized: 19 NOV 91

Sampled: 18 NOV 91
Prepared: 20 NOV 91

Received: 19 NOV 91
Analyzed: 04 DEC 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: Jon Danaceau

Approved By: Mark Dymerski

Volatile Organics
Appendix IX List
Method 8240

Client Name: U.S. Geological Survey

Client ID: KAFB061010-2

Lab ID: 019028-0001-SA

Matrix: AQUEOUS

Authorized: 19 NOV 91

Sampled: 18 NOV 91

Prepared: 20 NOV 91

Received: 19 NOV 91

Analyzed: 04 DEC 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	105	%	
4-Bromofluorobenzene	91	%	
1,2-Dichloroethane-d4	114	%	

ND = Not detected
NA = Not applicable

Reported By: Jon Danaceau

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS

FOR

U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 019028-0001

<u>Compound Name</u>	<u>Fraction</u>	<u>Confidence Level</u>	<u>Estimated Concentration ug/L</u>
Hexane	VOA	2	9.2
Cyclobutane, Ethyl-	VOA	2	16

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: KAFB061011-2
Lab ID: 019028-0002-SA
Matrix: AQUEOUS
Authorized: 19 NOV 91

Sample

Sampled: 18 NOV 91
Prepared: 20 NOV 91

Received: 19 NOV 91
Analyzed: 02 DEC 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: Jon Danaceau

Approved By: Mark Dymerski

Volatile Organics
Appendix IX List
Method 8240

Client Name: U.S. Geological Survey
Client ID: KAFB061011-2
Lab ID: 019028-0002-SA
Matrix: AQUEOUS
Authorized: 19 NOV 91

Sampled: 18 NOV 91
Prepared: 20 NOV 91

Received: 19 NOV 91
Analyzed: 02 DEC 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	108	%	
4-Bromofluorobenzene	95	%	
1,2-Dichloroethane-d4	81	%	

ND = Not detected
NA = Not applicable

Reported By: Jon Danaceau

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS
FOR
U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 019028-0002

<u>Compound Name</u>	<u>Fraction</u>	<u>Confidence Level</u>	<u>Estimated Concentration ug/L</u>
Unsaturated Hydrocarbon	VOA		6.7
Hexane	VOA	3	28
Cyclopentane, Methyl-	VOA	1	16

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: KAFB061009-2
 Lab ID: 019028-0003-TB
 Matrix: AQUEOUS
 Authorized: 19 NOV 91

Sampled: 18 NOV 91
 Prepared: 20 NOV 91

Received: 19 NOV 91
 Analyzed: 11 DEC 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: Scott McPhail

Approved By: Mark Dymerski

Volatile Organics
Appendix IX List
Method 8240

Client Name: U.S. Geological Survey
 Client ID: KAFB061009-2
 Lab ID: 019028-0003-TB
 Matrix: AQUEOUS
 Authorized: 19 NOV 91

Sampled: 18 NOV 91
 Prepared: 20 NOV 91

Received: 19 NOV 91
 Analyzed: 11 DEC 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	98	%	
4-Bromofluorobenzene	95	%	
1,2-Dichloroethane-d4	100	%	

ND = Not detected
 NA = Not applicable

Reported By: Scott McPhail

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS

FOR

U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 019028-0003

<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.

Metals

Total Metals

Equipment Blank

Client Name: U.S. Geological Survey
 Client ID: KAFB061010-2
 Lab ID: 019028-0001-SA
 Matrix: AQUEOUS
 Authorized: 19 NOV 91

Sampled: 18 NOV 91
 Prepared: See Below

Received: 19 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	19 NOV 91
Chromium	ND	mg/L	0.0020	7191	02 DEC 91	09 DEC 91

ND = Not detected
 NA = Not applicable

Reported By: David Patterson

Approved By: Will Pratt

Metals

Total Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB061011-2
 Lab ID: 019028-0002-SA
 Matrix: AQUEOUS
 Authorized: 19 NOV 91

Sample

Sampled: 18 NOV 91
 Prepared: See Below

Received: 19 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	20 NOV 91
Chromium	0.012	mg/L	0.0020	7191	02 DEC 91	09 DEC 91

