

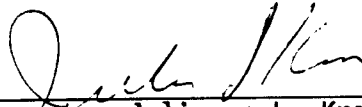
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7 of 11

ANALYTICAL RESULTS
FOR
U.S. GEOLOGICAL SURVEY
ENSECO-RMAL NO. 022921

July 02, 1992

Reviewed by:



Julieann L. Kramer


Mark Dymerski

KAFB1233


I. OVERVIEW

On May 20, 1992, Enseco-Rocky Mountain Analytical Laboratory received two aqueous samples from U.S. Geological Survey.

*See
H. 22-22-92
2-1-92
2-1-92 5-2*

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

Standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory QC samples analyzed in conjunction with the samples in this project were within established control limits.

The URANIUM analysis for sample 022921-0001 was inadvertently over looked. I reassigned this sample and test to project 023696-0001.

Method 8280 Dioxin analysis was performed by our sister laboratory Enseco California Analytical Laboratory under Enseco CAL project number 064243. Dioxin results are included as an appendix to the report provided by RMAL.

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 Date	Sampled Time	Received Date
022921-0001-SA	KAFB060813-2 - Sample	AQUEOUS	19 MAY 92	13:00	20 MAY 92
022921-0002-SA	KAFB060814-2 - Trip Blank	AQUEOUS	19 MAY 92	07:25	20 MAY 92

ANALYTICAL TEST REQUESTS
for
U.S. Geological Survey

Page 2 of 2

Lab ID: 022921	Group Code	Analysis Description	Custom Test?
		Screen - Volatile Organics Volatiles Library Search (10 Compound TID)	N N

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:

Volatile Organics

- a) The cis- and trans-isomers of 1,2-dichloroethene cannot be distinguished using EPA Method 624 or 8240. All dichloroethene present is reported as 1,2-dichloroethene (total).
- b) Due to the chemical nature of ethanol, this component cannot be consistently recovered using EPA Method 624 or 8240. This component is reported with a NR (Not Recoverable) in place of a reporting limit.
- c) Methylene chloride and acetone are common laboratory contaminants in GC/MS analysis. We have programs in place to minimize contamination, occasionally these compounds will be found at low levels in samples.

Semivolatile Organics

- a) Benzo(b) and benzo(k) fluoranthene cannot be differentiated based on their mass spectra; retention times are almost identical. The isomer which is the closest in retention time to the sample is reported.
- b) 1,2-diphenylhydrazine is measured as azobenzene.
- c) Diphenylamine cannot be distinguished from N-nitrosodiphenylamine.
- d) 3-Methyl phenol and 4-methyl phenol cannot be differentiated because their mass spectra and retention times are almost identical. Results are reported as 3/4-methyl phenol (or m&p-cresols).
- e) Several Appendix IX and Refinery List compounds are not consistently recovered using Method 8270, and reporting limits cannot be established. These compounds include: dimethoate, famphur, hexachlorophene, 4-nitroquinoline-1-oxide, 4-phenylenediamine, and benzenethiol.
- f) Two Refinery List compounds, pyridine and quinoline, are not recovered after alumina column cleanup.

- g) Bis-2-(ethyl)hexyl-phthalate is a common laboratory contaminant in GC/MS analysis. We have programs in place to minimize this contamination, occasionally these compounds will be found at low levels in samples.

Metals

All nominal reporting limits for metals have been established from instrument detection limit (IDL) evaluations and represent the level above which reliable data can be routinely obtained. Low level standards are analyzed seven times on three non-consecutive days on each instrument. The standard deviations of the three runs are summed to yield the IDL. Nominal reporting limits are generally 2-5 times the IDL (consistent with the American Chemical Society definition for the Limit of Quantification). The ability to achieve these quoted reporting limits is verified each quarter. Reporting limits above the nominal levels are often submitted due to matrix interferences or elevated analyte levels.

Reporting limits for metals analyzed by Inductively Coupled Plasma (ICP) are typically raised only for dilution due to an analyte exceeding the instrument linear range. Background and interelement interferences are corrected automatically and do not require dilution.

Metals analyzed by Graphite Furnace Atomic Absorption (GFAA) are subject to matrix interferences. Consequently, Enseco protocol is to analyze a spiked aliquot with every sample. The severity of the interference, based upon analyte level and spike recovery, is assessed against specific criteria and the need for an elevated reporting limit or dilution is determined.

The analysis of mercury by Cold Vapor Atomic Absorption (CVAA) is generally free from matrix interferences. As with ICP, reporting limits are raised only for dilution due to a sample concentration exceeding the linear range of the instrument.

Reporting limits for metals analyzed by inductively coupled plasma - mass spectrometry (ICPMS) may be raised for dilution due to an analyte exceeding the linear range of the instrument or matrix interference. An internal standard is analyzed with each sample to measure the degree of matrix interference - a dilution is performed when appropriate. Isobaric and

molecular interferences are corrected at the instrument and do not require dilution.

Tentatively Identified Compounds

This report presents results for the "identification" of unknown compounds that were detected in the GC/MS analysis. The results from this work are presented as "tentatively identified compounds" (TIC). The approach used for reporting TICs was based on the protocol established for this purpose in the EPA Superfund methods and on guidelines established by the American Chemical Society (ACS).

In summary, the mass spectrum of chromatographic peaks in concentrations in excess of 10% of the internal standard were obtained. Normally, the number of unknown compounds identified is limited to 10 compounds in the volatile fraction and 20 compounds in the semivolatile fraction. Each mass spectrum was then compared to a library of over 30,000 reference spectra in a computerized "library search." The three "best" matches obtained by the computer were hardcopied along with the mass spectrum of the unknown peak. This information was then reviewed by an analyst who "identified" the compound based on the available information.

All identifications were based on the "Guidelines for GC/MS Identification" developed by the American Chemical Society (Environmental Science and Technology, 1982, 16 143A). As recommended in these guidelines, identifications of unknown substances were reported with a level of confidence. The three levels of confidence cited in the ACS guidelines and used in this report are as follows:

Level 3: Confirmed Identification

The identification is based on the analysis of an authentic standard.

Level 2: Confident Identification

Good agreement was observed between the unknown compound and a specific library spectrum.

Level 1: Tentative Identification

The unknown compound is only indicative of a specific library spectrum.

Class Identification

The unknown compound was not similar to a specific library spectrum, but it did contain ions characteristic of a class of compounds (saturated hydrocarbon, chlorinated hydrocarbon, etc.).

If there were no library spectra similar to the unknown, and it could not be assigned to a particular class of compounds, the compound is reported as "unknown."

Quantitation of TICs is based on the total ionization peak area relative to an internal standard, assuming a response factor of one. Accordingly, the reported concentration is an estimate.

In general, mass spectrometry cannot distinguish isomers (compounds with the same molecular formula). Therefore, an identified compound may be any one of several different isomers.

