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ANALYTICAL RESULTS  
FOR  
U.S. GEOLOGICAL SURVEY  
ENSECO-RMAL NO. 015099

Enseco

JUNE 18, 1991

Reviewed by:

*Randall Thompson*  
\_\_\_\_\_  
Randall Thompson

*Lindsay Breyer*  
\_\_\_\_\_  
Lindsay Breyer



## Introduction

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:

- o Sample Description Information
- o Analytical Test Requests
- o Analytical Results
- o Quality Control Report

Due to laboratory error, the holding times for total and dissolved hexavalent chromium were missed on sample 015099-0001.

## Sample Description Information

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

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

## Analytical Test Requests

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

SAMPLE DESCRIPTION INFORMATION  
for  
U.S. Geological Survey

Lab ID	Client ID	Matrix	Sampled Date	Time	Received Date
015099-0001-SA	DICF SYSTEM-LINE	AQUEOUS	22 MAY 91	14:11	23 MAY 91

ANALYTICAL TEST REQUESTS  
for  
U.S. Geological Survey

Lab ID: 015099	Group Code	Analysis Description	Custom Test?
0001	A	Chromium, Furnace AA (Total)	N
		Prep - Total Metals, ICP	N
		Chromium, Furnace AA	N
		Chromium VI (Total)	N
		Chromium VI (Dissolved)	N
		Nitrate Plus Nitrite	N
		Uranium, Natural	N
		Gross Alpha & Beta	N
		Purgeable Volatile Organics	N
		AFIR Volatile Screen	N
		Volatiles Library Search (10 Compound TID)	N
		Halogenated Volatile Organics	N
		Halogenated Volatile Organics-2nd Column Analysis	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		ICP Suite: Air Force	N
		ICP Suite: Air Force	N

## Analytical Results

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

Data sheets contain a listing of the parameters measured in each test, the analytical results and the 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.

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

Purgeable Volatile Organics

Method 8240

Client Name: U.S. Geological Survey

Client ID: DDCF SYSTEM-LINE

Lab ID: 015099-0001-SA

Matrix: AQUEOUS

Authorized: 23 MAY 91

Sampled: 22 MAY 91

Prepared: 24 MAY 91

Received: 23 MAY 91

Analyzed: 31 MAY 91

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

(continued on following page)

ND = Not detected  
NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

Purgeable Volatile Organics (CONT.)

Method 8240

Client Name: U.S. Geological Survey  
 Client ID: DICF SYSTEM-LINE  
 Lab ID: 015099-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 23 MAY 91

Sampled: 22 MAY 91  
 Prepared: 24 MAY 91

Received: 23 MAY 91  
 Analyzed: 31 MAY 91

Parameter	Result	Units	Reporting Limit
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro-2-butene	ND	ug/L	50
Surrogate	Recovery		
Toluene-d8	98	%	
4-Bromofluorobenzene	99	%	
1,2-Dichloroethane-d4	108	%	

ND = Not detected  
 NA = Not applicable

Reported By: Deneen Spence

Approved By: Mark Dymerski

TENTATIVELY IDENTIFIED COMPOUNDS

FOR

U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 015099-0001

<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-2nd Column Analysis

Method 8010

Client Name: U.S. Geological Survey  
 Client ID: DICF SYSTEM-LINE  
 Lab ID: 015099-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 23 MAY 91  
 Sampled: 22 MAY 91  
 Prepared: NA  
 Received: 23 MAY 91  
 Analyzed: 31 MAY 91

Parameter	Result	Units	Reporting Limit	
Chloromethane	6.4	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	V
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	V
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	
1,2,3-Trichloropropane	ND	ug/L	5.0	

Surrogate Recovery  
 Bromochloromethane 91 %

(continued on following page)

ND = Not detected  
 NA = Not applicable

Reported By: Garth Atkins Approved By: Mike Hoffman

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Halogenated Volatile Organics-2nd Column Analysis (CONT.)

Method 8010

Client Name: U.S. Geological Survey  
Client ID: DICF SYSTEM-LINE  
Lab ID: 015099-0001-SA  
Matrix: AQUEOUS  
Authorized: 23 MAY 91  
Sampled: 22 MAY 91  
Prepared: NA  
Received: 23 MAY 91  
Analyzed: 31 MAY 91

Note V : Secondary column result is the preferred value.

