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6 of 10
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ANALYTICAL RESULTS
FOR
U.S. GEOLOGICAL SURVEY
ENSECO-RMAL NO. 015245

Enseco

JUNE 17, 1991

Reviewed by:

Debbie Ferris (for)

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KAFB1131



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 Total Chrome VI holding time for sample 015245-0002 was exceeded.

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
015245-0001-SA	KAFB061008-2	AQUEOUS	03 JUN 91	13:00	04 JUN 91
015245-0002-SA	KAFB061007-2	AQUEOUS	03 JUN 91	14:20	04 JUN 91

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Lab ID: 015245	Group Code	Analysis Description	Custom Test?
0001 - 0002	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: KAFB061008-2
 Lab ID: 015245-0001-SA
 Matrix: AQUEOUS
 Authorized: 04 JUN 91

Sampled: 03 JUN 91
 Prepared: See Below

Received: 04 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	04 JUN 91
Chromium	0.015	mg/L	0.0020	7191	05 JUN 91	07 JUN 91

ND = Not detected
 NA = Not applicable

Reported By: Norma Baier

Approved By: Sandra Jones

Metals

Total Metals

Client Name: U.S. Geological Survey

Client ID: KAFB061007-2

Lab ID: 015245-0002-SA

Matrix: AQUEOUS

Authorized: 04 JUN 91

Sampled: 03 JUN 91

Prepared: See Below

Received: 04 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	10 JUN 91
Chromium	ND	mg/L	0.0020	7191	05 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: KAFB061008-2
 Lab ID: 015245-0001-SA
 Matrix: AQUEOUS
 Authorized: 04 JUN 91

Sampled: 03 JUN 91
 Prepared: See Below

Received: 04 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	04 JUN 91
Chromium	0.0059	mg/L	0.0020	7191	NA	06 JUN 91

ND = Not detected
 NA = Not applicable

Reported By: Norma Baier

Approved By: Sandra Jones

Metals

Dissolved Metals

Client Name: U.S. Geological Survey

Client ID: KAFB061007-2

Lab ID: 015245-0002-SA

Matrix: AQUEOUS

Authorized: 04 JUN 91

Sampled: 03 JUN 91

Prepared: See Below

Received: 04 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	04 JUN 91
Chromium	ND	mg/L	0.0020	7191	NA	06 JUN 91

ND = Not detected
NA = Not applicable

Reported By: Norma Baier

Approved By: Sandra Jones

General Inorganics

Client Name: U.S. Geological Survey
Client ID: KAFB061008-2
Lab ID: 015245-0001-SA
Matrix: AQUEOUS
Authorized: 04 JUN 91

Sampled: 03 JUN 91
Prepared: See Below

Received: 04 JUN 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	29.3	mg/L	0.50	A429	NA	13 JUN 91
Nitrate plus Nitrite	23.2	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

General Inorganics

Client Name: U.S. Geological Survey
Client ID: KAFB061007-2
Lab ID: 015245-0002-SA
Matrix: AQUEOUS
Authorized: 04 JUN 91

Sampled: 03 JUN 91
Prepared: See Below

Received: 04 JUN 91
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chloride	0.53	mg/L	0.50	A429	NA	13 JUN 91
Nitrate plus Nitrite	ND	mg/L	0.050	353.2	NA	10 JUN 91
Total Organic Carbon	5.2	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)
015245-0001-SA	AQUEOUS	CR-FAA-AT	05 JUN 91-C	05 JUN 91-C
015245-0001-SA	AQUEOUS	CR-FAA-AD	06 JUN 91-A	-
015245-0001-SA	AQUEOUS	CR6-AT	04 JUN 91-A	-
015245-0001-SA	AQUEOUS	CR6-A	04 JUN 91-A	-
015245-0002-SA	AQUEOUS	CR-FAA-AT	05 JUN 91-C	05 JUN 91-C
015245-0002-SA	AQUEOUS	CR-FAA-AD	06 JUN 91-A	-
015245-0002-SA	AQUEOUS	CR6-AT	10 JUN 91-A	-
015245-0002-SA	AQUEOUS	CR6-A	04 JUN 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	Limit	
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 05 JUN 91-C Concentration Units: mg/L									
Chromium	0.20	0.211	0.210	0.210	105	75-125	0.5	20	
Category: CR-FAA-AD Matrix: AQUEOUS QC Lot: 06 JUN 91-A Concentration Units: mg/L									
Chromium	0.02	0.0199	0.0224	0.0212	106	75-125	12	20	
Category: CR6-AT Matrix: AQUEOUS QC Lot: 04 JUN 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0549	0.0486	0.0518	104	75-125	12	20	
Category: CR6-A Matrix: AQUEOUS QC Lot: 04 JUN 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0549	0.0486	0.0518	104	75-125	12	20	
Category: CR6-AT Matrix: AQUEOUS QC Lot: 10 JUN 91-A Concentration Units: mg/L									
Chromium (VI)	0.05	0.0531	0.0497	0.0514	103	75-125	6.6	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-C	QC Run: 05 JUN 91-C		
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)
015245-0001-SA	AQUEOUS	NO3-A	10 JUN 91-A	-
015245-0001-SA	AQUEOUS	TOC-A	07 JUN 91-A	-
015245-0001-SA	AQUEOUS	TOX-A	06 JUN 91-A	-
015245-0001-SA	AQUEOUS	CL-IC-A	13 JUN 91-M	-
015245-0002-SA	AQUEOUS	NO3-A	10 JUN 91-A	-
015245-0002-SA	AQUEOUS	TOC-A	07 JUN 91-A	-
015245-0002-SA	AQUEOUS	TOX-A	06 JUN 91-A	-
015245-0002-SA	AQUEOUS	CL-IC-A	13 JUN 91-M	-

