US EPA RECORDS CENTER REGION 5
1007449

A REPORT OF RCRA FACILITY INVESTIGATION (RFI) ACTIVITIES AT THE FORMER AMPHENOL SITE, FRANKLIN, INDIANA

Volume 3: Appendices K through M

DRAFT

Prepared for:

FRANKLIN POWER PRODUCTS
400 FORSYTHE STREET
FRANKLIN, INDIANA 46131

AMPHENOL CORPORATION
358 HALL AVENUE
P.O. BOX 5030
WALLINGFORD, CONNECTICUT 06492-7530

Prepared by:

WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, INDIANA 47408

June 13, 1994

07026.00

WW Engineering & Science
A Summit Company

5555 Glenwood Hills Parkway, SE, Post Office Box 874, Grand Rapids, Michigan 49588-0874

App K

January 3, 1995

Dr. Jim Keith
EARTH TECH
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin Curtis RFI Data Validation

Telephone
616.942.9600
Facsimile
616.942.6499

Dear Jim:

I am enclosing the results of the data validation for the Franklin Curtis RFI samples collected on December 2, 1994. If you have any questions on the validation, please contact me.

Sincerely,

Rick R Rediske

Richard R. Rediske, Ph.D.
Senior Environmental Scientist

enclosures

Data Validation
Franklin Curtis RFI
December 2, 1994 Samples

1. Introduction

This report summarizes the validation of 6 soil samples collected for the Franklin Curtis RFI. The samples were analyzed by Southwest Laboratories of Oklahoma for Volatile Organics by SW846-8240/CLPSOW-2-88. Validation was conducted according to the USEPA National Functional Guidelines (6/91) .

2. Holding Times

Samples were collected on 12/2/94 and analyzed on 12/6/94, 12/7/94, and 12/8/94. Samples were analyzed within the two week hold time.

3. GC/MS Instrument Performance Check

BFB was analyzed at the required frequency. Mass spectra for BFB met the required ion abundances.

4. Initial Calibration

The initial calibration analyzed on 11/4/94 was used for samples LCS1, LCS2, FCRSL1605-EB, and FRCSL1805-TB. RF's obtained for 2-chloroethyl vinyl ether were less than 0.05 and the %RSD was >30%. All other calibration data was acceptable.

The initial calibration analyzed on 11/30/94 was used for 16110-05, 16110-05DUP, 18110-05, 18110-05MS, and 18110-05MSD. The %RSD for bromomethane exceeded 30%. All other calibration data was acceptable.

5.0 Continuing Calibration Check

The continuing calibration standard analyzed on 12/6/94 had %D values for chloroethane, vinyl acetate, and 2-chloroethyl vinyl ether greater than 25%. The RRF for 2-chloroethyl vinyl ether was less than 0.05. All other calibration data was acceptable.

The continuing calibration standard analyzed on 12/8/94 had %D values for bromomethane, chloroethane vinyl acetate, 2-hexanone, and 2-chloroethyl vinyl ether greater than 25%. All other calibration data was acceptable.

6. Blanks

Results for system blanks were below reporting limits for all compounds. The equipment blank contained 15 ug/l of methylene chloride. All other compounds were below reporting limits.

7. MS/MSD

Results for MS/MSD samples were acceptable. All compounds were within 20%RPD and 80%-120% %R.

8. LCS

Two LCS samples were analyzed. All compounds were within acceptable limits except for 2-chloroethyl vinyl ether which was recovered at 70% in both samples.

9. Internal Standards

Internal standards were within acceptable limits for all samples except 18110-05MS. IS2 was 3% below minimum area.

10. Detection Limits

All samples met RFI detection limits.

11. TICs

Silane was the only TIC found in the sample set. This compound is a common analytical artifact from "column bleed" and probably not related to the actual site samples.

12. Duplicate Analysis

The following RPD's were obtained from the duplicate analyses:

Methylene chloride	131%
Acetone	200%
1,1,1-Trichloroethane	37%
Trichloroethylene	40%
Tetrachloroethylene	57%

All %RPD's for these compounds exceed 35% and indicate poor field precision. This is common for volatile organics in low level soils.