ND = Not detected  
NA = Not applicable

Reported By: Garth Atkins

Approved By: Mike Hoffman

Halogenated Volatile Organics

Method 8010

Client Name: U.S. Geological Survey  
 Client ID: DICF SYSTEM-LINE  
 Lab ID: 015099-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 23 MAY 91

Sampled: 22 MAY 91  
 Prepared: NA

Received: 23 MAY 91  
 Analyzed: 31 MAY 91

Parameter	Result	Units	Reporting Limit	
Chloromethane	4.2	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	0.57	ug/L	0.50	L
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	L
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: Garth Atkins

Approved By: Mike Hoffman

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Halogenated Volatile Organics (CONT.)

Method 8010

Client Name: U.S. Geological Survey  
Client ID: DICF SYSTEM-LINE  
Lab ID: 015099-0001-SA  
Matrix: AQUEOUS  
Authorized: 23 MAY 91  
Sampled: 22 MAY 91  
Prepared: NA  
Received: 23 MAY 91  
Analyzed: 31 MAY 91

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

Note L : These components are not separable using this method and are therefore quantified together.

ND = Not detected  
NA = Not applicable

Reported By: Garth Atkins

Approved By: Mike Hoffman

Metals

Total Metals

Client Name: U.S. Geological Survey  
 Client ID: DICF SYSTEM-LINE  
 Lab ID: 015099-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 23 MAY 91

Sampled: 22 MAY 91  
 Prepared: See Below

Received: 23 MAY 91  
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	24 MAY 91
Aluminum	ND	mg/L	0.20	6010	05 JUN 91	06 JUN 91
Antimony	ND	mg/L	0.20	6010	05 JUN 91	06 JUN 91
Chromium	0.0022	mg/L	0.0020	7191	05 JUN 91	06 JUN 91
Arsenic	ND	mg/L	0.30	6010	05 JUN 91	06 JUN 91
Barium	ND	mg/L	0.10	6010	05 JUN 91	06 JUN 91
Beryllium	ND	mg/L	0.0020	6010	05 JUN 91	06 JUN 91
Cadmium	ND	mg/L	0.0050	6010	05 JUN 91	06 JUN 91
Calcium	ND	mg/L	5.0	6010	05 JUN 91	06 JUN 91
Chromium	ND	mg/L	0.030	6010	05 JUN 91	06 JUN 91
Cobalt	ND	mg/L	0.040	6010	05 JUN 91	06 JUN 91
Copper	ND	mg/L	0.030	6010	05 JUN 91	06 JUN 91
Iron	ND	mg/L	0.040	6010	05 JUN 91	06 JUN 91
Lead	ND	mg/L	0.20	6010	05 JUN 91	06 JUN 91
Magnesium	ND	mg/L	5.0	6010	05 JUN 91	06 JUN 91
Manganese	ND	mg/L	0.010	6010	05 JUN 91	06 JUN 91
Molybdenum	ND	mg/L	0.040	6010	05 JUN 91	06 JUN 91
Nickel	ND	mg/L	0.040	6010	05 JUN 91	06 JUN 91
Potassium	ND	mg/L	5.0	6010	05 JUN 91	06 JUN 91
Selenium	ND	mg/L	0.40	6010	05 JUN 91	06 JUN 91
Silver	ND	mg/L	0.030	6010	05 JUN 91	06 JUN 91
Sodium	ND	mg/L	5.0	6010	05 JUN 91	06 JUN 91
Thallium	ND	mg/L	2.0	6010	05 JUN 91	06 JUN 91
Vanadium	ND	mg/L	0.040	6010	05 JUN 91	06 JUN 91
Zinc	ND	mg/L	0.010	6010	05 JUN 91	06 JUN 91

ND = Not detected  
 NA = Not applicable

Reported By: Debra Hosford

Approved By: Fred Velasquez

Metals

Dissolved Metals

Client Name: U.S. Geological Survey  
 Client ID: DICF SYSTEM-LINE  
 Lab ID: 015099-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 23 MAY 91