ND = Not detected
 NA = Not applicable

Reported By: David Patterson

Approved By: Will Pratt

Metals

Dissolved Metals

Client Name: U.S. Geological Survey

Client ID: KAFB061010-2

Lab ID: 019028-0001-SA

Matrix: AQUEOUS

Authorized: 19 NOV 91

Sampled: 18 NOV 91

Prepared: See Below

Received: 19 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	19 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: Will Pratt

Metals
Dissolved Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB061011-2
 Lab ID: 019028-0002-SA
 Matrix: AQUEOUS
 Authorized: 19 NOV 91

Sampled: 18 NOV 91
 Prepared: See Below

Received: 19 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	19 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: Will Pratt

General Inorganics



Client Name: U.S. Geological Survey
Client ID: KAFB061010-2
Lab ID: 019028-0001-SA
Matrix: AQUEOUS
Authorized: 19 NOV 91

Sampled: 18 NOV 91
Prepared: See Below

Received: 19 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	04 DEC 91

ND = Not detected
NA = Not applicable

Reported By: Steve Pope

Approved By: Roxanne Sullivan

General Inorganics

Client Name: U.S. Geological Survey
Client ID: KAFB061011-2
Lab ID: 019028-0002-SA
Matrix: AQUEOUS
Authorized: 19 NOV 91

Sampled: 18 NOV 91
Prepared: See Below

Received: 19 NOV 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	29.8	mg/L	0.50	A429	NA	03 DEC 91
Nitrate plus Nitrite	23.2	mg/L	1.2	353.2	NA	04 DEC 91

ND = Not detected
NA = Not applicable

Reported By: Steve Pope

Approved By: Roxanne Sullivan

 Four

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)
019028-0001-SA	AQUEOUS	624-A	03 DEC 91-H	03 DEC 91-H2
019028-0002-SA	AQUEOUS	624-A	20 NOV 91-B	02 DEC 91-B
019028-0002-MS	AQUEOUS	624-A	20 NOV 91-B	02 DEC 91-B
019028-0002-SD	AQUEOUS	624-A	20 NOV 91-B	02 DEC 91-B
019028-0003-TB	AQUEOUS	624-A	03 DEC 91-B	11 DEC 91-B

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: 03 DEC 91-H								
Concentration Units: ug/L								
1,1-Dichloroethene	50	37.3	42.5	39.9	80	56-138	13	20
Trichloroethene	50	47.9	44.0	46.0	92	76-109	8.5	13
Benzene	50	47.3	44.2	45.8	92	78-119	6.8	12
Toluene	50	57.7	53.1	55.4	111	82-114	8.3	13
Chlorobenzene	50	60.9	52.6	56.8	114	84-117	15	10

Category: 624-A
Matrix: AQUEOUS
QC Lot: 20 NOV 91-B
Concentration Units: ug/L

1,1-Dichloroethene	50	51.5	48.1	49.8	100	56-138	6.8	20
Trichloroethene	50	47.1	44.7	45.9	92	76-109	5.2	13
Benzene	50	50.2	50.5	50.4	101	78-119	0.6	12
Toluene	50	51.6	48.5	50.0	100	82-114	6.2	13
Chlorobenzene	50	54.4	50.6	52.5	105	84-117	7.2	10

Category: 624-A
Matrix: AQUEOUS
QC Lot: 03 DEC 91-B
Concentration Units: ug/L

1,1-Dichloroethene	50	41.2	48.8	45.0	90	56-138	17	20
Trichloroethene	50	44.4	45.1	44.8	90	76-109	1.6	13
Benzene	50	50.2	51.9	51.0	102	78-119	3.3	12
Toluene	50	44.8	48.8	46.8	94	82-114	8.5	13
Chlorobenzene	50	49.2	57.6	53.4	107	84-117	16	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: 03 DEC 91-H QC Run: 03 DEC 91-H2				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	53.3	107	82-112
4-Bromofluorobenzene	50.0	47.0	94	83-113
Toluene-d8	50.0	50.9	102	90-112

Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 20 NOV 91-B QC Run: 02 DEC 91-B				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	46.4	93	82-112
4-Bromofluorobenzene	50.0	48.8	98	83-113
Toluene-d8	50.0	48.8	98	90-112

Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 03 DEC 91-B QC Run: 11 DEC 91-B				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	46.1	92	82-112
4-Bromofluorobenzene	50.0	49.3	99	83-113
Toluene-d8	50.0	48.8	98	90-112