13. Overall Assessment of the Data

Based on professional judgment, the results for all samples associated with the 12/6/94 continuing calibration check are qualified as unusable (R) for 2-chloroethyl vinyl ether based on low RF (0.016) and high %D (-64%). This qualification only affects the equipment and trip blanks. All other deviations from validation criteria listed in sections 4, 5, 8, and 9 are minor and are not sufficient to qualify the results reported as less than the detection limit. The low end standards were sensitive enough to achieve the reported detection limit.

Data was qualified as estimated (J) for detectable concentrations in the field blanks and for poor precision between field duplicates. These qualifications are minor and typical of the problems encountered in the collection and analysis of low level volatile organics in soils.

A complete summary of all qualified data points by sample number is included on the attached tables.

Table 1
Sample: 16110-05

Compound	Concentration (ug/kg)	Qualifier	Comment
Methylene chloride	6	JB	Poor duplicate precision Detected in field blanks
Acetone	11	UJB	Poor duplicate precision
1,1,1-Trichloroethane	11	J	Poor duplicate precision
Trichloroethylene	94	J	Poor duplicate precision
Tetrachloroethylene	5	J	Poor duplicate precision

Table 2
Sample: 16110-05DUP

Compound	Concentration (ug/kg)	Qualifier	Comment
Methylene chloride	29	JB	Poor duplicate precision Detected in field blanks
Acetone	95	UJB	Poor duplicate precision
1,1,1-Trichloroethane	16	J	Poor duplicate precision
Trichloroethylene	140	J	Poor duplicate precision
Tetrachloroethylene	9	J	Poor duplicate precision

Table 3
Sample: 18110-05

Compound	Concentration (ug/kg)	Qualifier	Comment
Methylene chloride	20	JB	Poor duplicate precision Detected in field blanks ✓
Acetone	97	UJB	Poor duplicate precision
1,1,1-Trichloroethane	11	J	Poor duplicate precision
Trichloroethylene	53	J	Poor duplicate precision
Tetrachloroethylene	5	UJ	Poor duplicate precision

Table 4
Sample: FCSL1605EB

Compound	Concentration (ug/l)	Qualifier	Comment
2-chloroethyl vinyl ether	10	UR	Calibration unusable

Table 5
Sample: FCRSL1805TB

Compound	Concentration (ug/l)	Qualifier	Comment
2-Chloroethyl vinyl ether	10	UR	Calibration unusable

Work Copy

APPENDIX K

QA/QC worksheets.

App L Water Well requests
M Fowl letter

DRAFT

WW Engineering & Science
A Summit Company
5010 Stone Hill Road • Bloomington, Indiana 47408

Chain of Custody Record
Analytical Services

COC No. № 30082

WWES Proj. Mgr.
Project Name
WWES Proj. No.
Sampler (Print)
Sampler Signature

No's Correspond to Bottle Packing List

For Lab Use Only
Rack/Tray No:
Lab Project #

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments (seq. Lab #s)	Sample No.	Filtered Date/Time
21 May 93	1155	WTR		X	FCR-GW-PGP 4-04EB	4		(2) 40 VOA — VOC 485, 486; (1) 1000 Poly HNO3 metals 487; (1) 1000 Poly No. OH - Total Am CN 488		
	1240	WTR			FCR-GW-PGP 12-04	4		Same 489, 490, 491, 492		
	1500				FCR-GW-PGP 13-04	4		Same 493, 494, 495, 49[illegible]		
	1500				FCR-GW-PGP 13-04d	4		Same [illegible]		
	1620				FCR-GW-PGP 14-04	4		Same 50[illegible]		
21 May 93	—				FCR-GW-PGP 4-04TG	2		(2) 40 VOA — VOC 5[illegible]		

6-9-93 Revision/Addition

Relinquished By	Date/Time	Received By	Received to Lab By	Date/Time	Logged in By	Date/Time
[signature]	1800/5/21	To Custody Lab	[signature]	5/22/93 0400	[signature]	5/22/93 1030

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

ESL/Chain of Custody

HMM Associates, Inc.
A Summit Company

6908-302/HAZ/13862I

July 2, 1993

Mr. James H. Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Inorganic Data Validation Report
Southwest Laboratory of Oklahoma
Metals: 5 low concentration samples
Cyanide: 5 low concentration samples

Dear Mr. Keith:

Data validation was performed on the inorganic analytical data from 5 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, February 1989:

- data completeness
- holding times
- calibration verification
- field and laboratory blank results
- ICP interference check sample results
- matrix spike percent recovery results
- laboratory and field duplicate results
- laboratory control sample results
- ICP serial dilution analysis
- sample results

- All criteria was met for this parameter.

