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ANALYTICAL RESULTS
FOR
U.S. GEOLOGICAL SURVEY
ENSECO-RMAL NO. 011192

OCTOBER 4, 1990

KAFB1055



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**ANALYTICAL RESULTS
FOR
U.S. GEOLOGICAL SURVEY
ENSECO-RMAL NO. 011192**



OCTOBER 4, 1990

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ANALYTICAL RESULTS
FOR
U.S. GEOLOGICAL SURVEY
ENSECO-RMAL NO. 011192

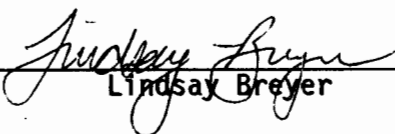


OCTOBER 4, 1990

Reviewed by:



Randall Thompson



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

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
011192-0001-SA	KAFB061003-2	AQUEOUS	31 AUG 90	13:40	01 SEP 90
011192-0001-MB	DIOXIN METHOD BLANK	AQUEOUS			01 SEP 90

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Lab ID: 011192	Group Code	Analysis Description	Custom Test?
0001	A	Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Nitrate Plus Nitrite	N
		Chromium, Furnace AA	N
		Chromium, Furnace AA (Total)	N
		Prep - Total Metals, ICP	N
		Appendix IX Herbicides	N
		Prep - Herbicides by GC	N
		Appendix IX C14-C16 Dioxins and Furans	N
		Prep- Low Res. Method 8280 Extraction for Dioxins/Furans	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.

Appendix IX Dioxins/Furans

Low Resolution

Client Name: U.S. Geological Survey
 Client ID: KAFB061003-2
 Lab ID: 011192-0001-SA
 Matrix: AQUEOUS
 Authorized: 01 SEP 90
 Sampled: 31 AUG 90
 Prepared: 07 SEP 90
 Received: 01 SEP 90
 Analyzed: 16 SEP 90

Sample Amount 500 MLS
 Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	ng/L	0.053	
PeCDFs (total)	ND	ng/L	0.095	
HxCDFs (total)	ND	ng/L	0.10	
Dioxins				
TCDDs (total)	ND	ng/L	0.086	
2,3,7,8-TCDD	ND	ng/L	0.086	
PeCDDs (total)	ND	ng/L	0.17	
HxCDDs (total)	ND	ng/L	0.20	

Parameter	Result	Units	Detection Limit	Data Qualifiers
% Recovery				
13C-2,3,7,8-TCDF	52			
13C-2,3,7,8-TCDD	57			
13C-1,2,3,7,8-PeCDD	56			
13C-1,2,3,6,7,8-HxCDD	61			

ND = Not detected
 NA = Not applicable

Reported By: Bob Martin

Approved By: Jeff Lowry

Appendix IX Herbicides

Method 8150

Client Name: U.S. Geological Survey
Client ID: KAFB061003-2
Lab ID: 011192-0001-SA
Matrix: AQUEOUS
Authorized: 01 SEP 90

Sampled: 31 AUG 90
Prepared: 05 SEP 90

Received: 01 SEP 90
Analyzed: 28 SEP 90

Parameter	Result	Units	Reporting Limit
2,4-D	ND	ug/L	1.2
2,4,5-T	ND	ug/L	0.20
2,4,5-TP (Silvex)	ND	ug/L	0.17
Surrogate	Recovery		
DCAA	61	%	

ND = Not detected
NA = Not applicable

Reported By: Susan McCool

Approved By: Jeff Lowry

Metals

Total Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB061003-2
 Lab ID: 011192-0001-SA
 Matrix: AQUEOUS
 Authorized: 01 SEP 90

Sampled: 31 AUG 90
 Prepared: See Below

Received: 01 SEP 90
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.051	mg/L	0.0050	7191	14 SEP 90	18 SEP 90

ND = Not detected
 NA = Not applicable

Reported By: Mike Befort

Approved By: Dave Roberts

Metals

Dissolved Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB061003-2
 Lab ID: 011192-0001-SA
 Matrix: AQUEOUS
 Authorized: 01 SEP 90

Sampled: 31 AUG 90
 Prepared: See Below

Received: 01 SEP 90
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.0050	7191	NA	18 SEP 90

ND = Not detected
 NA = Not applicable

Reported By: Mike Befort

Approved By: Dave Roberts

General Inorganics

Client Name: U.S. Geological Survey
Client ID: KAFB061003-2
Lab ID: 011192-0001-SA
Matrix: AQUEOUS
Authorized: 01 SEP 90