Volatile Organics
Appendix IX List
Method 8240

Client Name: U.S. Geological Survey
Client ID: KAFB060813-2
Lab ID: 022921-0001-SA
Matrix: AQUEOUS
Authorized: 21 MAY 92

Sampled: 19 MAY 92
Prepared: 26 MAY 92

Received: 21 MAY 92
Analyzed: 02 JUN 92

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Acetonitrile	ND	ug/L	200
Acrolein	ND	ug/L	100
Acrylonitrile	ND	ug/L	100
Allyl chloride	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Chloroprene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,2-Dibromo-3-chloro- propane (DBCP)	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	10
Dibromomethane	ND	ug/L	5.0
trans-1,4-Dichloro- 2-butene	ND	ug/L	5.0
Dichlorodifluoromethane	ND	ug/L	20
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
1,4-Dioxane	ND	ug/L	500
Ethylbenzene	ND	ug/L	5.0
Ethyl methacrylate	ND	ug/L	20
Iodomethane	ND	ug/L	5.0
Isobutanol	ND	ug/L	200
2-Hexanone	ND	ug/L	10
Methacrylonitrile	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Debbie Coyle

Approved By: Mark Pokorny

Volatile Organics
 Appendix IX List
 Method 8240

Client Name: U.S. Geological Survey
 Client ID: KAFB060813-2
 Lab ID: 022921-0001-SA
 Matrix: AQUEOUS
 Authorized: 21 MAY 92

Sampled: 19 MAY 92
 Prepared: 26 MAY 92

Received: 21 MAY 92
 Analyzed: 02 JUN 92

Parameter	Result	Units	Reporting Limit
Methyl methacrylate	ND	ug/L	20
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Propionitrile	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	101	%	
4-Bromofluorobenzene	94	%	
1,2-Dichloroethane-d4	99	%	

ND = Not detected
 NA = Not applicable

Reported By: Debbie Coyle

Approved By: Mark Pokorny

TENTATIVELY IDENTIFIED COMPOUNDS
FOR
U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 022921-0001

<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.

Volatile Organics
Appendix IX List
Method 8240

Client Name: U.S. Geological Survey
Client ID: KAFB060814-2
Lab ID: 022921-0002-SA
Matrix: AQUEOUS
Authorized: 21 MAY 92

Sampled: 19 MAY 92
Prepared: 26 MAY 92

Received: 21 MAY 92
Analyzed: 02 JUN 92

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Acetonitrile	ND	ug/L	200
Acrolein	ND	ug/L	100
Acrylonitrile	ND	ug/L	100
Allyl chloride	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Chloroprene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,2-Dibromo-3-chloro- propane (DBCP)	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	10
Dibromomethane	ND	ug/L	5.0
trans-1,4-Dichloro- 2-butene	ND	ug/L	5.0
Dichlorodifluoromethane	ND	ug/L	20
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
1,4-Dioxane	ND	ug/L	500
Ethylbenzene	ND	ug/L	5.0
Ethyl methacrylate	ND	ug/L	20
Iodomethane	ND	ug/L	5.0
Isobutanol	ND	ug/L	200
2-Hexanone	ND	ug/L	10
Methacrylonitrile	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Debbie Coyle

Approved By: Mark Pokorny

**Volatile Organics
Appendix IX List
Method 8240**

Client Name: U.S. Geological Survey
Client ID: KAFB060814-2
Lab ID: 022921-0002-SA
Matrix: AQUEOUS
Authorized: 21 MAY 92

Sampled: 19 MAY 92
Prepared: 26 MAY 92

Received: 21 MAY 92
Analyzed: 02 JUN 92

Parameter	Result	Units	Reporting Limit
Methyl methacrylate	ND	ug/L	20
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Propionitrile	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	98	%	
4-Bromofluorobenzene	90	%	
1,2-Dichloroethane-d4	103	%	

ND = Not detected
NA = Not applicable

Reported By: Debbie Coyle

Approved By: Mark Pokorny

TENTATIVELY IDENTIFIED COMPOUNDS

FOR

U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 022921-0002

<u>Compound Name</u>	<u>Fraction</u>	<u>Confidence Level</u>	<u>Estimated Concentration ug/L</u>
Propane, 2-methoxy-2-methyl-	VOA	1	9.0

NOTES:

Confidence Levels

- Level 3 - Confirmed Identification
- Level 2 - Confident Identification
- Level 1 - Tentative Identification

Please refer to the discussion for further details.

Semivolatile Organics
 Appendix IX List
 Method 8270

Client Name: U.S. Geological Survey
 Client ID: KAFB060813-2
 Lab ID: 022921-0001-SA
 Matrix: AQUEOUS
 Authorized: 21 MAY 92

Sampled: 19 MAY 92
 Prepared: 25 MAY 92

Received: 21 MAY 92
 Analyzed: 26 JUN 92

Parameter	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro- phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
bis(2-Chloroethoxy)- methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)- ether	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10

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ND = Not detected
 NA = Not applicable

Reported By: Paul Smith

Approved By: Mark Pokorny

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: U.S. Geological Survey
Client ID: KAFB060813-2
Lab ID: 022921-0001-SA
Matrix: AQUEOUS
Authorized: 21 MAY 92

Sampled: 19 MAY 92
Prepared: 25 MAY 92

Received: 21 MAY 92
Analyzed: 26 JUN 92

Parameter	Result	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethylamine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-2-methylphenol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Disulfoton bis(2-Ethylhexyl)phthalate	ND	ug/L	50
Ethyl methanesulfonate	ND	ug/L	10
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Methyl parathion	ND	ug/L	50
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Paul Smith

Approved By: Mark Pokorny

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: U.S. Geological Survey
Client ID: KAFB060813-2
Lab ID: 022921-0001-SA
Matrix: AQUEOUS
Authorized: 21 MAY 92

Sampled: 19 MAY 92
Prepared: 25 MAY 92

Received: 21 MAY 92
Analyzed: 26 JUN 92

Parameter	Result	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Parathion	ND	ug/L	50
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	100
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	20
Safrole	ND	ug/L	10
Sulfotepp	ND	ug/L	50
1,2,4,5-Tetrachloro-benzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	50
Thionazin	ND	ug/L	50

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Paul Smith

Approved By: Mark Pokorny

Semivolatile Organics
 Appendix IX List
 Method 8270

Client Name: U.S. Geological Survey
 Client ID: KAFB060813-2
 Lab ID: 022921-0001-SA
 Matrix: AQUEOUS
 Authorized: 21 MAY 92

Sampled: 19 MAY 92
 Prepared: 25 MAY 92

Received: 21 MAY 92
 Analyzed: 26 JUN 92

Parameter	Result	Units	Reporting Limit
2-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
0,0,0-Triethylphosphorothioate	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
1,3,5-Trinitrobenzene	ND	ug/L	10
Surrogate	Recovery		
Nitrobenzene-d5	74	%	
2-Fluorobiphenyl	69	%	
Terphenyl-d14	75	%	
Phenol-d5	69	%	
2-Fluorophenol	70	%	
2,4,6-Tribromophenol	76	%	

ND = Not detected
 NA = Not applicable

Reported By: Paul Smith

Approved By: Mark Pokorny

TENTATIVELY IDENTIFIED COMPOUNDS

FOR

U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER 022921-0001

<u>Compound Name</u>	<u>Fraction</u>	<u>Confidence Level</u>	<u>Estimated Concentration ug/L</u>
None Detected	BNA		

NOTES:

Confidence Levels

- Level 3 - Confirmed Identification
- Level 2 - Confident Identification
- Level 1 - Tentative Identification

Please refer to the discussion for further details.