196 Baker Avenue Concord MA 01742 508 371-4000 Fax 508 371-2468
Three Executive Park Drive Bedford NH 03110 603 647-1010 Fax 603 626-0642

Data Completeness

The packages were complete and legible.

Holding Times

All holding times were met for all analytes.

Calibration Verification

All calibration results were reviewed and found to be acceptable.

Field and Laboratory Blanks

The method blanks were prepared and analyzed at the required frequency. The initial and continuing calibration blanks were also reported. There was one field blank, PGP-GW-13-04EB, included in the data package.

The continuing calibration blank (CCB) had a reported concentrations of 81.1 ug/L for aluminum, 6 ug/L for iron, and 420.5 ug/L for sodium. The preparation blank had reported concentrations of 58.2 ug/L for iron and 424.2 ug/L for sodium. The action level for these analytes is five times the reported concentration. Samples with reported concentrations less than five times the blank result will be treated as non-detects and qualified U.

The following analytes were detected in field blanks:

Calcium	914 ug/L
Chromium	38 ug/L
Iron	1350 ug/L
Lead	1.5 ug/L
Manganese	11.6 ug/L
Sodium	3720 ug/L
Zinc	41.7 ug/L

Sample results less than five times the reported result for the above analytes will be qualified U and treated as non-detects.

ICP Interference Check Sample Results

The reported results for the ICP interference check sample A were acceptable.

Matrix Spike Recovery Results

Matrix spike recovery results were not provided with the data package.

Laboratory and Field Duplicates

There were no laboratory duplicates submitted with the data package.

Aluminum, calcium, potassium, sodium, and zinc did not meet required criteria for field duplicates.

Positive sample results for aluminum, calcium, potassium, and zinc will be estimated (J).

Laboratory Control Sample Results

The laboratory control sample results were reviewed and found to be acceptable.

ICP Serial Dilution Analysis

The following compounds did not meet the required criteria for serial dilution: aluminum, copper, nickel, and sodium. Positive results for sodium in all samples will be estimated (J). Positive results for aluminum, copper, and nickel will be estimated in sample FCR-PGP-GW-14-04.

Sample Results

All sample results were reported accurately by the laboratory.

Data tables for both the validated (qualified) and unvalidated analytical results have been provided. Please feel free to call me or Cosmo Gallinaro directly at (508) 371-4000 with questions.

Sincerely,

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

6908-302/HAZ/138621

SUMMARY OF INORGANIC ANALYSES - WATER

EPA Sample No.	PGP004	PGP120	PGP13D	PGP130	PGP140
Lab Sample No.	1386201	1386202	1386204	1386203	1386205
Matrix	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low
Date Collected	5/21/93	5/21/93	5/21/93	5/21/93	5/21/93
Date Received:	5/21/93	5/21/93	5/21/93	5/21/93	5/21/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte					
Aluminum	69.7 U	2660 J	595 J	330 U	2750 J
Antimony	23.0 U	23.0 U	23.0 U	23.0 U	23.0 U
Arsenic	2.0 U	6.1 B	2.0 U	2.0 U	3.6 B
Barium	7.0 U	918	67.9 B	79.2 B	125 B
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Calcium	914 J	493000 J	149000 J	197000 J	213000 J
Chromium	7.6 J	23.7 U	6.7 U	7.2 U	28.5 U
Cobalt	6.0 U	7.6 B	6.0 U	9.5 B	6.0 U
Copper	6.0 U	31.2	10.4 B	9.7 B	35.1 J
Iron	1350	15800	2350 U	2850 U	8710
Lead	1.5 J	19.8	3.5 U	2.7 U	16.9
Magnesium	171 U	64900	44400	26100	71400
Manganese	11.6 B	1740	180 U	754	1350
Mercury	0.2 U	0.20 U	0.2 U	0.2 U	0.2 U
Nickel	7.0 U	31.4 B	7.0 U	20.9 B	37.5 J
Potassium	248 U	6020 J	2060.0 J	1540 J	1820 J
Selenium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Silver	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U
Sodium	3720 B	15200 U	27900 J	16800 U	17800 U
Thallium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	5.0 U	8.4 B	5.0 U	5.0 U	6.8 B
Zinc	41.7	160 U	63.0 U	377 J	181 U
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.
J = The reported value is an estimated quantity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