Sampled: 31 AUG 90
Prepared: See Below

Received: 01 SEP 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Nitrate plus Nitrite	26.0	mg/L	1.0	353.2	NA	06 SEP 90
Total Organic Carbon	1.6	mg/L	0.50	9060	NA	07 SEP 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	18 SEP 90

ND = Not detected
NA = Not applicable

Reported By: Steve Pope

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
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011192-0001-SA	AQUEOUS	8280-AP9-A	17 JUL 90-A	-
011192-0001-MB	AQUEOUS	8280-AP9-A	17 JUL 90-A	-

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Spiked	Concentration		AVG	Accuracy		Precision	
		DCS1	Measured DCS2		Average(%) DCS	Limits	(RPD) DCS Limit	DCS Limit
Category: 8280-AP9-A								
Matrix: AQUEOUS								
QC Lot: 17 JUL 90-A								
Concentration Units: ng/L								
2,3,7,8-TCDF	10.0	9.50	9.98	9.74	97	60-140	4.9	20
1,2,3,7,8-PeCDF	10.0	10.3	10.1	10.2	102	60-140	2.0	20
1,2,3,4,7,8-HeCDF	10.0	10.2	10.3	10.2	103	60-140	1.0	20
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NC	NC	60-140	NC	20
OCDF	NA	NA	NA	NC	NC	60-140	NC	20
2,3,7,8-TCDD	10.0	9.59	10.2	9.90	99	60-140	6.2	20
1,2,3,7,8-PeCDD	10.0	10.1	10.0	10.0	101	60-140	1.0	20
1,2,3,4,7,8-HeCDD	10.0	9.93	10.1	10.0	100	60-140	1.7	20
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NC	NC	60-140	NC	20
OCDD	NA	NA	NA	NC	NC	60-140	NC	20

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

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

Appendix IX Dioxins/Furans

Low Resolution

Client Name: U.S. Geological Survey
 Client ID: DIOXIN METHOD BLANK
 Lab ID: 011192-0001-MB
 Matrix: AQUEOUS
 Authorized: 01 SEP 90
 Sampled: NA
 Prepared: 07 SEP 90
 Received: NA
 Analyzed: 16 SEP 90

Sample Amount 500 MLS
 Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
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Furans

TCDFs (total)	ND	ng/L	0.022	
PeCDFs (total)	ND	ng/L	0.053	
HxCDFs (total)	ND	ng/L	0.10	

Dioxins

TCDDs (total)	ND	ng/L	0.053	
2,3,7,8-TCDD	ND	ng/L	0.053	
PeCDDs (total)	ND	ng/L	0.061	
HxCDDs (total)	ND	ng/L	0.15	

Parameter	Result	Units	Detection Limit	Data Qualifiers
-----------	--------	-------	-----------------	-----------------

% Recovery

13C-2,3,7,8-TCDF	82
13C-2,3,7,8-TCDD	84
13C-1,2,3,7,8-PeCDD	81
13C-1,2,3,6,7,8-HxCDD	86

ND = Not detected
 NA = Not applicable

Reported By: Bob Martin

Approved By: Jeff Lowry

QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011192-0001-SA	AQUEOUS	615-A	05 SEP 90-A	05 SEP 90-A

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC

Analyte	Spiked	Concentration		AVG	Accuracy		Precision		
		DCS1	Measured DCS2		DCS	Average(%) Limits	(RPD) DCS Limit	DCS Limit	
Category: 615-A									
Matrix: AQUEOUS									
QC Lot: 05 SEP 90-A									
Concentration Units: ug/L									
2,4-D	5.0	4.75	4.71	4.73	95	19-129	0.9	54	
2,4,5-TP (Silvex)	1.0	0.922	0.919	0.920	92	23-127	0.3	39	
2,4,5-T	1.0	1.04	1.03	1.04	104	40-112	1.0	20	

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

SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Category: 615-A				
Matrix: AQUEOUS				
QC Lot: 05 SEP 90-A QC Run: 05 SEP 90-A				
Concentration Units: ug/L				
DCAA	5.00	6.02	120	60-120

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

METHOD BLANK REPORT
Semivolatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 8150-AP9-A			
Matrix: AQUEOUS			
QC Lot: 05 SEP 90-A QC Run: 05 SEP 90-A			
2,4-D	ND	ug/L	1.2
2,4,5-TP (Silvex)	ND	ug/L	0.17
2,4,5-T	ND	ug/L	0.20

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011192-0001-SA	AQUEOUS	CR-FAA-AD	18 SEP 90-A	-
011192-0001-SA	AQUEOUS	CR-FAA-AT	14 SEP 90-A	14 SEP 90-A