Chlorinated Pesticides and PCB's
Appendix IX List
Method 8080

Client Name: U.S. Geological Survey
Client ID: KAFB060813-2
Lab ID: 022921-0001-SA
Matrix: AQUEOUS
Authorized: 21 MAY 92

Sampled: 19 MAY 92
Prepared: 24 MAY 92

Received: 20 MAY 92
Analyzed: 04 JUN 92

Parameter	Result	Units	Reporting Limit	
Aldrin	ND	ug/L	0.050	T
Aroclor 1016	ND	ug/L	1.0	
Aroclor 1221	ND	ug/L	1.0	
Aroclor 1232	ND	ug/L	1.0	
Aroclor 1242	ND	ug/L	1.0	
Aroclor 1248	ND	ug/L	1.0	
Aroclor 1254	ND	ug/L	1.0	
Aroclor 1260	ND	ug/L	1.0	
alpha-BHC	ND	ug/L	0.050	
beta-BHC	ND	ug/L	0.050	
delta-BHC	ND	ug/L	0.050	
gamma-BHC (Lindane)	ND	ug/L	0.050	
alpha-Chlordane	ND	ug/L	0.050	
gamma-Chlordane	ND	ug/L	0.050	
Chlorobenzilate	ND	ug/L	0.10	
4,4'-DDD	ND	ug/L	0.10	
4,4'-DDE	ND	ug/L	0.10	
4,4'-DDT	ND	ug/L	0.10	
Diallate	ND	ug/L	1.0	
Dieldrin	ND	ug/L	0.10	
Endosulfan I	ND	ug/L	0.050	
Endosulfan II	ND	ug/L	0.10	
Endosulfan sulfate	ND	ug/L	0.10	
Endrin	ND	ug/L	0.10	
Endrin aldehyde	ND	ug/L	0.10	
Heptachlor	ND	ug/L	0.050	
Heptachlor epoxide	ND	ug/L	0.050	
Isodrin	ND	ug/L	0.10	
Kepone	ND	ug/L	1.0	
Methoxychlor	ND	ug/L	0.50	
Toxaphene	ND	ug/L	5.0	
Surrogate	Recovery			
Dibutyl chlorendate	79	%		

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

ND = Not detected
NA = Not applicable

Reported By: Lue Lor

Approved By: Donna Reinwald

Appendix IX Herbicides

Method 8150

Client Name: U.S. Geological Survey
 Client ID: KAFB060813-2
 Lab ID: 022921-0001-SA
 Matrix: AQUEOUS
 Authorized: 21 MAY 92

Sampled: 19 MAY 92
 Prepared: 24 MAY 92

Received: 21 MAY 92
 Analyzed: 03 JUN 92

Parameter	Result	Units	Reporting Limit	
2,4-D	ND	ug/L	1.2	T
2,4,5-TP (Silvex)	ND	ug/L	0.17	
2,4,5-T	ND	ug/L	0.20	
Surrogate	Recovery			
DCAA	80	%		

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

ND = Not detected
 NA = Not applicable

Reported By: Susan McCool

Approved By: Donna Reinwald

Metals

Total Metals

Client Name: U.S. Geological Survey

Client ID: KAFB060813-2

Lab ID: 022921-0001-SA

Matrix: AQUEOUS

Authorized: 21 MAY 92

Sampled: 19 MAY 92

Prepared: See Below

Received: 21 MAY 92

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Antimony	ND	mg/L	0.060	6010	04 JUN 92	09 JUN 92
Arsenic	ND	mg/L	0.0050	7060	04 JUN 92	09 JUN 92
Barium	0.067	mg/L	0.010	6010	04 JUN 92	09 JUN 92
Beryllium	ND	mg/L	0.0020	6010	04 JUN 92	09 JUN 92
Cadmium	ND	mg/L	0.0050	6010	04 JUN 92	09 JUN 92
Chromium	ND	mg/L	0.010	6010	04 JUN 92	09 JUN 92
Cobalt	ND	mg/L	0.010	6010	04 JUN 92	09 JUN 92
Copper	ND	mg/L	0.020	6010	04 JUN 92	09 JUN 92
Lead	ND	mg/L	0.0050	7421	04 JUN 92	09 JUN 92
Mercury	ND	mg/L	0.00020	7470	02 JUN 92	02 JUN 92
Nickel	ND	mg/L	0.040	6010	04 JUN 92	09 JUN 92
Selenium	ND	mg/L	0.0050	7740	04 JUN 92	09 JUN 92
Silver	ND	mg/L	0.010	6010	04 JUN 92	09 JUN 92
Thallium	ND	mg/L	0.010	7841	04 JUN 92	09 JUN 92
Tin	ND	mg/L	0.10	6010	04 JUN 92	09 JUN 92
Vanadium	ND	mg/L	0.010	6010	04 JUN 92	09 JUN 92
Zinc	ND	mg/L	0.020	6010	04 JUN 92	09 JUN 92

ND = Not detected
NA = Not applicable

Reported By: Scott Moroschan

Approved By: Dave Roberts

Metals

Dissolved Metals

Client Name: U.S. Geological Survey
 Client ID: KAFB060813-2
 Lab ID: 022921-0001-SA
 Matrix: AQUEOUS
 Authorized: 21 MAY 92

Sampled: 19 MAY 92
 Prepared: See Below

Received: 21 MAY 92
 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Antimony	ND	mg/L	0.060	6010	NA	18 JUN 92
Arsenic	ND	mg/L	0.0050	7060	NA	09 JUN 92
Barium	0.070	mg/L	0.010	6010	NA	18 JUN 92
Beryllium	ND	mg/L	0.0020	6010	NA	18 JUN 92
Cadmium	ND	mg/L	0.0050	6010	NA	18 JUN 92
Chromium	ND	mg/L	0.010	6010	NA	18 JUN 92
Cobalt	ND	mg/L	0.010	6010	NA	18 JUN 92
Copper	ND	mg/L	0.020	6010	NA	18 JUN 92
Lead	ND	mg/L	0.0050	7421	NA	09 JUN 92
Mercury	ND	mg/L	0.00020	7470	02 JUN 92	02 JUN 92
Nickel	ND	mg/L	0.040	6010	NA	18 JUN 92
Selenium	ND	mg/L	0.0050	7740	NA	09 JUN 92
Silver	ND	mg/L	0.010	6010	NA	18 JUN 92
Thallium	ND	mg/L	0.010	7841	NA	09 JUN 92
Tin	ND	mg/L	0.10	6010	NA	18 JUN 92
Vanadium	ND	mg/L	0.010	6010	NA	18 JUN 92
Zinc	ND	mg/L	0.020	6010	NA	18 JUN 92

ND = Not detected
 NA = Not applicable

Reported By: Scott Moroschan

Approved By: Dave Roberts

General Inorganics

Client Name: U.S. Geological Survey
Client ID: KAFB060813-2
Lab ID: 022921-0001-SA
Matrix: AQUEOUS
Authorized: 21 MAY 92

Sampled: 19 MAY 92
Prepared: See Below

Received: 21 MAY 92
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Cyanide	ND	mg/L	0.010	9012	NA	25 MAY 92
Nitrate plus Nitrite	25.7	mg/L	2.5	353.2	NA	14 JUN 92
Sulfide, Total	ND	mg/L	0.050	376.2	NA	21 MAY 92

ND = Not detected
NA = Not applicable

Reported By: Matt Coyle

Approved By: Kathryn Okonzak

Radiochemistry

Client Name: U.S. Geological Survey
Client ID: KAFB060813-2
Lab ID: 022921-0001-SA
Matrix: AQUEOUS
Authorized: 21 MAY 92

Sampled: 19 MAY 92
Prepared: See Below

Received: 21 MAY 92
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Gross Alpha	3.9	pCi/L	(+/- 2.7)	900.0	NA	27 MAY 92
Gross Beta	1.2	pCi/L	(+/- 2.8)	900.0	NA	27 MAY 92