Sampled: 22 MAY 91  
 Prepared: See Below

Received: 23 MAY 91  
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	24 MAY 91
Aluminum	ND	mg/L	0.20	6010	NA	07 JUN 91
Antimony	ND	mg/L	0.20	6010	NA	07 JUN 91
Chromium	ND	mg/L	0.0020	7191	NA	30 MAY 91
Arsenic	ND	mg/L	0.30	6010	NA	07 JUN 91
Barium	ND	mg/L	0.10	6010	NA	07 JUN 91
Beryllium	ND	mg/L	0.0020	6010	NA	07 JUN 91
Cadmium	ND	mg/L	0.0050	6010	NA	07 JUN 91
Calcium	ND	mg/L	5.0	6010	NA	07 JUN 91
Chromium	ND	mg/L	0.030	6010	NA	07 JUN 91
Cobalt	ND	mg/L	0.040	6010	NA	07 JUN 91
Copper	ND	mg/L	0.030	6010	NA	07 JUN 91
Iron	ND	mg/L	0.040	6010	NA	07 JUN 91
Lead	ND	mg/L	0.20	6010	NA	07 JUN 91
Magnesium	ND	mg/L	5.0	6010	NA	07 JUN 91
Manganese	ND	mg/L	0.010	6010	NA	07 JUN 91
Molybdenum	ND	mg/L	0.040	6010	NA	07 JUN 91
Nickel	ND	mg/L	0.040	6010	NA	07 JUN 91
Potassium	ND	mg/L	5.0	6010	NA	07 JUN 91
Selenium	ND	mg/L	0.40	6010	NA	07 JUN 91
Silver	ND	mg/L	0.030	6010	NA	07 JUN 91
Sodium	ND	mg/L	5.0	6010	NA	07 JUN 91
Thallium	ND	mg/L	5.0	6010	NA	07 JUN 91
Vanadium	ND	mg/L	0.040	6010	NA	07 JUN 91
Zinc	ND	mg/L	0.010	6010	NA	07 JUN 91

ND = Not detected  
 NA = Not applicable

Reported By: Richard Persichitte

Approved By: Fred Velasquez

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General Inorganics

Enseco  
A Corning Company

Client Name: U.S. Geological Survey  
Client ID: DICF SYSTEM-LINE  
Lab ID: 015099-0001-SA  
Matrix: AQUEOUS  
Authorized: 23 MAY 91

Sampled: 22 MAY 91  
Prepared: See Below

Received: 23 MAY 91  
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Nitrate plus Nitrite	ND	mg/L	0.050	353.2	NA	04 JUN 91
Total Organic Carbon	ND	mg/L	0.50	9060	NA	07 JUN 91
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	05 JUN 91

ND = Not detected  
NA = Not applicable

Reported By: Tammy Bailey

Approved By: Roxanne Sullivan

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Radiochemistry

Enseco  
A Corning Company

Client Name: U.S. Geological Survey  
Client ID: DICF SYSTEM-LINE  
Lab ID: 015099-0001-SA  
Matrix: AQUEOUS  
Authorized: 23 MAY 91

Sampled: 22 MAY 91  
Prepared: See Below

Received: 23 MAY 91  
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Gross Alpha	1.8	pCi/L	+/- 2.1	900.0	NA	05 JUN 91
Gross Beta	1.0	pCi/L	+/- 2.1	900.0	NA	05 JUN 91
Uranium, Natural	<0.002	mg/L	--	ASTM D2907-70T	NA	29 MAY 91

ND = Not detected  
NA = Not applicable

Reported By: Paula Hubble

Approved By: Pam Rosas



## Quality Control Results

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 either representative target compounds or surrogate compounds appropriate to the method being used. An SCS is prepared for each sample lot for which the DCS pair are not analyzed.

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)
015099-0001-SA	AQUEOUS	624-A	28 MAY 91-H	31 MAY 91-H

DUPLICATE CONTROL SAMPLE REPORT  
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average (%)		Precision (RPD)	
		DCS1	DCS2		DCS	Limits	DCS	Limit
Category: 624-A								
Matrix: AQUEOUS								
QC Lot: 28 MAY 91-H								
Concentration Units: ug/L								
1,1-Dichloroethene	50	32.0	39.3	35.6	71	61-145	20	14
Trichloroethene	50	42.0	45.4	43.7	87	71-120	7.8	14
Benzene	50	46.0	50.2	48.1	96	76-127	8.7	11
Toluene	50	43.2	47.3	45.2	91	76-125	9.1	13
Chlorobenzene	50	46.3	47.0	46.6	93	75-130	1.5	13

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

SINGLE CONTROL SAMPLE REPORT  
Volatile Organics by GC/MS

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 28 MAY 91-H    QC Run: 31 MAY 91-H				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	54.0	108	76-114
4-Bromofluorobenzene	50.0	48.3	97	86-115
Toluene-d8	50.0	50.7	101	88-110