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

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

Analyte	Result	Units	Reporting Limit
Test: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 03 DEC 91-H QC Run: 03 DEC 91-H2			
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: 20 NOV 91-B QC Run: 02 DEC 91-B

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: 20 NOV 91-B QC Run: 02 DEC 91-B			
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

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

Analyte	Result	Units	Reporting Limit
Test: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 03 DEC 91-B QC Run: 11 DEC 91-B			
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

MATRIX SPIKE / MATRIX SPIKE DUPLICATE REPORT
Volatile Organics by GC/MS

Analyte	Sample	Concentration			Spiked		%Recovery		% RPD
		Matrix Spike	Matrix Spike Dup	MS	MSD	MS	MSD		
Benzene	ND	60	53	50	50	120	106	13	
Chlorobenzene	ND	54	57	50	50	107	114	7	
1,1-Dichloroethene	ND	52	45	50	50	104	90	14	
Toluene	ND	54	50	50	50	108	100	8	
Trichloroethene	ND	45	44	50	50	91	87	4	

ND = Not detected

NC = Not calculated, calculation not applicable

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

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

Analyte	Result	Units	Reporting Limit
Test: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 03 DEC 91-B QC Run: 11 DEC 91-B			
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

MATRIX SPECIFIC QC
ASSIGNMENT REPORT
Volatile Organics by GC/MS

QC SAMPLE TYPE	TEST	LABORATORY SAMPLE NUMBER	QC LOT
MATRIX SPIKE DUPLICATE	8240CP-AP9-AP	019028-0002-SD	20 NOV 91-B
MATRIX SPIKE	8240CP-AP9-AP	019028-0002-MS	20 NOV 91-B

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
019028-0001-SA	AQUEOUS	CR6-A	19 NOV 91-A	-
019028-0001-SA	AQUEOUS	CR-FAA-AT	02 DEC 91-B	02 DEC 91-B
019028-0001-SA	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
019028-0001-SA	AQUEOUS	CR6-AT	19 NOV 91-A	-
019028-0002-SA	AQUEOUS	CR6-A	19 NOV 91-A	-
019028-0002-SA	AQUEOUS	CR-FAA-AT	02 DEC 91-B	02 DEC 91-B
019028-0002-SA	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
019028-0002-SA	AQUEOUS	CR6-AT	20 NOV 91-Z	-
019028-0002-MS	AQUEOUS	CR6-A	19 NOV 91-A	-
019028-0002-MS	AQUEOUS	CR-FAA-AT	02 DEC 91-B	02 DEC 91-B
019028-0002-MS	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
019028-0002-MS	AQUEOUS	CR6-AT	20 NOV 91-Z	-
019028-0002-SD	AQUEOUS	CR6-A	19 NOV 91-A	-
019028-0002-SD	AQUEOUS	CR-FAA-AT	02 DEC 91-B	02 DEC 91-B
019028-0002-SD	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
019028-0002-SD	AQUEOUS	CR6-AT	20 NOV 91-Z	-

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Spiked	Concentration		AVG	Accuracy		Precision		
		DCS1	Measured DCS2		DCS	Average(%) Limits	(RPD) DCS Limit	DCS Limit	
Category: CR6-A Matrix: AQUEOUS QC Lot: 19 NOV 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0502	0.0514	0.0508	102	75-125	2.4	20	
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 02 DEC 91-B Concentration Units: mg/L									
Chromium	0.20	0.181	0.188	0.184	92	75-125	3.8	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: 19 NOV 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0502	0.0514	0.0508	102	75-125	2.4	20	
Category: CR6-AT Matrix: AQUEOUS QC Lot: 20 NOV 91-Z Concentration Units: mg/L									
Chromium (VI)	0.05	0.0587	0.0561	0.0574	115	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
Test: CR-FAA-AT			
Matrix: AQUEOUS			
QC Lot: 02 DEC 91-B	QC Run: 02 DEC 91-B		
Chromium	ND	mg/L	0.0020