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

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Spiked	Concentration		AVG	Accuracy		Precision		
		DCS1	Measured DCS2		Average(%) DCS	Limits	(RPD) DCS Limit	DCS Limit	
Category: CR-FAA-AD Matrix: AQUEOUS QC Lot: 18 SEP 90-A Concentration Units: mg/L									
Chromium	0.02	0.0188	0.0185	0.0186	93	75-125	1.6	20	
Category: CR-FAA-AT Matrix: AQUEOUS QC Lot: 14 SEP 90-A Concentration Units: mg/L									
Chromium	0.20	0.212	0.217	0.214	107	75-125	2.3	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: 14 SEP 90-A QC Run: 14 SEP 90-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)
011192-0001-SA	AQUEOUS	TOC-A	07 SEP 90-A	-
011192-0001-SA	AQUEOUS	TOX-A	18 SEP 90-A	-
011192-0001-SA	AQUEOUS	NO3-A	06 SEP 90-B	-

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: TOC-A Matrix: AQUEOUS QC Lot: 07 SEP 90-A Concentration Units: mg/L									
Total Organic Carbon	25	25.6	25.8	25.7	103	91-109	0.8	20	
Category: TOX-A Matrix: AQUEOUS QC Lot: 18 SEP 90-A Concentration Units: ug Cl/L									
Total Organic Halogen as Cl	100	95.9	93.9	94.9	95	80-120	2.1	20	
Category: NO3-A Matrix: AQUEOUS QC Lot: 06 SEP 90-B Concentration Units: mg/L									
Nitrate as N	5.4	5.40	5.59	5.50	102	91-109	3.5	10	

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



Appendix

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

KAFB061003-2

Station Name

USGS/WRD/NEW MEXICO SWMU

Field Office

Project

USGS

Collector

(505) 262-6678
Phone (FTS)
BILL DAM

File Deposition* (Circle one)

Q - WATSTORE
X - Lab File

[Empty box for Laboratory Use Only]

For Laboratory Use Only

Sample identification

KAFB061003-2

Station ID or Unique Number*

463536001

Project Account #

1990
Year*

08
Month*

31
Day*

1340
Time*

08
Month

31
Day

1420
Time

NM
State Code*

035
District/ User Code*

001
County Code

Begin Date

Composite End Date

6=GW
9=SW

Analysis level codes and schedules

1 = SPIKE
5 = DUPLICATE
9 = REGULAR

J = STORM
9 = ROUTINE

6
Sample Medium**

Geologic Unit

H or 9
Analysis Status**

GS FIELD
MAGE-LAB
G
Analysis Source**

9
Hydrologic Condition**

9
Sample Type**

9
Hydrologic Event**

PARAMETER:

METHOD:

TOC
SW 9060

TOX
SW 9020

NO2+NO3
E 353.2

DISSOLVED CHROMIUM
SW 3005/SW 791

TOTAL CHROMIUM
SW 3020/SW 791

PARAMETER:

METHOD:

VOC
SW 5030/SW 8010

APP. IX
VOC
SW 5030/SW 8240

APP. IX
DIOXIN-FURANS
SW 3520/SW 8280

APP. IX
HERBICIDES
SW 3520/SW 8150

PARAMETER:

METHOD:

APPENDIX IX ICP, DISSOLVED
Co, Cu, Fe, Pb, Mn, Mo, Ni, V, Zn
SW 3005/SW 6010

APPENDIX IX ICP TOTAL
Co, Cu, Fe, Pb, Mn, Mo, Ni, V, Zn
SW 3010/SW 6010

PARAMETER:

METHOD:

APP. IX SEMI-VOC
SW 3520/SW 8270

Chain-of-Custody Record

PROJECT NAME KIRTLAND AFB SWMU

PROJECT NO. 463536001 P.O. NO.

Relinquished by: (Signature)

Received by: (Signature)

Date

Time

[Signature]

AIRBORNE EXPRESS

900831

1730

Relinquished by: (Signature)

Received by: (Signature)

Date

Time

Relinquished by: (Signature)

Received at lab by: (Signature)

Date

Time

[Signature] RMAL

09-01-90

1330

Relinquished from lab by: (Signature)

Received by: (Signature)

Date

Time

Comments (Only 50 characters stored in NWIS)

Record 5 GOLF COURSE POND WELL NR SW CORNER

Record 6

Total number of sample bottles for this request:

6 plus SHIP TO:
1 EXTRA
APPENDIX
IX GCC

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

ATTENTION: THOMPSON, BREYER OR MCDEVITT