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ANALYTICAL RESULTS  
FOR  
U.S. GEOLOGICAL SURVEY  
ENSECO-RMAL NO. 015259

Enseco

JUNE 17, 1991

Reviewed by:

*Debbie Arzoo (for)*  
Randall Thompson

Lindsay Breyer



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## 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

The hexavalent chromium was analyzed June 5, 1991 at 11:50 a.m.

## 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
015259-0001-SA	KAFB060218-2	AQUEOUS	04 JUN 91	15:11	05 JUN 91

ANALYTICAL TEST REQUESTS  
for  
U.S. Geological Survey

Lab ID: 015259	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
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Chloride, Ion Chromatography, for Air Force Contracts	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.

Metals

Total Metals

Client Name: U.S. Geological Survey  
 Client ID: KAFB060218-2  
 Lab ID: 015259-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 05 JUN 91

Sampled: 04 JUN 91  
 Prepared: See Below

Received: 05 JUN 91  
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	05 JUN 91
Chromium	0.011	mg/L	0.0020	7191	07 JUN 91	10 JUN 91

ND = Not detected  
 NA = Not applicable

Reported By: Carla Owen

Approved By: Sandra Jones

Metals

Dissolved Metals

Client Name: U.S. Geological Survey  
 Client ID: KAFB060218-2  
 Lab ID: 015259-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 05 JUN 91

Sampled: 04 JUN 91  
 Prepared: See Below

Received: 05 JUN 91  
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium (VI)	ND	mg/L	0.010	7196	NA	05 JUN 91
Chromium	ND	mg/L	0.0020	7191	NA	10 JUN 91

ND = Not detected  
 NA = Not applicable

Reported By: Carla Owen

Approved By: Sandra Jones

General Inorganics

Client Name: U.S. Geological Survey  
 Client ID: KAFB060218-2  
 Lab ID: 015259-0001-SA  
 Matrix: AQUEOUS  
 Authorized: 05 JUN 91

Sampled: 04 JUN 91  
 Prepared: See Below

Received: 05 JUN 91  
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	29.8	mg/L	0.50	A429	NA	13 JUN 91
Nitrate plus Nitrite	22.1	mg/L	1.3	353.2	NA	10 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	06 JUN 91

ND = Not detected  
 NA = Not applicable

Reported By: Tammy Bailey

Approved By: Toni Stovall



## 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  
 Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
015259-0001-SA	AQUEOUS	CR-FAA-AT	07 JUN 91-A	07 JUN 91-A
015259-0001-SA	AQUEOUS	CR-FAA-AD	10 JUN 91-C	-
015259-0001-SA	AQUEOUS	CR6-AT	05 JUN 91-A	-
015259-0001-SA	AQUEOUS	CR6-A	05 JUN 91-A	-

DUPLICATE CONTROL SAMPLE REPORT  
 Metals Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average(%)		Precision (RPD)		
		DCS1	DCS2		DCS	Limits	DCS	Limit	
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 07 JUN 91-A Concentration Units: mg/L									
Chromium	0.20	0.213	0.208	0.210	105	75-125	2.4	0	
Category: CR-FAA-AD Matrix: AQUEOUS QC Lot: 10 JUN 91-C Concentration Units: mg/L									
Chromium	0.02	0.0207	0.0205	0.0206	103	75-125	1.0	0	
Category: CR6-AT Matrix: AQUEOUS QC Lot: 05 JUN 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0540	0.0546	0.0543	109	75-125	1.1	0	
Category: CR6-A Matrix: AQUEOUS QC Lot: 05 JUN 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0540	0.0546	0.0543	109	75-125	1.1	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: 07 JUN 91-A    QC Run: 07 JUN 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)
015259-0001-SA	AQUEOUS	NO3-A	10 JUN 91-A	-
015259-0001-SA	AQUEOUS	TOC-A	07 JUN 91-A	-
015259-0001-SA	AQUEOUS	TOX-A	06 JUN 91-A	-
015259-0001-SA	AQUEOUS	CL-IC-A	13 JUN 91-M	-

DUPLICATE CONTROL SAMPLE REPORT  
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average(%)		Precision (RPD)		
		DCS1	DCS2		DCS	Limits	DCS	Lim	
Category: NO3-A Matrix: AQUEOUS QC Lot: 10 JUN 91-A Concentration Units: mg/L									
Nitrate as N	7.1	7.50	7.38	7.44	105	91-109	1.6	1	
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	2	
Category: TOX-A Matrix: AQUEOUS QC Lot: 06 JUN 91-A Concentration Units: ug Cl/L									
Total Organic Halogen as Cl	100	96.3	95.0	95.6	96	80-120	1.4	2	
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 13 JUN 91-M Concentration Units: mg/L									
Chloride	20.0	19.9	20.1	20.0	100	92-108	1.0	20	

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



# Appendix

ENSECO ANALYTICAL SERVICES REQUEST FORM

RMA# 15049-C1

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

hazardous material  
SAMPLE

Station Name: KAFB 060218-2

Field ID: USGS/WRD/NEW MEX  
Field Office

Project: KIRTLAND AFB RP-SWMU'S

Collector: BILL DAM

Site Type (circle one)  
 SW - Surface Water  
 GW - Ground Water  
 ME - Meteorological  
 LK - Lake  
 ES - Estuary  
 SP - Spring  
 SS - Special Source  
 Phone (FTS): (505) 262-53

File Deposition\* (Circle one)

Q - WATSTORE  
X - Lab File

Sample identification

For Laboratory Use Only

Station ID or Unique Number\*: KAFB 060218-2

Project Account #: 463 53 600

Year: 99

Month: 06

Day: 04

Time: 1511

Month: 06

Day: 04

Time: 1521

State Code: NM

District/ User Code: 035

County Code: 001

Begin Date

Composite End Date

Analysis level codes and schedules

PARAMETER:	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 DISS.	NITRATE & NITRITE
METHOD:	SW3020/SW7191		SW3005/SW7191		SW7196	SW7196	E353.2
PARAMETER:	URANIUM, GROSS	ALPHA & BETA		VOC	VOC		TOC/TOX
METHOD:	A711B, E900		SW5030/SW8240	SW5030/SW8010			E415.1/SW9020
PARAMETER:	CHLORIDE, DISS						
METHOD:	A429						

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
Mike Royce	FEDERAL EXPRESS	6/4/91	1730
	Justin Chappel	6/5/91	0800

Comments (Only 50 characters stored in NWIS)

Record 5 SE GOLF COURSE POND

Record 6

Total number of sample bottles for this request: 7

SHIP TO:

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