

6 of 8

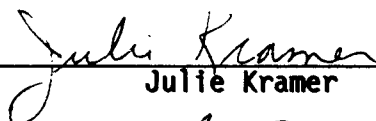


ANALYTICAL RESULTS  
FOR  
U.S. GEOLOGICAL SURVEY  
ENSECO-RMAL NO. 019110

Enseco  
A CORNING Company

JANUARY 16, 1992

Reviewed by:

  
Julie Kramer

  
Mark Dymerski



One

## I. OVERVIEW

On November 21, 1991, Enseco-Rocky Mountain Analytical Laboratory received two 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

No problems were associated with the analyses of these samples.

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
019110-0001-SA	KAFB010714-2	AQUEOUS	20 NOV 91	13:37	21 NOV 91
019110-0002-EB	KAFB010713-2	AQUEOUS	20 NOV 91	14:25	21 NOV 91

ANALYTICAL TEST REQUESTS  
for  
U.S. Geological Survey

Lab ID: 019110	Group Code	Analysis Description	Custom Test?
0001 - 0002	A	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
		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:

## Metals

Arsenic, selenium and thallium are customarily determined by graphite furnace atomic absorption (GFAA). All mercury determinations are by cold vapor atomic absorption. All other metals are determined using Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP).

All metals nominal reporting limits are statistically determined by analyzing a reagent blank seven times on three non-consecutive days. The standard deviations from each group of analyses are then summed (reporting limit = three times the standard deviation of a blank). The ability to attain the quoted reporting limits is verified each quarter. Reporting limits above nominal values are often reported since sample matrix interferences must be compensated for by dilutions prior to analysis or by the use of Method of Standard Additions. All GFAA reporting limits and results are verified by spike recoveries and represent the lowest attainable for each sample matrix. The metals reporting limits reported should not be viewed as quantitation limits. As recommended by the American Chemical Society Subcommittee on Environmental Analytical Chemistry (Analytical Chemistry 1980, 52, 2242-49), the Limit of Quantitation (LOQ) is equal to ten times the standard deviation of a blank or 3.3 times the reporting limit.

Metals

Total Metals

Client Name: U.S. Geological Survey  
 Client ID: KAFB010714-2  
 Lab ID: 019110-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 21 NOV 91

Sampled: 20 NOV 91  
 Prepared: See Below

Received: 21 NOV 91  
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	0.011	mg/L	0.010	7196	NA	21 NOV 91
Chromium	0.0097	mg/L	0.0020	7191	04 DEC 91	09 DEC 91

ND = Not detected  
 NA = Not applicable

Reported By: David Patterson

Approved By: Fred Velasquez

**Metals**

**Total Metals**

Client Name: U.S. Geological Survey  
 Client ID: KAFB010713-2  
 Lab ID: 019110-0002-EB  
 Matrix: AQUEOUS  
 Authorized: 21 NOV 91

Sampled: 20 NOV 91  
 Prepared: See Below

Received: 21 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	21 NOV 91
Chromium	ND	mg/L	0.0020	7191	04 DEC 91	09 DEC 91

ND = Not detected  
 NA = Not applicable

Reported By: David Patterson

Approved By: Fred Velasquez

Metals

Dissolved Metals

Client Name: U.S. Geological Survey

Client ID: KAFB010714-2

Lab ID: 019110-0001-SA

Matrix: AQUEOUS

Authorized: 21 NOV 91

Sampled: 20 NOV 91

Prepared: See Below

Received: 21 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	21 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: Fred Velasquez

**Metals**

**Dissolved Metals**

Client Name: U.S. Geological Survey  
 Client ID: KAFB010713-2  
 Lab ID: 019110-0002-EB  
 Matrix: AQUEOUS  
 Authorized: 21 NOV 91

Sampled: 20 NOV 91  
 Prepared: See Below

Received: 21 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	21 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: Fred Velasquez

General Inorganics

Client Name: U.S. Geological Survey  
 Client ID: KAFB010714-2  
 Lab ID: 019110-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 21 NOV 91

Sampled: 20 NOV 91  
 Prepared: See Below

Received: 21 NOV 91  
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	5.9	mg/L	0.50	A429	NA	04 DEC 91
Nitrate plus Nitrite	0.053	mg/L	0.050	353.2	NA	03 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: KAFB010713-2  
 Lab ID: 019110-0002-EB  
 Matrix: AQUEOUS  
 Authorized: 21 NOV 91

Sampled: 20 NOV 91  
 Prepared: See Below

Received: 21 NOV 91  
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	ND	mg/L	0.50	A429	NA	04 DEC 91
Nitrate plus Nitrite	ND	mg/L	0.050	353.2	NA	03 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  
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
019110-0001-SA	AQUEOUS	CR6-A	21 NOV 91-A	-
019110-0001-SA	AQUEOUS	CR-FAA-AT	04 DEC 91-A	04 DEC 91-A
019110-0001-SA	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
019110-0001-SA	AQUEOUS	CR6-AT	21 NOV 91-A	-
019110-0002-EB	AQUEOUS	CR6-A	21 NOV 91-A	-
019110-0002-EB	AQUEOUS	CR-FAA-AT	04 DEC 91-A	04 DEC 91-A
019110-0002-EB	AQUEOUS	CR-FAA-AD	09 DEC 91-G	-
019110-0002-EB	AQUEOUS	CR6-AT	21 NOV 91-A	-