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

METHOD BLANK REPORT  
Volatile Organics by GC/MS

Analyte	Result	Units	Reporting Limit
Test: 624-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 28 MAY 91-H    QC Run: 31 MAY 91-H			
Chloromethane	ND	ug/L	14
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	11
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	17
Acetone	ND	ug/L	50
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	4.0
1,1-Dichloroethane	ND	ug/L	5.0
trans-1,2-Dichloroethene	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	50
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	100
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	50
1,1,2,2-Tetrachloroethane	ND	ug/L	7.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Acrolein	ND	ug/L	60
Acrylonitrile	ND	ug/L	25
Dibromomethane	ND	ug/L	10
Dichlorodifluoromethane	ND	ug/L	10
Ethanol	ND	ug/L	NR
Ethyl methacrylate	ND	ug/L	10
2-Hexanone	ND	ug/L	50
Iodomethane	ND	ug/L	10

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

Analyte	Result	Units	Reporting Limit
Test: 624-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 28 MAY 91-H    QC Run: 31 MAY 91-H			
Styrene	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	10
Vinyl acetate	ND	ug/L	50
trans-1,4-Dichloro- 2-butene	ND	ug/L	50



QC LOT ASSIGNMENT REPORT  
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
015099-0001-SA	AQUEOUS	601-A	29 MAY 91-F	31 MAY 91-F
015099-0001-SA	AQUEOUS	601-A	29 MAY 91-F	31 MAY 91-F

DUPLICATE CONTROL SAMPLE REPORT  
Volatile Organics by GC

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average(%)		Precision (RPD)		
		DCS1	DCS2		DCS	Limits	DCS	Limit	
Category: 601-A									
Matrix: AQUEOUS									
QC Lot: 29 MAY 91-F									
Concentration Units: ug/L									
1,1-Dichloroethane	5.0	4.58	4.36	4.47	89	80-130	4.9	20	
Chloroform	5.0	5.69	5.64	5.66	113	80-120	0.9	20	
Bromodichloromethane	10	8.98	8.69	8.84	88	80-120	3.3	20	
Trichloroethene	5.0	4.49	4.34	4.42	88	70-120	3.4	20	
Chlorobenzene	5.0	4.27	4.37	4.32	86	80-120	2.3	20	

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

SINGLE CONTROL SAMPLE REPORT  
Volatile Organics by GC

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Category: 601-A				
Matrix: AQUEOUS				
QC Lot: 29 MAY 91-F				
QC Run: 31 MAY 91-F				
Concentration Units: ug/L				
Bromochloromethane	5.00	6.24	125	20-160

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

METHOD BLANK REPORT  
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 601-AFIR-A			
Matrix: AQUEOUS			
QC Lot: 29 MAY 91-F    QC Run: 31 MAY 91-F			
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

METHOD BLANK REPORT  
Volatile Organics by GC (cont.)

Analyte	Result	Units	Reporting Limit
Test: 601-AFIR-2-A			
Matrix: AQUEOUS			
QC Lot: 29 MAY 91-F    QC Run: 31 MAY 91-F			
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)
015099-0001-SA	AQUEOUS	CR-FAA-AT	05 JUN 91-R	05 JUN 91-R
015099-0001-SA	AQUEOUS	CR-FAA-AD	30 MAY 91-G	-
015099-0001-SA	AQUEOUS	CR6-AT	24 MAY 91-B	-
015099-0001-SA	AQUEOUS	CR6-A	24 MAY 91-B	-
015099-0001-SA	AQUEOUS	ICP-AT	05 JUN 91-R	05 JUN 91-R
015099-0001-SA	AQUEOUS	ICP-AD	07 JUN 91-A	-