REGION I
Data Review Worksheets

Site Name FRANKLIN-CORTIS RFI
Reference Number _____

REGION I REVIEW OF INORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. 13862 SAS No. _____ Sampling Date(s) 5/21/93
SDG. No. _____ Matrix WATER Shipping Date(s) 5/21/93
No. of Samples 5 Date Rec'd by Lab 5/21/93

Traffic Report Nos: PGP004, PGP120, PGP130

Trip Blank No.:
Equipment Blank No.: [illegible]
Field Dup Nos: PGP15F

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -Calibrations
- -Blanks
- -ICP Interference Check Results
- -Matrix Spike Recoveries
- -Laboratory Duplicates
- -Field Duplicates
- -Lab Control Sample Results
- -Furnace AA Results
- -ICP Serial Dilution Results
- -Detection Limit Results
- -Sample Quantitation

Overall Comments: _____

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Analyte not detected.

Reviewer: [signature] Date: 7/8/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS - ALL INFORMATION WAS PROVIDED BY THE LAB.

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets – ALL OK

II. HOLDING TIMES Complete table for all samples and circle the analysis date for samples not within criteria.

SAMPLE ID	DATE SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
PGP001EB	5/21/93	6/2/93	6/2/93	6/2/93		
PGP120	5/21/93	6/2/93	6/2/93	6/2/93		
PGP130	5/21/93	6/2/93	6/2/93	6/2/93		
PGP130	5/21/93	6/2/93	6/2/93	6/2/93		
PGP140	5/21/93	6/2/93	6/2/93	6/2/93		

METALS - 180 DAYS FROM SAMPLE COLLECTION
MERCURY - 28 DAYS FROM SAMPLE COLLECTION
CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

ACTION:

1. If holding times are exceeded all positive results are estimated (J) and non-detects are estimated (UJ).

2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable (R).

REGION I
Data Review worksheets

III A. INSTRUMENT CALIBRATION (Section 1) - ALL OK

1. Recovery Criteria

List the analytes which did not meet the percent recovery (%R) criteria for Initial or Continuing Calibration.

DATE	ICV/CCV#	ANALYTE	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If any analyte does not meet the %R criteria follow the actions stated below:

For Positive Results:

	Accept	Estimate (J)	Reject (R)
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%R
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%R

For Non-detected Results:

	Accept	Estimate (UJ)	Reject (R)
Metals	90-125%R	75-89%R	<75%R, >125%R
Mercury	80-135%R	65-79%R	<65%R, >135%R
Cyanide	85-130%R	70-84%R	<70%R, >130%R

REGION I
Data Review Worksheets

III B. INSTRUMENT CALIBRATION (Section 2)

2. Analytical Sequence

A. Did the laboratory use the proper number of standards for calibration as described in the SOW? Yes or No

B. Were calibrations performed at the beginning of each analysis? Yes or No

C. Were calibration standards analyzed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during analysis, whichever is more frequent? Yes or No

D. Were the correlation coefficients for the calibration curves for AA, Hg, and CN ≥ 0.995? Yes or No

E. Was a standard at 2xCRDL analyzed for all ICP analyses? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

REGION 5
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

MATRIX: WATER

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS
~~CCB~~	CCB# 2		Na	420.5 ug/L
	CCB#2		AL	60.0 ug/L
	CCB#3		Na	343.0 ug/L
		PB#1	AL	58.228 ug/L
		~~PB#1~~	Na	424.166 ug/L
	~~CCB#4~~		AL	81.1 ug/L
	~~CCB#4~~		FE	6 ug/L
	CCB#4		~~Na~~	391.0 ug/L