ND = Not detected
NA = Not applicable

Reported By: Kathryn Okonzak

Approved By: Lori Sherman

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
Volatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
022921-0001-SA	AQUEOUS	624-A	27 MAY 92-F	02 JUN 92-F
022921-0002-SA	AQUEOUS	624-A	27 MAY 92-F	02 JUN 92-F

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: 27 MAY 92-F								
Concentration Units: ug/L								
1,1-Dichloroethene	50	24.6	28.1	26.4	53	56-138	13	20
Trichloroethene	50	48.2	45.2	46.7	93	76-109	6.4	13
Benzene	50	55.3	53.1	54.2	108	78-119	4.1	12
Toluene	50	45.4	46.5	46.0	92	82-114	2.4	13
Chlorobenzene	50	53.2	54.4	53.8	108	84-117	2.2	10

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: 27 MAY 92-F QC Run: 02 JUN 92-F Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	49.5	99	82-112
4-Bromofluorobenzene	50.0	45.6	91	83-113
Toluene-d8	50.0	51.9	104	90-112

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: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 27 MAY 92-F	QC Run: 02 JUN 92-F		
Acetone	ND	ug/L	10
Acetonitrile	ND	ug/L	200
Acrolein	ND	ug/L	100
Acrylonitrile	ND	ug/L	100
Allyl chloride	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Chloroprene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,2-Dibromo-3-chloro- propane (DBCP)	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	10
Dibromomethane	ND	ug/L	5.0
trans-1,4-Dichloro- 2-butene	ND	ug/L	5.0
Dichlorodifluoromethane	ND	ug/L	20
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
1,4-Dioxane	ND	ug/L	500
Ethylbenzene	ND	ug/L	5.0
Ethyl methacrylate	ND	ug/L	20
Iodomethane	ND	ug/L	5.0
Isobutanol	ND	ug/L	200
2-Hexanone	ND	ug/L	10
Methacrylonitrile	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0

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

Analyte	Result	Units	Reporting Limit
Test: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 27 MAY 92-F QC Run: 02 JUN 92-F			
Methyl methacrylate	ND	ug/L	20
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Propionitrile	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0

Test: 8240CP-AP9-AP
 Matrix: AQUEOUS
 QC Lot: 27 MAY 92-F QC Run: 02 JUN 92-F

Acetone	ND	ug/L	10
Acetonitrile	ND	ug/L	200
Acrolein	ND	ug/L	100
Acrylonitrile	ND	ug/L	100
Allyl chloride	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Chloroprene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0

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

Analyte	Result	Units	Reporting Limit
Test: 8240CP-AP9-AP			
Matrix: AQUEOUS			
QC Lot: 27 MAY 92-F QC Run: 02 JUN 92-F			
1,2-Dibromo-3-chloro- propane (DBCP)	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	10
Dibromomethane	ND	ug/L	5.0
trans-1,4-Dichloro- 2-butene	ND	ug/L	5.0
Dichlorodifluoromethane	ND	ug/L	20
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
1,4-Dioxane	ND	ug/L	500
Ethylbenzene	ND	ug/L	5.0
Ethyl methacrylate	ND	ug/L	20
Iodomethane	ND	ug/L	5.0
Isobutanol	ND	ug/L	200
2-Hexanone	ND	ug/L	10
Methacrylonitrile	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
Methyl methacrylate	ND	ug/L	20
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Propionitrile	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Trichlorofluoromethane	ND	ug/L	5.0
1,2,3-Trichloropropane	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0

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)
022921-0001-SA	AQUEOUS	625-A	21 MAY 92-6A	25 MAY 92-6A

DUPLICATE CONTROL SAMPLE REPORT
 Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average (%)		Precision (RPD)	
		DCS1	DCS2		DCS	Limits	DCS	Limit
Category: 625-A								
Matrix: AQUEOUS								
QC Lot: 21 MAY 92-6A								
Concentration Units: ug/L								
Phenol	100	71.8	74.6	73.2	73	42-109	3.8	33
2-Chlorophenol	100	75.0	77.8	76.4	76	50-104	3.7	38
1,4-Dichlorobenzene	50	31.3	31.2	31.2	63	31-101	0.3	33
N-Nitroso-di-n-propylamine	50	40.0	40.8	40.4	81	49-109	2.0	30
1,2,4-Trichlorobenzene	50	31.3	29.2	30.2	61	29-100	6.9	33
4-Chloro-3-methylphenol	100	86.0	82.6	84.3	84	48-112	4.0	37
Acenaphthene	50	35.5	32.7	34.1	68	48- 99	8.2	27
4-Nitrophenol	100	89.7	81.5	85.6	86	29-124	9.6	53
2,4-Dinitrotoluene	50	39.1	38.3	38.7	77	52-104	2.1	26
Pentachlorophenol	100	97.9	95.9	96.9	97	25-132	2.1	49
Pyrene	50	34.6	40.0	37.3	75	51-116	14	26

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

SINGLE CONTROL SAMPLE REPORT
 Semivolatile Organics by GC/MS

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Category: 625-A				
Matrix: AQUEOUS				
QC Lot: 21 MAY 92-6A QC Run: 25 MAY 92-6A				
Concentration Units: ug/L				
Nitrobenzene-d5	100	83.3	83	44-103
2-Fluorobiphenyl	100	74.7	75	41- 99
Terphenyl-d14	100	102	102	41-126
2-Fluorophenol	200	144	72	37-100
Phenol-d5	200	147	74	25-112
2,4,6-Tribromophenol	200	168	84	40-115

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

METHOD BLANK REPORT
 Semivolatile Organics by GC/MS

Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A			
Matrix: AQUEOUS			
QC Lot: 21 MAY 92-6A	QC Run: 25 MAY 92-6A		
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro- phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
bis(2-Chloroethoxy)- methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)- ether	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	2.9	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10

J

J = Result is detected below the reporting limit or is an estimated concentration.

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

Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A			
Matrix: AQUEOUS			
QC Lot: 21 MAY 92-6A QC Run: 25 MAY 92-6A			
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethylamine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-2-methylphenol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Disulfoton	ND	ug/L	50
bis(2-Ethylhexyl) phthalate	1.8	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Methyl parathion	ND	ug/L	50
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10

J

J = Result is detected below the reporting limit or is an estimated concentration.

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

Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A			
Matrix: AQUEOUS			
QC Lot: 21 MAY 92-6A QC Run: 25 MAY 92-6A			
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Parathion	ND	ug/L	50
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	100
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	20
Safrole	ND	ug/L	10
Sulfotepp	ND	ug/L	50
1,2,4,5-Tetrachlorobenzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	50
Thionazin	ND	ug/L	50

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

Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A			
Matrix: AQUEOUS			
QC Lot: 21 MAY 92-6A QC Run: 25 MAY 92-6A			
2-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
2,4,6-Trichlorophenol	ND	ug/L	10
0,0,0-Triethylphosphoro- thioate	ND	ug/L	10
1,3,5-Trinitrobenzene	ND	ug/L	10

QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
022921-0001-SA	AQUEOUS	608-A	01 MAY 92-6A	24 MAY 92-6A
022921-0001-SA	AQUEOUS	615-A	18 MAY 92-7A	24 MAY 92-7A