MATRIX SPECIFIC QC
ASSIGNMENT REPORT
Metals Analysis and Preparation

QC SAMPLE TYPE	TEST	LABORATORY SAMPLE NUMBER	QC LOT
MATRIX SPIKE DUPLICATE	CR6-SPEC-AD	019028-0002-SD	19 NOV 91-A
MATRIX SPIKE	CR6-SPEC-AD	019028-0002-MS	19 NOV 91-A
MATRIX SPIKE DUPLICATE	CR-FAA-AT	019028-0002-SD	02 DEC 91-B
MATRIX SPIKE	CR-FAA-AT	019028-0002-MS	02 DEC 91-B
MATRIX SPIKE DUPLICATE	CR-FAA-AD	019028-0002-SD	09 DEC 91-G
MATRIX SPIKE	CR-FAA-AD	019028-0002-MS	09 DEC 91-G
MATRIX SPIKE DUPLICATE	CR6-SPEC-AT	019028-0002-SD	20 NOV 91-Z
MATRIX SPIKE	CR6-SPEC-AT	019028-0002-MS	20 NOV 91-Z

MATRIX SPIKE / MATRIX SPIKE DUPLICATE REPORT
 Metals Analysis and Preparation

Analyte	Sample	Concentration			Spiked		%Recovery		% RPD
		Matrix Spike	Matrix Spike Dup	MS	MSD	MS	MSD		
Test: CR6-SPEC-AD Matrix AQUEOUS Sample: 019028-0002 Units: mg/L									
Chromium (VI)	ND	0.049	0.048	0.050	0.050	98	96	2	
Test: CR-FAA-AT Matrix AQUEOUS Sample: 019028-0002 Units: mg/L									
Chromium	0.012	0.22	0.20	0.20	0.20	104	94	10	
Test: CR-FAA-AD Matrix AQUEOUS Sample: 019028-0002 Units: mg/L									
Chromium	ND	0.021	0.021	0.020	0.020	106	103	3	
Test: CR6-SPEC-AT Matrix AQUEOUS Sample: 019028-0002 Units: mg/L									
Chromium (VI)	ND	0.048	0.050	0.050	0.050	97	99	3	

ND = Not detected
 NC = Not calculated, calculation not applicable

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

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)
019028-0001-SA	AQUEOUS	NO3-A	04 DEC 91-A	-
019028-0001-SA	AQUEOUS	CL-IC-A	03 DEC 91-N	-
019028-0002-SA	AQUEOUS	NO3-A	04 DEC 91-A	-
019028-0002-SA	AQUEOUS	CL-IC-A	03 DEC 91-N	-
019028-0002-MS	AQUEOUS	NO3-A	04 DEC 91-A	-
019028-0002-MS	AQUEOUS	CL-IC-A	03 DEC 91-N	-
019028-0002-SD	AQUEOUS	NO3-A	04 DEC 91-A	-
019028-0002-SD	AQUEOUS	CL-IC-A	03 DEC 91-N	-

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 DEC 91-A Concentration Units: mg/L									
Nitrate as N	2.0	1.95	1.91	1.93	97	91-109	2.1	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.

MATRIX SPECIFIC QC
ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

QC SAMPLE TYPE	TEST	LABORATORY SAMPLE NUMBER	QC LOT
MATRIX SPIKE DUPLICATE	NO3+NO2-TEC-A	019028-0002-SD	04 DEC 91-A
MATRIX SPIKE	NO3+NO2-TEC-A	019028-0002-MS	04 DEC 91-A
MATRIX SPIKE DUPLICATE	CL-IC-AFIR-A	019028-0002-SD	03 DEC 91-N
MATRIX SPIKE	CL-IC-AFIR-A	019028-0002-MS	03 DEC 91-N

MATRIX SPIKE / MATRIX SPIKE DUPLICATE REPORT
 Wet Chemistry Analysis and Preparation

Analyte	Sample	Concentration			Spiked		%Recovery		% RPD
		Matrix Spike	Matrix Spike Dup	MS	MSD	MS	MSD		
Test: NO3+NO2-TEC-A Matrix AQUEOUS Sample: 019028-0002 Units: mg/L									
Nitrate plus Nitrite as N	23.2	75.2	75.4	50.0	50.0	104	104	0	
Test: CL-IC-AFIR-A Matrix AQUEOUS Sample: 019028-0002 Units: mg/L									
Chloride	29.8	80.5	80.3	50.0	50.0	101	101	0	