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS (ug/L)
	PEP-CO4EB	Ca	914
		Cr	38
		Fe	1350
		Pb	1.5
		Mn	11.6
		Na	3720
		Zn	41.7

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? Yes or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION I
Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Levels for any analyte is equal to five times the highest concentration of that element's contamination in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL). Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

MATRIX: WATER

ELEMENT	MAX. CONC./ UNITS	AL/ UNITS
AL	81.1 ug/L	
Ca	914 ug/L	
Cr	38 ug/L	
Fe	1350 ug/L	
Pb	1.5 ug/L	
Mn	11.6 ug/L	
Na	3720 ug/L	

MATRIX: Water

ELEMENT	MAX. CONC./ UNITS	AL/ UNITS
Zn	41.7 ug/L	

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{Conc. in ug/L} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1L}{1000ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the action level gives a final result in mg/kg which can then be compared to sample results.

REGION I
Data Review Worksheets

V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2)-ALL OK

1. Recovery Criteria

List any elements in the ICS AB solution which did not meet the criteria for %R.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If an element does not meet the %R criteria, follow the actions stated below:

	PERCENT RECOVERY		
	<50%	50-79%	>120%
Positive Sample Results	R	J	J
Non-detected Sample Results	R	UJ	A

2. Frequency Requirements

Were Interference QC samples run at the beginning and end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent? Yes or No

If no,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

REGION I
Data Review Worksheets

V B. ICP INTERFERENCE CHECK SAMPLE (Section 3) - ALL OK

3. Report the concentration of any elements detected in the ICS A solution > 2xIDL that should not be present.

ELEMENT	CONC. DETECTED IN THE ICS	CONC. OF INTERFERENTS IN THE ICS			
		AL	CA	FE	MG

Estimate the concentration produced by the interfering element in all affected samples. See guidelines for examples. List the samples affected by interferences below:

SAMPLE AFFECTED	ELEMENT AFFECTED	SAMPLE CONC. (ug/L)	SAMPLE INTERFERENT CONC.				ESTIMATED INTERF. (ug/L)
			AL	CA	FE	MG	

ACTIONS:

1. In general, the sample data can be accepted without qualification if the sample concentrations of Al, Ca, Fe, and Mg are less than 50% of their respective levels in the ICS solution.

2. Estimate (J) positive results for affected elements for samples with levels of interferents 50% or more of that in the ICS solution.

3. Reject (R) positive results if the reported concentration is due entirely to the interfering element.

4. Estimate (UJ) non-detected results for which false negatives are suspect.

Give explanations for any actions taken below:

_____

_____

_____

REGION I
Data Review Worksheets

VI. MATRIX SPIKE - ALL OK

TR # LCS *

MATRIX: WATER

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spikes sample result
SR - sample result

Analyte	SSR	SR	S	%R	Action

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no action is taken.

2. If any analyte does not meet the %R criteria follow the actions stated below:

	PERCENT RECOVERY		
	<30%	30%-74%	≥125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No

B. Was a post digestion spike analyzed for elements that did not meet required criteria for matrix spike recovery? Yes or No

A separate worksheet should be used for each matrix spike pair.

* AN LCS WAS SUBSTITUTED FOR THE MS/MSD PAIR.