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC

Analyte	Concentration Spiked	Concentration Measured		AVG	Accuracy Average(%)		Precision (RPD)		
		DCS1	DCS2		DCS	Limits	DCS	Limit	
Category: 608-A									
Matrix: AQUEOUS									
QC Lot: 01 MAY 92-6A									
Concentration Units: ug/L									
gamma-BHC (Lindane)	0.200	0.189	0.195	0.192	96	56-111	3.1	12	
Heptachlor	0.200	0.194	0.201	0.193	99	50-121	3.5	21	
Aldrin	0.200	0.180	0.185	0.182	91	49-109	2.7	16	
Dieldrin	0.500	0.459	0.479	0.469	94	47-111	4.3	13	
Endrin	0.500	0.481	0.499	0.490	98	50-123	3.7	16	
4,4'-DDT	0.500	0.489	0.529	0.509	102	45-117	7.9	14	

Category: 615-A
 Matrix: AQUEOUS
 QC Lot: 18 MAY 92-7A
 Concentration Units: ug/L

2,4-D	5.0	3.43	3.46	3.44	69	36-126	0.9	33
2,4,5-TP (Silvex)	1.0	0.811	0.844	0.828	83	52-135	4.0	28
2,4,5-T	1.0	0.790	0.807	0.798	80	41-158	2.1	34

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: 608-A Matrix: AQUEOUS QC Lot: 01 MAY 92-6A QC Run: 24 MAY 92-6A Concentration Units: ug/L				
Dibutyl chlorendate	1.00	0.741	74	41-135
Category: 615-A Matrix: AQUEOUS QC Lot: 18 MAY 92-7A QC Run: 24 MAY 92-7A Concentration Units: ug/L				
DCAA	5.00	3.80	76	51-138

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

METHOD BLANK REPORT
Semivolatle Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 8080CP-AP9-A			
Matrix: AQUEOUS			
QC Lot: 01 MAY 92-6A QC Run: 24 MAY 92-6A			
Aldrin	ND	ug/L	0.050
Aroclor 1016	ND	ug/L	1.0
Aroclor 1221	ND	ug/L	1.0
Aroclor 1232	ND	ug/L	1.0
Aroclor 1242	ND	ug/L	1.0
Aroclor 1248	ND	ug/L	1.0
Aroclor 1254	ND	ug/L	1.0
Aroclor 1260	ND	ug/L	1.0
alpha-BHC	ND	ug/L	0.050
beta-BHC	ND	ug/L	0.050
delta-BHC	ND	ug/L	0.050
gamma-BHC (Lindane)	ND	ug/L	0.050
alpha-Chlordane	ND	ug/L	0.050
gamma-Chlordane	ND	ug/L	0.050
Chlorobenzilate	ND	ug/L	0.10
4,4'-DDD	ND	ug/L	0.10
4,4'-DDE	ND	ug/L	0.10
4,4'-DDT	ND	ug/L	0.10
Diallate	ND	ug/L	1.0
Dieldrin	ND	ug/L	0.10
Endosulfan I	ND	ug/L	0.050
Endosulfan II	ND	ug/L	0.10
Endosulfan sulfate	ND	ug/L	0.10
Endrin	ND	ug/L	0.10
Endrin aldehyde	ND	ug/L	0.10
Heptachlor	ND	ug/L	0.050
Heptachlor epoxide	ND	ug/L	0.050
Isodrin	ND	ug/L	0.10
Kepone	ND	ug/L	1.0
Methoxychlor	ND	ug/L	0.50
Toxaphene	ND	ug/L	5.0

Test: 8150-AP9-A
 Matrix: AQUEOUS
 QC Lot: 18 MAY 92-7A QC Run: 24 MAY 92-7A

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)
022921-0001-SA	AQUEOUS	ICP-AT	04 JUN 92-H7	04 JUN 92-H7
022921-0001-SA	AQUEOUS	ICP-AD	18 JUN 92-M7	-
022921-0001-SA	AQUEOUS	AS-FAA-AD	09 JUN 92-G7	-
022921-0001-SA	AQUEOUS	AS-FAA-AT	04 JUN 92-H7	04 JUN 92-H7
022921-0001-SA	AQUEOUS	PB-FAA-AD	09 JUN 92-L7	-
022921-0001-SA	AQUEOUS	PB-FAA-AT	04 JUN 92-H7	04 JUN 92-H7
022921-0001-SA	AQUEOUS	SE-FAA-AD	09 JUN 92-L7	-
022921-0001-SA	AQUEOUS	SE-FAA-AT	04 JUN 92-H7	04 JUN 92-H7
022921-0001-SA	AQUEOUS	TL-FAA-AD	09 JUN 92-G7	-
022921-0001-SA	AQUEOUS	TL-FAA-AT	04 JUN 92-H7	04 JUN 92-H7
022921-0001-SA	AQUEOUS	HG-CVAA-AT	02 JUN 92-E7	02 JUN 92-E7
022921-0001-SA	AQUEOUS	HG-CVAA-AT	02 JUN 92-E7	02 JUN 92-E7

DUPLICATE CONTROL SAMPLE REPORT
 Metals Analysis and Preparation

Analyte	Concentration			AVG	Accuracy Average (%)		Precision (RPD)	
	Spiked	DCS1	Measured DCS2		DCS	Limits	DCS	Limit
Category: ICP-AT								
Matrix: AQUEOUS								
QC Lot: 04 JUN 92-H7								
Concentration Units: mg/L								
Aluminum	2.0	2.21	1.86	2.04	102	75-125	17	20
Antimony	0.5	0.491	0.508	0.500	100	75-125	3.4	20
Arsenic	0.5	0.416	0.384	0.400	80	75-125	7.9	20
Barium	2.0	1.86	1.85	1.85	93	75-125	0.5	20
Beryllium	0.05	0.0462	0.0462	0.0462	92	75-125	0.2	20
Cadmium	0.05	0.0455	0.0465	0.0460	92	75-125	2.2	20
Calcium	100	96.0	88.7	92.4	92	75-125	7.9	20
Chromium	0.2	0.170	0.168	0.169	85	75-125	1.0	20
Cobalt	0.5	0.434	0.435	0.435	87	75-125	0.2	20
Copper	0.25	0.240	0.239	0.240	96	75-125	0.6	20
Iron	1.0	1.19	0.967	1.08	108	75-125	21	20
Lead	0.5	0.416	0.413	0.414	83	75-125	0.7	20
Magnesium	50	47.7	46.8	47.3	95	75-125	2.0	20
Manganese	0.5	0.468	0.463	0.466	93	75-125	1.1	20
Nickel	0.5	0.452	0.440	0.446	89	75-125	2.9	20
Potassium	50	46.6	45.5	46.0	92	75-125	2.4	20
Silver	0.05	0.0430	0.0433	0.0432	86	75-125	0.6	20
Sodium	100	99.3	96.7	98.0	98	75-125	2.7	20
Vanadium	0.5	0.456	0.455	0.456	91	75-125	0.2	20
Zinc	0.5	0.455	0.442	0.449	90	75-125	2.8	20

Category: ICP-AD
 Matrix: AQUEOUS
 QC Lot: 18 JUN 92-M7
 Concentration Units: mg/L

Aluminum	1.0	0.945	0.958	0.951	95	85-115	1.3	10
Antimony	1.0	0.970	0.980	0.975	98	85-115	1.0	10
Arsenic	1.0	0.954	0.975	0.965	96	85-115	2.2	10
Barium	1.0	0.973	0.961	0.967	97	85-115	1.2	10
Beryllium	1.0	0.955	0.947	0.951	95	85-115	0.8	10
Cadmium	1.0	0.958	0.953	0.956	96	85-115	0.5	10
Calcium	20	20.1	20.1	20.1	101	85-115	0.3	10
Chromium	1.0	0.975	0.971	0.973	97	85-115	0.4	10
Cobalt	1.0	0.945	0.942	0.944	94	85-115	0.3	10
Copper	1.0	0.975	0.969	0.972	97	85-115	0.6	10
Iron	1.0	0.963	0.953	0.958	96	85-115	1.1	10
Lead	1.0	0.935	0.926	0.930	93	85-115	0.9	10
Magnesium	20	20.1	19.9	20.0	100	85-115	1.1	10