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



Appendix

ENSECO ANALYTICAL SERVICES REQUEST FORM

19028-01

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

Hazardous material
EQ BLANK
KAFB 061010-2
Station Name

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

K A F B 061010-2
Station ID or Unique Number*

463536001
Project Account #

1991 11 18 1330
Year* Month* Day* Time*
Begin Date

Month* Day* Time*
Composite End Date

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

Analysis level codes and schedules

	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:	VOX						
METHOD:	SW5030/8010						

Chain-of-Custody Record

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

Relinquished by: (Signature) Mike Roybal Received by: (Signature) FEDERAL EXPRESS Date 11/18/91 Time 1530

Relinquished by: (Signature) Received by: (Signature) RMAZ Date 11/19/91 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: EQUIPMENT BLANK GOLF C.P. SW

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
(303) 421-6611

ENSECO ANALYTICAL SERVICES REQUEST FORM

14028-02

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

Hazardous material
SAMPLE

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

Station Name
KAFB061011-2

Field ID
USGS/WRD/NEW MEX

Project
KIRTLAND AFB
IRP-SWMU'S

Collector
Miko Roybal

Phone (FTS)
(505) 262-5344

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

Sample identification

For Laboratory Use Only

Station ID or Unique Number*
K A F B 061011-2

Project Account #
463536001

Begin Date: 1991 11 18 1205
 Composite End Date: 11 18 1232
 State Code: NM District/User Code: 035 County Code: 001

Analysis level codes and schedules

	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	URANIUM	GROSS ALPHA & GROSS BETA
METHOD:	E353.2		A429		SW5030/8240	A11B	E900
PARAMETER:	NOX						
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>11/18/91</u>	<u>1530</u>
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
	<u>RMAZ M. Potts</u>	<u>11/19/91</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 SAMPLE FROM WELL AT SW CNR OF GOLF COURSE POND

Record 6 _____

Total number of sample bottles for this request: 9

SHIP TO: DEBBIE FAZIO/TONI STOVALL
 Enenco-Rocky Mountain Analytical
 4955 Yarrow Street
 Arvada, CO 80002
 (303) 421-6611

ENSECO ANALYTICAL SERVICES REQUEST FORM

19078-2SD

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

Hazardous material
MATRIX SP. DUP
KAFB 061013-2
Station Name

Field ID
USGS/WRD/NEW MEX
Field Office

KIRTLAND AFB
RP-SWMU'S
Project

Miko Roybal
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

[Blank Box]
For Laboratory Use Only

K A F B 061013-2
Station ID or Unique Number*

463536001
Project Account #

1991 11 18 1205 11 18 1232 N M 035 001
Year* Month* Day* Time* Month* Day* Time* State Code* District/User Code* County Code

Analysis level codes and schedules

	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		AN.1B, 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) Miko Roybal	Received by: (Signature) FEDERAL EXPRESS	Date 11/18/91	Time 1530
Relinquished by: (Signature)	Received by: (Signature) RMAZ mydette	Date 11/19/91	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 MATRIX SPIKE DUPLICATE FR. WELL AT SW CNR O.F. GOLF COURSE P.

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
(303) 421-6611

ENSECO ANALYTICAL SERVICES REQUEST FORM

19078 - 03

Special Handling

(Circle as appropriate and explain in record 5)

Hazardous material

TRIP BLANK

KAFB 061009-2

Station Name

Field ID

USGS/WRD/NEW MEX

Field Office

KIRTLAND AFB

IRP-SWMU'S

Project

Miko Roybal

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)

File Deposition*

Circle one)

Q - WATSTORE

X - Lab File

Sample identification

K A F B 0 6 1 0 0 9 - 2

Station ID or Unique Number*

4 6 3 5 3 6 0 0 1

Project Account #

1 9 9 1
 Year*

1 1
 Month*

1 8
 Day*

0 7 2 2
 Time*

Month

Day

Time

Composite End Date

N M
 State Code*

0 3 5
 District/ User Code*

0 0 1
 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		A711B, 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) Miko Roybal Received by: (Signature) FEDERAL EXPRESS Date 11/18/91 Time 1530

Relinquished by: (Signature) Received by: (Signature) R M AL M... Date 11/19/91 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 FA 210/TONI STOVALL

Enseco-Rocky Mountain Analytical
 4955 Yarrow Street.
 Arvada, CO 80002
 (303) 421-6611