REGION I
Data Review Worksheets

VII. LABORATORY DUPLICATES - NOT APPLICABLE

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

MATRIX: _____

Element	CRDL water ug/L	CRDL soil mg/kg	Sample #	Duplicate#	RPD	Action
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >20% for waters and >35% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results for elements whose absolute difference is >CRDL, (2xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # PGP130	Duplicate# PGP13D	RPD	Action
Aluminum	200		595	330	57	J pos results
Antimony	60					
Arsenic	10					
Barium	200		67.9	79.2	15	
Beryllium	5					
Cadmium	5		149			
Calcium	5000		149000	197000	27	J pos results
Chromium	10		6.7	7.2	7	
Cobalt	50		6U	9.5B	NC	
Copper	25		10.4	9.7	7	
Iron	100		2350	2850	19	
Lead	5		3.5	2.7	25	
Magnesium	5000		44400	26100	50	No action
Manganese	15		180	754	122	No action
Mercury	0.2		~~7U~~	~~20.9B~~		
Nickel	40		~~2060~~ 7U	~~1540~~ 20.4B	NC	
Potassium	5000		2060	1540	29	J pos results
Selenium	5					
Silver	10					
Sodium	5000		27900	16800	49	No action
Thallium	10					
Vanadium	50					
Zinc	20		63	377	142	J pos results
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >20% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

IX. LABORATORY CONTROL SAMPLE – ALL OK

1. Aqueous LCS

List any LCS recoveries not within the 80-120% criteria and the samples affected.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

2. Solid LCS

List any analytes that were not within the control windows set by the EPA for the solid LCS sample. The 80-120% criteria is not used to evaluate solid LCS results.

ELEMENT	LCS CONC.	CONTROL WINDOWS	ACTION	SAMPLES AFFECTED

ACTIONS:

AQUEOUS LCS	Percent Recovery <50%	51-79%	>120%
Positive Results	R	J	J
Non-detected Results	R	UJ	A

SOLID LCS	<EPA Control Windows	>EPA Control Windows
Positive Results	J	J
Non-detected Results	UJ	A

3. Frequency Criteria

A. Was an LCS analyzed for every matrix, every digestion batch, and every 20 samples? Yes or No

REGION I
Data Review Worksheets

X A. FURNACE ATOMIC ABSORPTION ANALYSIS

1. Duplicate Precision

--X-- Duplicate injections and one-point analytical spikes were performed for all samples: duplicate injections agreed within ± 20%.

-------- Duplicate injections and/or spikes were not performed for the following samples/elements: _____

-------- Duplicate injections did not agree within ± 20% for samples/elements: _____

2. Post Digestion Spike Recoveries

X

-------- Spike recoveries met the 85-115% recovery criteria for all samples.

-------- Spike recoveries did not meet the 85-115% criteria but did not require MSA for the following samples/elements:

_____

-------- MSA was used to quantitate analytical results when contractually required.

_____ Correlation coefficients ≥0.995, accept results.
_____ Correlation coefficients <0.995 for sample numbers/elements: _____

-------- Method of Standard Addition (MSA) was not performed as required for samples/elements: _____

ACTIONS:

1. Estimate (J) positive results if duplicate injections are outside ± 20 % RSD or CV.

2. If the sample absorbance is <50% of post digestion spike absorbance the following actions should be applied:

	PERCENT RECOVERY		
	≤10%	11%-84%	≥115%
Positive Sample Results	J or R	J	J
Non-detected Results	R	UJ	A

3. Estimate (J) sample results if MSA was required and not performed.

4. Estimate (J) sample results if correlation coefficient was <0.995.

REGION I
Data Review Worksheets

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

_____ Serial Dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

_____ Serial Dilutions were not performed for the following:

X Serial Dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 50x the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

MATRIX: WATER

ELEMENT	IDL	50xIDL	SAMPLE RESULT	SERIAL DILUTION	%D	ACTION
Aluminum	49	2200			17.6%	J positive Resu
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt	~~15~~	~~300~~				
Copper	6	300			29%	J positive Result
Iron						
Lead						
Magnesium						
Manganese						
Nickel	7	350			23%	J positive Result
Potassium						
Silver						
Sodium	218	10900			11%	J positive Result
Vanadium						
Zinc						

Actions apply to all samples of the same matrix.

ACTIONS:

1. Estimate (J) positive results if %D >15.

REGION I
Data Review Worksheets

XII. DETECTION LIMIT RESULTS

1. Instrument Detection Limits

X Instrument Detection Limit results were present and found to be less than the Contract Required Detection Limits.