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-AD									
Matrix: AQUEOUS									
QC Lot: 18 JUN 92-M7									
Concentration Units: mg/L									
Manganese	1.0	0.950	0.945	0.948	95	85-115	0.5	10	
Nickel	1.0	0.937	0.935	0.936	94	85-115	0.3	10	
Potassium	20	20.7	20.0	20.3	102	85-115	3.2	10	
Silver	1.0	0.963	0.956	0.959	96	85-115	0.8	10	
Sodium	200	212	196	204	102	85-115	7.8	10	
Vanadium	1.0	0.977	0.965	0.971	97	85-115	1.2	10	
Zinc	1.0	0.959	0.958	0.958	96	85-115	0.1	10	

Category: AS-FAA-AD
 Matrix: AQUEOUS
 QC Lot: 09 JUN 92-G7
 Concentration Units: mg/L

Arsenic	0.03	0.0261	0.0303	0.0282	94	75-125	15	20
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Category: AS-FAA-AT
 Matrix: AQUEOUS
 QC Lot: 04 JUN 92-H7
 Concentration Units: mg/L

Arsenic	0.03	0.0324	0.0344	0.0334	111	75-125	6.0	20
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Category: PB-FAA-AD
 Matrix: AQUEOUS
 QC Lot: 09 JUN 92-L7
 Concentration Units: mg/L

Lead	0.03	0.0341	0.0346	0.0344	115	75-125	1.5	20
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Category: PB-FAA-AT
 Matrix: AQUEOUS
 QC Lot: 04 JUN 92-H7
 Concentration Units: mg/L

Lead	0.03	0.0324	0.0330	0.0327	109	75-125	1.8	20
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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: SE-FAA-AD Matrix: AQUEOUS QC Lot: 09 JUN 92-L7 Concentration Units: mg/L									
Selenium	0.03	0.0285	0.0239	0.0262	87	75-125	18	20	
Category: SE-FAA-AT Matrix: AQUEOUS QC Lot: 04 JUN 92-H7 Concentration Units: mg/L									
Selenium	0.03	0.0237	0.0234	0.0236	79	75-125	1.3	20	
Category: TL-FAA-AD Matrix: AQUEOUS QC Lot: 09 JUN 92-G7 Concentration Units: mg/L									
Thallium	0.03	0.0289	0.0272	0.0280	94	75-125	6.1	20	
Category: TL-FAA-AT Matrix: AQUEOUS QC Lot: 04 JUN 92-H7 Concentration Units: mg/L									
Thallium	0.03	0.0238	0.0283	0.0260	87	75-125	17	20	
Category: HG-CVAA-AT Matrix: AQUEOUS QC Lot: 02 JUN 92-E7 Concentration Units: mg/L									
Mercury	0.0010	0.000899	0.00102	0.000959	96	75-125	13	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: ICP-AP9-AT			
Matrix: AQUEOUS			
QC Lot: 04 JUN 92-H7 QC Run: 04 JUN 92-H7			
Antimony	ND	mg/L	0.060
Barium	ND	mg/L	0.010
Beryllium	ND	mg/L	0.0020
Cadmium	ND	mg/L	0.0050
Chromium	ND	mg/L	0.010
Cobalt	ND	mg/L	0.010
Copper	ND	mg/L	0.020
Nickel	ND	mg/L	0.040
Silver	ND	mg/L	0.010
Tin	ND	mg/L	0.10
Vanadium	ND	mg/L	0.010
Zinc	ND	mg/L	0.020

Test: AS-FAA-AT
 Matrix: AQUEOUS
 QC Lot: 04 JUN 92-H7 QC Run: 04 JUN 92-H7

Arsenic	ND	mg/L	0.0050
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Test: PB-FAA-AT
 Matrix: AQUEOUS
 QC Lot: 04 JUN 92-H7 QC Run: 04 JUN 92-H7

Lead	ND	mg/L	0.0050
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Test: SE-FAA-AT
 Matrix: AQUEOUS
 QC Lot: 04 JUN 92-H7 QC Run: 04 JUN 92-H7

Selenium	ND	mg/L	0.0050
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METHOD BLANK REPORT
 Metals Analysis and Preparation (cont.)

Analyte	Result	Units	Reporting Limit
Test: TL-FAA-AT Matrix: AQUEOUS QC Lot: 04 JUN 92-H7 QC Run: 04 JUN 92-H7			
Thallium	ND	mg/L	0.0050
Test: HG-CVAA-AD Matrix: AQUEOUS QC Lot: 02 JUN 92-E7 QC Run: 02 JUN 92-E7			
Mercury	ND	mg/L	0.00020
Test: HG-CVAA-AT Matrix: AQUEOUS QC Lot: 02 JUN 92-E7 QC Run: 02 JUN 92-E7			
Mercury	ND	mg/L	0.00020

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)
022921-0001-SA	AQUEOUS	CN-A	25 MAY 92-7B	25 MAY 92-7B
022921-0001-SA	AQUEOUS	S-A	21 MAY 92-7B	-
022921-0001-SA	AQUEOUS	NO3-A	14 JUN 92-7L	-

DUPLICATE CONTROL SAMPLE REPORT
 Wet Chemistry Analysis and Preparation

Analyte	Spiked	Concentration		Measured	AVG	Accuracy		Precision	
		DCS1	DCS2			DCS	Limits	(RPD)	DCS Limit
Category: CN-A Matrix: AQUEOUS QC Lot: 25 MAY 92-7B Concentration Units: mg/L									
Cyanide	0.20	0.178	0.186	0.182	91	75-125	4.4	20	
Category: S-A Matrix: AQUEOUS QC Lot: 21 MAY 92-7B Concentration Units: mg/L									
Sulfide, Total	0.494	0.441	0.484	0.462	94	80-120	9.3	20	
Category: NO3-A Matrix: AQUEOUS QC Lot: 14 JUN 92-7L Concentration Units: mg/L									
Nitrate as N	2.0	2.01	1.95	1.98	99	91-109	3.0	10	

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

METHOD BLANK REPORT
 Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: CNTOT-TEC-A Matrix: AQUEOUS QC Lot: 25 MAY 92-7B QC Run: 25 MAY 92-7B			
Cyanide	ND	mg/L	0.010

TABLE OF CONTENTS

ENSECO CAL LAB PROJECT NUMBER 064243

Case Narrative

Quality Assurance Program

Sample Description Information

Chain of Custody Documentation

Client Purchase Order

Appendix IX Dioxins/Furans

Includes Samples: 1

Duplicate Control Sample Report

Method Blank Report/Sample Data Sheets

CASE NARRATIVE

ENSECO CAL LAB PROJECT NUMBER 064243

There were no anomalies associated with this report.

ENSECO CAL LAB'S QUALITY ASSURANCE PROGRAM

Enseco Cal Lab has implemented an extensive Quality Assurance (QA) program to ensure the production of scientifically sound, legally defensible data of known documental quality. A key element of this program is Enseco's Laboratory Control Sample (LCS) system. Controlling lab operations with LCS (as opposed to matrix spike/matrix spike duplicate samples), allows the lab to differentiate between bias as a result of procedural errors versus bias due to matrix effects. The analyst can then identify and implement the appropriate corrective actions at the bench level, without waiting for extensive senior level review or costly and time-consuming sample re-analyses. The LCS program also provides our client with information to assess batch, and overall laboratory performance.