DUPLICATE CONTROL SAMPLE REPORT  
Metals Analysis and Preparation

Analyte	Spiked	Concentration		Measured DCS2	AVG	Accuracy Average(%)		Precision (RPD)	
		DCS1	DCS			DCS	Limits	DCS	Limit
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 05 JUN 91-R Concentration Units: mg/L									
Chromium	0.20	0.176	0.188	0.182	91	75-125	6.6	20	
Category: CR-FAA-AD Matrix: AQUEOUS QC Lot: 30 MAY 91-G Concentration Units: mg/L									
Chromium	0.02	0.0212	0.0220	0.0216	108	75-125	3.7	20	
Category: CR6-AT Matrix: AQUEOUS QC Lot: 24 MAY 91-B Concentration Units: mg/L									
Chromium (VI)	0.05	0.0485	0.0505	0.0495	99	75-125	4.0	20	
Category: CR6-A Matrix: AQUEOUS QC Lot: 24 MAY 91-B Concentration Units: mg/L									
Chromium (VI)	0.05	0.0485	0.0505	0.0495	99	75-125	4.0	20	
Category: ICP-AT Matrix: AQUEOUS QC Lot: 05 JUN 91-R Concentration Units: mg/L									
Aluminum	2.0	2.06	2.05	2.06	103	75-125	0.5	20	
Antimony	0.5	0.518	0.506	0.512	102	75-125	2.3	20	
Arsenic	0.5	0.503	0.497	0.500	100	75-125	1.2	20	
Barium	2.0	1.96	1.93	1.95	97	75-125	1.2	20	
Beryllium	0.05	0.0499	0.0487	0.0493	99	75-125	2.5	20	
Cadmium	0.05	0.0493	0.0459	0.0476	95	75-125	7.0	20	
Calcium	100	109	107	108	108	75-125	1.9	20	
Chromium	0.2	0.193	0.186	0.189	95	75-125	3.9	20	

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

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

Analyte	Spiked	Concentration		AVG	Accuracy		Precision		
		DCS1	Measured DCS2		Average(%) DCS	Limits	(RPD) DCS	Limit	
Category: ICP-AT									
Matrix: AQUEOUS									
QC Lot: 05 JUN 91-R									
Concentration Units: mg/L									
Cobalt	0.5	0.476	0.466	0.471	94	75-125	2.1	20	
Copper	0.25	0.251	0.246	0.248	99	75-125	1.8	20	
Iron	1.0	0.985	1.02	1.00	100	75-125	3.2	20	
Lead	0.5	0.494	0.478	0.486	97	75-125	3.3	20	
Magnesium	50	51.9	51.2	51.5	103	75-125	1.5	20	
Manganese	0.5	0.473	0.463	0.468	94	75-125	2.0	20	
Nickel	0.5	0.489	0.478	0.484	97	75-125	2.4	20	
Potassium	50	53.6	52.9	53.3	107	75-125	1.2	20	
Silver	0.05	0.0538	0.0525	0.0531	106	75-125	2.5	20	
Sodium	100	110	108	109	109	75-125	1.5	20	
Vanadium	0.5	0.501	0.492	0.497	99	75-125	1.8	20	
Zinc	0.5	0.486	0.474	0.480	96	75-125	2.6	20	

Category: ICP-AD  
Matrix: AQUEOUS  
QC Lot: 07 JUN 91-A  
Concentration Units: mg/L

Aluminum	2.0	1.92	2.02	1.97	99	75-125	4.9	20
Antimony	0.5	0.485	0.500	0.493	99	75-125	3.2	20
Arsenic	0.5	0.463	0.489	0.476	95	75-125	5.5	20
Barium	2.0	1.81	1.91	1.86	93	75-125	5.3	20
Beryllium	0.05	0.0476	0.0489	0.0482	96	75-125	2.8	20
Cadmium	0.05	0.0452	0.0455	0.0454	91	75-125	0.5	20
Calcium	100	99.7	105	102	102	75-125	5.4	20
Chromium	0.2	0.176	0.189	0.183	91	75-125	7.3	20
Cobalt	0.5	0.436	0.459	0.448	90	75-125	5.0	20
Copper	0.25	0.246	0.253	0.249	100	75-125	2.7	20
Iron	1.0	0.917	0.953	0.935	93	75-125	3.8	20
Lead	0.5	0.435	0.475	0.455	91	75-125	8.7	20
Magnesium	50	47.7	49.8	48.8	98	75-125	4.3	20
Manganese	0.5	0.437	0.457	0.447	89	75-125	4.6	20
Nickel	0.5	0.449	0.472	0.460	92	75-125	5.0	20
Potassium	50	50.7	51.5	51.1	102	75-125	1.5	20
Silver	0.05	0.0581	0.0569	0.0575	115	75-125	2.0	20
Sodium	100	105	105	105	105	75-125	0.5	20
Vanadium	0.5	0.471	0.493	0.482	96	75-125	4.5	20
Zinc	0.5	0.442	0.467	0.454	91	75-125	5.6	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: 05 JUN 91-R    QC Run: 05 JUN 91-R			
Chromium	ND	mg/L	0.0050