_____ IDLs were not included in the data package on Form XI.

_____ IDLs were present, but the criteria was not met for the following elements:_____

2. Reporting Requirements

_____ Were sample results on Form I reported down to the IDL not the CRDL for all analytes? Yes or No

_____ Were sample results that were analyzed by ICP for Se, Tl, As, or Pb at least 5x IDL. Yes or No

_____ Were sample weights, volumes, and dilutions taken into account when reporting detection limits on Form I. Yes or No

If No,

The reported results may be inaccurate. Make the necessary changes on the data summary tables and request that the laboratory resubmit the corrected data.

HMM Associates, Inc.
A Summit Company

6908-302/HAZ/138620

July 2, 1993

Mr. James Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Organic Data Validation Report
Southwest Laboratory of Oklahoma
VOCs: 6 low concentration samples

Dear Mr. Keith:

Data validation was performed on the organic analytical data from 6 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988:

- data completeness
- holding times
- GC/MS tuning
- calibration
- laboratory, field, and trip blanks
- surrogate spike recoveries
- matrix spike/matrix spike duplicates
- field duplicates
- internal standard performance
- sample quantitation
- All criteria was met for this parameter

196 Baker Avenue Concord, MA 01742 508 371-1600 Fax 508 371-2168
Three Executive Park Drive Bedford, NH 03110 603 617-1010 Fax 603 626-1612

CHAIN OF CUSTODY RECORD

1927

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: CURTIS FRANKLIN RFI

PROJECT NO. 07026.00

SAMPLERS: Jeffrey D. Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE: 250 ml glass wide	125 ml glass vial				ANALYSIS
FCR-SB-MW26-6.0-01	020492	13:24	SOIL		X	MW 26 6.0 feet	1	X					Metals, Cyanide (03)
							2		X				Volatiles (01, 02)
FCR-SB-MW26-12.0-01	020492	13:45	SOIL		X	MW26 12.0 feet	1	X					Metals Cyanide (04)
							2		X				Volatiles (05, 06)

Relinquished By	Date	Time	Received By	Date	Time
D Bryan	2/4/92	1750	James H. Kiella	2/4/92	1750
James H Kiella	2/5/92	0855	Received For Lab By	Date	Time

Remarks: Note: Metals, CN and Volatiles in accordance with QAPP for Franklin-Curtis RFI/CMS (non-Appendix IX)

JHK 2/5/92

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1929

WW Engineering & Science, Inc.
5010 Stone-Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis Franklin

PROJECT NO.: 07026.00

SAMPLERS: Jeffrey D. Brown

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE 125 glass	250 glass				ANALYSIS
FCR-SB-MW24-6.0-01	020692	1120	SOIL		X	Monitor Well 24	2	X					VOLATILES (013, 014)
							1		X				CYANIDE / METALS (015)
FCR-SB-MW24-6.0-01	020692	1158	SOIL		X	MONITOR WELL 24	2	X					VOLATILES (016, 017)
							1		X				CYANIDE / METALS (018)

Relinquished By	Date	Time	Received By	Date	Time
[illegible]	2/6/92	1800	[illegible]	2/6/92	1800
[illegible]	2/7/92	0855	Received For Lab By	Date	Time

Remarks: Non-Appendix IX - analyte list from Franklin Curtis QAPP

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1928

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis Franklin RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: Jeffrey D. Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE 125 Glass	250 Glass				ANALYSIS
FCR-SB-MW20-6.0-01	020592	1350	SOIL		X	MW-20 6 Feet	2	X					Volatiles (07, 08)
							1		X				Metals/Cyanide (08)
~~FCR-SB-MW20-6~~													
FCR-SB-MW20-12.0-01	020592	1412	SOIL		X	MW-20 12 Feet	2	X					Volatiles (011, 012)
							1		X				Metals/Cyanide (012)

Relinquished By	Date	Time	Received By	Date	Time
[illegible]	2/5/92	1800	[illegible]	2/5/92	1800
[illegible]	2/6/92	0820	[illegible]		

Relinquished For Lab By	Date	Time

Remarks: See Franklin Curtis QAPjP for analytes; non-Appendix IX TAK

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1992

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Franklin-Curtis RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: Jeff Bryan and Marty Lytle