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration			AVG	Accuracy		Precision		
	Spiked	DCS1	Measured DCS2		Average(%) DCS	Limits	(RPD) DCS	Limit	
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	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: 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	20	
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

18245-01

Special Handling

(Circle as appropriate and explain in record 5)

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

Hazardous material
 (SAMPLE)
 KAFB 061008-2
 Station Name

Field ID: USGS/WRD/NEW MEX
 Field Office: KIRTLAND AFB
 Project: IRP-SWMU'S
 Collector: BILL DAM
 Phone (FTS): (505) 262-5341

File Deposition*

(Circle one)
 Q - WATSTORE
 X - Lab File

Sample identification

[Blank Box]
 For Laboratory Use Only

K A F B 061008-2
 Station ID or Unique Number*
 463 53 600 1
 Project Account #

Year: 99
 Month: 06
 Day: 03
 Time: 1300
 Composite End Date: 06 03 1310
 State Code: NM
 District/User Code: 035
 County Code: 001

Analysis level codes and schedules

Sample Medium**	Geologic Unit	Analysis Status**	Analysis Source**	Hydrologic Condition	Sample Type	Hydrologic Event**
PARAMETER: CHROMIUM, TOTAL		(H) or 9	9	CHROMIUM HEXAVALENT TOTAL	9	9
METHOD: SW3020/SW7191		CHROMIUM, DISS	SW3005/SW7191	SW7196	CHROMIUM HEXAVALENT DISS.	SW7196
PARAMETER: URANIUM, GROSS	ALPHA'S		VOC			NITRATE & NITRITE
METHOD: A711B, E900	BETA		SW5030/SW8240	SW5030/SW8010		E353.2
PARAMETER: CHLORIDE, DISS						TOC/TOX
METHOD: A429						E415.1/SW9020

Chain-of-Custody Record

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

Relinquished by: (Signature) Miko Ryzel	Received by: (Signature) FEDERAL EXPRESS	Date 6/3/91	Time 1630
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Received at lab by: (Signature) L. MAL	Date 06-04-91	Time 0800
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

Comments (Only 50 characters stored in NWIS)

Record 5: SW 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

ENSECO ANALYTICAL SERVICES REQUEST FORM

15058-02

Special Handling

(Circle as appropriate and explain in record 5)

Hazardous material
EQUIPMENT BLANK
KAFB061007-2

Station Name

Field ID

USGS/WRD/NEW MEX
Field Office

SW - Surface Water
GW - Ground Water
ME - Meteorological

Site Type (circle one)

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

KIRTLAND AFB
IRP-SWMU'S
Project

BILL DAM
Collector

(505) 262-5341
Phone (FTS)

File Deposition*

(Circle one)
Q - WATSTORE
X - Lab File

Sample identification

[Blank Box]
For Laboratory Use Only

K A F B 061007-2
Station ID or Unique Number*

463536001
Project Account #

1991
Year*

06 03
Month* Day*

1420
Time*

06 03
Month Day

1430
Time

Composite End Date

N M
State Code*

035
District/
User Code*

001
County
Code

Analysis level codes and schedules

	6	(H) or 9	9	9	9	9	
	Sample Medium**	Geologic Unit	Analysis Status**	Analysis Source**	Hydrologic Condition**	Sample Type**	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		5415.1/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 Roybal	FEDERAL EXPRESS	6/3/91	1630
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Received at lab by: (Signature)	Date	Time
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time
	ALMA	06-04-91	0800

Comments (Only 50 characters stored in NWIS)

Record 5 EQUIPMENT BLANK
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