Laboratory Control Samples - (LCS)

Laboratory Control Samples (LCS) are well-characterized, laboratory generated samples used to monitor the laboratory's day-to-day performance of routine analytical methods. The results of the LCS are compared to well-defined laboratory acceptance criteria to determine whether the laboratory system is "in control". Three types of LCS are routinely analyzed: Duplicate Control Samples (DCS), Single Control Samples (SCS), and method blanks. Each of these LCS are described below.

Duplicate Control Samples. A DCS is a well-characterized matrix (blank water, sand, sodium sulfate or celite) which is spiked with certain target parameters and analyzed at approximately 10% of the sample load in order to establish method-specific control limits.

Single Control Samples. An 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 control sample identical to the DCS serves as the control sample. An SCS is prepared for each sample lot. Accuracy is calculated identically to the DCS.

Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

SAMPLE DESCRIPTION INFORMATION
for
Enseco, Inc.

Lab ID	Client ID	Matrix	Sampled		Received
			Date	Time	Date
064243-0001-SA	22921-01	AQUEOUS	19 MAY 92	13:00	22 MAY 92
064243-0001-MB	Method Blank	AQUEOUS			22 MAY 92

Appendix IX Dioxins/Furans

DUPLICATE CONTROL SAMPLE REPORT
 Special Services - Low Resolution Mass Spectrometry

Analyte	Concentration		Measured	AVG	Accuracy		Precision	
	Spiked	DCS1			DCS2	Average (%)	Limits	(RPD)

Category: DXNFUR-A
 Matrix: AQUEOUS
 QC Lot: 20 MAY 92-A
 Concentration Units:

Warning *** No components were found.

Category: DXNFUR-A
 Matrix: AQUEOUS
 QC Lot: 20 MAY 92-B
 Concentration Units: ng

2,3,7,8-TCDF	10	11.0	11.0	11.0	110	60-140	0.0	50.0
2,3,4,7,8-PeCDF	10	9.40	10.0	9.70	97	60-140	6.2	50.0
1,2,3,4,7,8-HxCDF	10	9.40	10.0	9.70	97	60-140	6.2	50.0
1,2,3,4,6,7,8-HpCDF	10	9.80	9.00	9.40	94	60-140	8.5	50.0
OCDF	50	60.0	65.0	62.5	125	60-140	8.0	50.0
2,3,7,8-TCDD	10	9.90	12.0	11.0	110	60-140	19	50.0
1,2,3,7,8-PeCDD	10	10.0	11.0	10.5	105	60-140	9.5	50.0
1,2,3,4,7,8-HxCDD	10	9.50	11.0	10.2	103	60-140	15	50.0
1,2,3,4,6,7,8-HpCDD	10	9.40	9.60	9.50	95	60-140	2.1	50.0
OCDD	50	55.0	61.0	58.0	116	60-140	10	50.0

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

APPENDIX IX DIOXINS/FURANS

LOW RESOLUTION

Client Name: Enseco, Inc.
 Client ID: Method Blank
 Lab ID: 064243-0001-MB
 Matrix: AQUEOUS
 Authorized: 22 MAY 92
 Sampled: NA
 Prepared: 26 MAY 92
 Received: NA
 Analyzed: 28 MAY 92

Sample Amount 1.00 L
 Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	ng/L	0.033	
PeCDFs (total)	ND	ng/L	0.058	
HxCDFs (total)	ND	ng/L	0.76	
Dioxins				
TCDDs (total)	ND	ng/L	0.12	
2,3,7,8-TCDD	ND	ng/L	0.12	
PeCDDs (total)	ND	ng/L	0.17	
HxCDDs (total)	ND	ng/L	0.22	
% Recovery				
13C-2,3,7,8-TCDF	76			
13C-2,3,7,8-TCDD	79			
13C-1,2,3,7,8-PeCDD	85			
13C-1,2,3,6,7,8-HxCDD	89			

ND = Not detected
 NA = Not applicable

Reported By: Robert Hrabak

Approved By: Shelly Eyraud

The cover letter is an integral part of this report.
 Rev 230787

APPENDIX IX DIOXINS/FURANS

LOW RESOLUTION

Client Name: Enseco, Inc.
 Client ID: 22921-01
 Lab ID: 064243-0001-SA
 Matrix: AQUEOUS
 Authorized: 22 MAY 92

Sampled: 19 MAY 92
 Prepared: 26 MAY 92

Received: 22 MAY 92
 Analyzed: 28 MAY 92

Sample Amount 0.974 L
 Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	ng/L	0.038	
PeCDFs (total)	ND	ng/L	0.063	
HxCDFs (total)	ND	ng/L	0.13	
Dioxins				
TCDDs (total)	ND	ng/L	0.069	
2,3,7,8-TCDD	ND	ng/L	0.069	
PeCDDs (total)	ND	ng/L	0.18	
HxCDDs (total)	ND	ng/L	0.28	
% Recovery				
13C-2,3,7,8-TCDF	80			
13C-2,3,7,8-TCDD	87			
13C-1,2,3,7,8-PeCDD	84			
13C-1,2,3,6,7,8-HxCDD	96			

ND = Not detected
 NA = Not applicable

Reported By: Robert Hrabak

Approved By: Shelly Eyraud

The cover letter is an integral part of this report.

Rev 230787

QC LOT ASSIGNMENT REPORT
Special Services - Low Resolution Mass Spectrometry

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
064243-0001-SA	AQUEOUS	DXNFUR-A	20 MAY 92-A ^{20 MAY 92-B}	-
064243-0001-MB	AQUEOUS	DXNFUR-A	20 MAY 92-B	7-7-92

ENSECO CAL LABS

SPECIAL SERVICES

LR-11
Enseco
A Warning Company

LOW RESOLUTION DIOXIN/FURANS ANALYSIS

ANALYSIS: Appendix 1X
Cl₄-Cl₆ + 2378 TCDD PROJECT NUMBER: 64243

PAGE 1 OF 1 LOCATION: IL20

DATE RECEIVED: 5/22/92 DATE IN PREP: 5/22/92

DATE TO GCMS: 5/27/92 DCS REF: 5/20/92B

SAMPLE ID	EXTRACTION		QC	13C-INTERNAL STDS
64243 -1	613 IL	X	MB	25 ng 13c-2378 tcdd/dl
			DU	25 ng 13c-1000/1001
			MS	50 ng 13c-cl5-cl7 d/d
			SD	250 ng 13c-ocdd
			DCS	SPECIAL

10 NG 37CL-2378 TCDD

% MOISTURE

OPTIONAL
OPT C

OPT C

SPECIAL
INSTRUCTION

IFB

BASIC AL

OPTION D2

X	25 NG 13C 1234 TCDD	- 20 ul	9 4	DB-5 SP2331 SPECIAL
---	------------------------	---------	--------	---------------------------

DATE DUE:
6/4/92

SAMPLES _____ WENT BACK FOR _____

RX ON _____ DUE TO: _____

COMMENTS:

USE 64233 MB

Enseco, Inc. - Cal Lab Analytical
2544 Industrial Blvd.