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: 21 NOV 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0499	0.0486	0.0492	99	75-125	2.6	20	
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 04 DEC 91-A Concentration Units: mg/L									
Chromium	0.20	0.179	0.176	0.178	89	75-125	1.7	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: 21 NOV 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0499	0.0486	0.0492	99	75-125	2.6	20	

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

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METHOD BLANK REPORT  
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: CR-FAA-AT			
Matrix: AQUEOUS			
QC Lot: 04 DEC 91-A	QC Run: 04 DEC 91-A		
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)
019110-0001-SA	AQUEOUS	NO3-A	03 DEC 91-A	-
019110-0001-SA	AQUEOUS	CL-IC-A	04 DEC 91-N	-
019110-0002-EB	AQUEOUS	NO3-A	03 DEC 91-A	-
019110-0002-EB	AQUEOUS	CL-IC-A	04 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: 03 DEC 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: 04 DEC 91-N Concentration Units: mg/L									
Chloride	50	50.9	51.2	51.0	102	92-108	0.6	20	

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

# Appendix

ENSECO ANALYTICAL SERVICES REQUEST FORM

19110

**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

SAMPLE

Field ID

USGS/WRD/NEW MEX

KIRTLAND AFB  
 RP-SWMU'S

Miko Roybal  
 Collector

(505) 262-5344  
 Phone (FTS)

Station Name

Field Office

Project

Collector

File Deposition\*

Sample identification

Circle one)

Q - WATSTORE

X - Lab File

K A F 3 0 1 0 7 1 4 - 2

4 6 3 5 3 6 0 0 1

For Laboratory Use Only

Station ID or Unique Number\*

Project Account #

1 9 9 1  
 Year\*

1 1 2 0  
 Month\* Day\*

1 3 3 7  
 Time\*

1 1 2 0  
 Month\* Day\*

1 3 4 0  
 Time\*

N M  
 State Code\*

0 3 5  
 District/ User Code\*

0 0 1  
 County Code

Begin Date

Composite End Date

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 TX-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)	Received by: (Signature)	Date	Time
<i>Miko Roybal</i>	FEDERAL EXPRESS	11/20/91	1:00
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
	<i>Holly Jany</i>	11/21/91	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 SAMPLE FROM WELL AT LF 1

Record 6

Total number of sample bottles for this request: 6

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

19110 '2

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

Hazardous material  
EQ BLANK  
KAFBC10713-2  
Station Name

Field ID: USGS/WRD/NEW MEX  
Field Office: KIRTLAND AFB  
Project: IRP-SWMU'S  
Collector: Miko Roybal  
Site Type (circle one): ~~SW~~ Surface Water, ~~GW~~ Ground Water, ME Meteorological, SS Special Source  
Phone (FTS): (505) 262-5344

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

Sample identification  
For Laboratory Use Only: [ ]  
Station ID or Unique Number\*: K A F B C 1 0 7 1 3 - 2  
Project Account #: 4 6 3 5 3 . 6 0 0 1

1 9 9 1 Year\* 1 1 Month\* 2 0 Day\* 1 4 2 5 Time\*  
Begin Date: 11/20/91  
Composite End Date: 1/4/92  
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**	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:	<del>NOX</del>	/		/		/	
METHOD:	<del>SW5030/8010</del>	/		/		/	

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) \_\_\_\_\_ Date: 11/20/91 Time: 1600

Relinquished by: (Signature) \_\_\_\_\_ Received by: (Signature) \_\_\_\_\_ Date: 11/21/91 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 LFI

Record 6:

Total number of sample bottles for this request: 6

SHIP TO: DEBBIE FA 210/TONI STOVALL  
Enseco-Rocky Mountain Analytical  
4955 Yarrow Street  
Arvada, CO 80002  
(303) 421-6611

Project Number 19110  
 Client: USGS  
 Date Collected: 11-20  
 Special Instructions: \_\_\_\_\_

Accepted by Wet Chem Dept: BRETZ  
 Date: 1045 hrs  
 Time: 21 NOV 91

Raw Data: \_\_\_\_\_

Samples  
 Required Analysis

Holding Time Analysis					
ASAP					
Dissolved Oxygen (O <sub>2</sub> )					
Sulfite (SO <sub>3</sub> <sup>-2</sup> )					
24 Hours					
pH (S)					
pH (Dup.)					
pH (Quad)					
Conductivity (Single)					
Conductivity (Dup.)					
Conductivity (Quad)					
Alkalinity					
Chlorine Residual					
Chromium Hex (Cr <sup>+6</sup> )					
Coliform, Fecal					
Coliform, Total					
Odor					
48 Hours					
BOD					
Color					
MBAS-Surfactants					
Nitrite (NO <sub>2</sub> <sup>-</sup> ) (Spec) or Nitrate (NO <sub>3</sub> <sup>-</sup> ) (Tec)					
Nitrate (IC)					
Ortho-phosphate (Spec)					
Ortho-phosphate (IC)					
Turbidity					
Settleable Solids					
Other					
TDS (need conductance)					
Sulfide (D, AT)					
Ion Balance					

1,2

T.D. ✓