Test: ICP-AFIR-AT  
Matrix: AQUEOUS  
QC Lot: 05 JUN 91-R    QC Run: 05 JUN 91-R

Aluminum	ND	mg/L	0.20
Antimony	ND	mg/L	0.20
Arsenic	ND	mg/L	0.30
Barium	ND	mg/L	0.10
Beryllium	ND	mg/L	0.0020
Cadmium	ND	mg/L	0.0050
Calcium	ND	mg/L	5.0
Chromium	ND	mg/L	0.030
Cobalt	ND	mg/L	0.040
Copper	ND	mg/L	0.030
Iron	ND	mg/L	0.040
Lead	ND	mg/L	0.20
Magnesium	ND	mg/L	5.0
Manganese	ND	mg/L	0.010
Molybdenum	ND	mg/L	0.040
Nickel	ND	mg/L	0.040
Potassium	ND	mg/L	5.0
Selenium	ND	mg/L	0.40
Silver	ND	mg/L	0.030
Sodium	ND	mg/L	5.0
Thallium	ND	mg/L	2.0
Vanadium	ND	mg/L	0.040
Zinc	ND	mg/L	0.010

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)
015099-0001-SA	AQUEOUS	N03-A	04 JUN 91-E	-
015099-0001-SA	AQUEOUS	TOC-A	07 JUN 91-A	-
015099-0001-SA	AQUEOUS	TOX-A	05 JUN 91-A	-

DUPLICATE CONTROL SAMPLE REPORT  
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average(%)		Precision (RPD)		
		DCS1	DCS2		DCS	Limits	DCS	Limit	
Category: NO3-A Matrix: AQUEOUS QC Lot: 04 JUN 91-E Concentration Units: mg/L									
Nitrate as N	7.1	7.50	7.48	7.49	105	91-109	0.3	10	
Category: TOC-A Matrix: AQUEOUS QC Lot: 07 JUN 91-A Concentration Units: mg/L									
Total Organic Carbon	25	25.3	25.0	25.2	101	91-109	1.2	20	
Category: TOX-A Matrix: AQUEOUS QC Lot: 05 JUN 91-A Concentration Units: ug Cl/L									
Total Organic Halogen as Cl	100	98.5	96.5	97.5	98	80-120	2.1	20	

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

# Appendix

ENSECO ANALYTICAL SERVICES REQUEST FORM

RMA# 15099 B1

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

hazardous material

Site Type (circle one)

- SW - Surface Water
- GW** - Ground Water
- ME - Meteorological
- LK - Lake
- ES - Estuary
- SP - Spring
- SS - Special Source

DI-CF-SYSTEM-LINE  
Station Name

USGS/WRD/NEW MEX  
Field Office

KIRTLAND AFB  
RP-SWMU'S  
Project

KIM ONG +  
MIKO ROYBAL  
Collector

(505) 262-5341  
Phone (FTS)

File Deposition\*  
Circle one)

Sample identification

- Q - WATSTORE
- X - Lab File

For Laboratory Use Only

DICFS SYSTEM-LINE  
Station ID or Unique Number\*

463 53 600 1  
Project Account #

1991  
Year\*

05  
Month\*

22  
Day\*

1411  
Time\*

05  
Month

22  
Day

1434  
Time

N M  
State Code\*

035  
District/ User Code\*

001  
County Code

Begin Date

Composite End Date

Analysis level codes and schedules

PARAMETER:	6 Sample Medium**	Geologic Unit	(H) or 9 Analysis Status**	9 Analysis Source**	Hydrologic Condition**	9 Sample Type**	9 Hydrologic Event**
PARAMETER:	CHROMIUM, TOTAL		CHROMIUM, DISS		CHROMIUM HEXAVALENT TOTAL	CHROMIUM HEXAVALENT DISS.	NITRATE & NITRITE
METHOD:	SW3020/SW7191		SW3005/SW7191		SW7196	SW7196	E353.2
PARAMETER:	URANIUM, GROSS	ALPHA & BETA	VOC		VOX		TOC/TOX
METHOD:	A711B, E900		SW5030/SW8240		SW5030/SW3010		E415.1/SW9020
PARAMETER:	ICP, TOTAL		ICP, DISSOLVED				
METHOD:	SW3005/SW6010		SW3005/SW6010				

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 5/22/91 Time 1600

Relinquished by: (Signature) Received by: (Signature) Date Time

Relinquished by: (Signature) *(ENSECO-RMAC)* Received at lab by: (Signature) *Lee Mills* Date 5/23/91 Time 0800

Relinquished from lab by: (Signature) Received by: (Signature) Date Time

Comments (Only 50 characters stored in NWIS)

Record 5 PH = 6.16  
SPC = 0.7

Record 6

Total number of sample bottles for this request: 15

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