Enseco
A Corning Company

West Sacramento, California 95691
(916) 372-1393

Date Received : 22 MAY 92 08:30

Mrs. Julieahn L. Kramer
Enseco, Inc. -
4955 Yarrow Street
Arvada, Colorado

80002

(303) 421-6611

Project ID,
EPA Case, RMA Lot : ENIC004 PO:02034
AQUEOUS DXNFUR(AP9) 052
P.O. Number : 02034
Delivered By :
Storage Location : R20
Logged in by : RBONALY

One aqueous sample received in good condition; samples unrelinquished
by Chain-of-Custody. Delivered by Federal Express.

Sample ID	Enseco ID	Client's label info	Date/Time Samp.	Containers
54243-0001-SA	240272	22921-01	19 MAY 92 13:00	2-1AGB
064243-0001-MB	240273	Method Blank		

Samples not destroyed in testing are retained a maximum
of thirty (30) days unless otherwise requested.

Client Manager: Shelly Eyraud

ENSECO - CALIFORNIA ANALYTICAL LABORATORY
LOW-RES PROJECT CHECKLIST

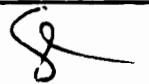
	REVIEW I	REVIEW II
PREP:		
All samples were extracted within hold time	<u>RH6/3</u>	<u>GM6/3</u>
LIMS entry completed with correct dates	_____	_____
INSTRUMENT:		
Standards		
CPSM/WDM criteria met	_____	_____
Standard criteria met	_____	_____
Blank/Samples		
Blank criteria met	_____	_____
IS recovery checked	_____	_____
S/N ratio checked	_____	_____
Chromatography checked	_____	_____
All samples run within 12 hours of standard	_____	_____
Logbook pages included	_____	_____
ANALYSIS:		
DCS included	_____	_____
CPSM/WDM correctly labeled and included	_____	_____
All associated standards included	_____	_____
All samples and associated blanks reported	_____	_____
- correct RRF's used in calculations	_____	_____
- IS recoveries met	_____	_____
- all ratios in	_____	_____
- correct sample volume used in calculations	_____	_____
All anomaly's noted on anomaly sheet	_____	_____
LIM's entry	completed <u>RH6/3</u>	released <u>6/4/3</u> <u>SP</u>

**ANOMALY SHEET
GC/MS DEPARTMENT**

Project number 64243

ANOMALIES	SAMPLE(S)
Analysis holding time missed.	_____
Surrogate recoveries out of control limits.	_____
Internal std. areas out of advisory limits.	_____
Sample diluted due to high conc. of NON-target compounds.	_____
Sample diluted due to high conc. of target compounds.	_____
Surrogate compounds diluted out due to high concentration of target or NON-target compounds.	_____
Headspace in VOA vial.	_____
VOA sample not preserved with HCl.	_____
Internal stds have recoveries <10% but the S/N ratio is >10:1	_____

COMMENTS: DSE 64233 MB

Reviewer:  date: 6/4/52

Appendix

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
 KAFB 060813-2

Station Name

Field ID

USGS/WRD/NM

Field Office

KAFB-IRP

Project

TOM CROUCH

MIKO ROYBAL

Collector

(505) 262-5399

Phone (FTS)

File Deposition*
 (Circle one)

Q - WATSTORE
 X - Lab File

Sample identification

KAFB 060813-2

Station ID or Unique Number*

463536001

Project Account #

1992
 Year*

05
 Month*

19
 Day*

1300
 Time*

05
 Month

19
 Day

1340
 Time

NM
 State Code*

035
 District/ User Code*

001
 County Code

Begin Date

Composite End Date

Analysis level codes and schedules

Sample Medium**	Geologic Unit	Analysis Status**	Analysis Source**	Hydrologic Condition**	Sample Type**	Hydrologic Event**
6		(H) or 9	9		9	9
PARAMETER:	APPX IX-VOC	APPX IX-SEMIVOC	APPX IX-PESTICIDES	APPX IX-HERBICIDES		
METHOD:	SW5030/SW8240	SW3510/SW8270	SW3520/SW8080	SW3520/SW8150		
PARAMETER:	APPX IX-DIOXINS	APPX IX-METALS (TOTAL)	APPX IX-METALS (DISS)	APPX IX-CYANIDE		
METHOD:	SW3520/SW8280	SW3005/SW6010	SW3005/SW6010	SW9010		
PARAMETER:	APPX IX-SULFIDE	NITRATE & NITRITE	URANIUM, GROSS ALPHA & BETA	VOX		
METHOD:	SW 9030	E353.2	D2907, E900	SW5030/SW8010		

EXTRA SAMPLES

Chain-of-Custody Record

PROJECT NAME KIRTLAND AFB IRP PROJECT NO. 463536001 P.O. NO. _____

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

Miko Roybal FEDERAL EXPRESS 19 MAY 92 1500

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

Relinquished by: (Signature) _____ Received at lab by: (Signature) _____ Date _____ Time _____

[Signature] 20 May 92 8:00

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

[Signature] July 1, 1992

Comments (Only 50 characters stored in NWIS)

Record 5 SAMPLE FROM WELL AT NW COR OF GOLF C. POND.

Record 6 _____

Total number of sample bottles for this request: 14

SHIP TO:

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

ATTENTION: TRACY CONROY / JULIE CRAMER

ENSECO ANALYTICAL SERVICES REQUEST FORM

22921-02

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

TRIP BLANK
 KAEB 06 08 14-2

Field ID
 USGS/WRD/NM
 Field Office

Project
 KAEB-IRP

Collector
 TOM CROUCH
 MIKO ROYBAL

Phone (FTS)
 (505) 262-5399

File Deposition*
 (Circle one)

Sample identification

Q - WATSTORE
 X - Lab File

[Empty box for Laboratory Use Only]

Station ID or Unique Number*
 KAEB 06 08 14-2

Project Account #
 46.35.36.00.1

Year*
 1992

Month*
 05

Day*
 19

Time*
 0725

Month

Day

Time

Begin Date

Composite End Date

State Code*
 N.M.

District/ User Code*
 035

County Code
 001

Analysis level codes and schedules

6 (H) or 9 9 9 9
 Sample Medium** Geologic Unit Analysis Status** Analysis Source** Hydrologic Condition** Sample Type** Hydrologic Event**

PARAMETER:	APPX IX-VOC	APPX IX-SEMIVOC	APPX IX-PESTICIDES	APPX IX-HERBICIDES
METHOD:	SW5030/SW8240	SW3510/SW8270	SW3520/SW8080	SW3520/SW8150
PARAMETER:	APPX IX-DIOXINS	APPX IX-METALS(TOTAL)	APPX IX-METALS(DISS)	APPX IX-CYANIDE
METHOD:	SW3520/SW8280	SW3005/SW6010	SW3005/SW6010	SW9010
PARAMETER:	APPX IX-SULFIDE	NITRATE & NITRITE	URANIUM, GROSS ALPHA & BETA	VOC
METHOD:	SW 9030	E353.2	D2907, E900	SW5030/SW8010

EXTRA SAMPLES

Chain-of-Custody Record

PROJECT NAME KIRTLAND AFB IRP PROJECT NO. 463536001 P.O. NO.

Relinquished by: (Signature) *Miko Roybal* Received by: (Signature) Date 19MAY92 Time 1500
 FEDERAL EXPRESS

Relinquished by: (Signature) *[Signature]* Received at lab by: (Signature) Date 20MAY 92 Time P.00
 Relinquished from lab by: (Signature) Received by: (Signature) Date July 2 1992

Comments (Only 50 characters stored in NWIS)

Record 5 TRIP BLANK - NW GOLF C.P.

Record 6

Total number of sample bottles for this request: 3

SHIP TO:

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

ATTENTION: TRACY CONROY / JULIE CRAMER