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE: Widemouth VOA 1 2 ml	Widemouth glass Jar 4 ml				ANALYSIS
FCR-SB-SB3-6.0-01	2/7/92	1030	Soil		X	Soil Boring SB-3; 6 feet	3	2					Volatiles
									1				Metals, Total + Amenable CN
FCR-SB-SB3-10.0-01	2/7/92	1049	Soil		X	Soil Boring SB-3; 10 feet	3	2					Volatiles
									1				Metals, Total + Amenable CN
FCR-SB-SB4-6.0-01	2/7/92	1210	Soil		X	Soil Boring SB-4; 6 feet	3	2					Volatiles
									1				Metals, Total + Amenable CN
FCR-SB-SB4-10.0-01	2/7/92	1215	Soil		X	Soil Boring SB-4; 10 feet	3	2					Volatiles
									1				Metals, Total + Amenable CN
FCR-SB-SB4-10.0-01d	2/7/92	1216	Soil		X	dupe of FCR-SB-SB4-10.0-01	3	2					Volatiles
									1				Metals, Total + Amenable CN
FCR-SB-SB3-0.0-01	2/7/92	1028	Soil		X	Equipment Blank for SB-3	3	2					Volatiles
									1				Metals, Total + Amenable CN

Relinquished By	Date	Time	Received By	Date	Time
J D Bryan	2/7/92	1730	James H. Kaille	2/7/92	1730
Relinquished By	Date	Time	Received For Lab By	Date	Time

Remarks: See Franklin-Curtis QAP; P for analytes; non-Appendix IX

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1930

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: CURTIS/FRANKLIN RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: Jeffrey D Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE 125 Glass Hydro	250 Glass Hydro				ANALYSIS
FCR-SB-SB5-2.0-01	021092	1023	SOIL		X	SOIL BORING SB-5	2	X					Volatiles (037, 038)
							1		X				Cyanide/Metals (039)
FCR-SB-SB8-2.0-01	021092	1320	SOIL		X	SOIL BORING SB-8	2	X					Volatiles (040, 041)
							1		X				CN/Metals (042)
FCR-SB-SB8-19.0-01	021092	1400	SOIL		X	SOIL BORING SB-8	2	X					Volatiles (043, 044)
							1		X				CN/Metals (045)

Relinquished By	Date	Time	Received By	Date	Time	Remarks
J D Bryan	2/10/92	1745	James H. Kiell	2/10/92	1745	
Relinquished By	Date	Time	Received For Lab By	Date	Time	
James H. Kiell	2/11/92	0927				

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

190

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: CURTIS - FRANKLIN RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: Jeffrey D. Bryan

SAMPLE ID.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE 125 Glass	250 Glass				ANALYSIS
FCR-SB-MW22A-2.0-01	02/11/92	1059	SOIL		X	MW22A 0-2 feet; for		X					Volatiles (047; 048)
		1059			X	Risk Assessment			X				CN/Metals (049)
~~FCR-SB~~ HK						(MW22A abandoned)							
FCR-SB-MW-22-10.0-01		1403			X	MW22 10 feet		X					Volatiles (050; 051)
		1403			X				X				CN/Metals (052)
FCR-SB-MW-22-19.0-01		1440			X	MW22 10 feet		X					Volatiles (053; 054)
		1440			X				X				CN/Metals (055)

Relinquished By	Date	Time	Received By	Date	Time
J D Bryan	2/11/92	1800	James H Kiel	2/11/92	1800
Relinquished By	Date	Time	Received For Lab By	Date	Time
James H Kiel	2/12/92	0910			

Remarks: CN includes both total and amenable Cyanide; Non-Appendix B compounds - see Franklin-Curtis QAPjP JHK

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1903

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis - Franklin RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: Jeffrey D. Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE					ANALYSIS
FCR-SB-SB6-8.0-01	021292	1120	SOIL		X	SB6 8'	2	X					Volatile ~~(062; 063)~~ (060; 061) JHK
		1120					1		X				CN/Metals (059) ~~(064)~~ JHK
FCR-SB-SB6-8.0-01d		1120				SB6 8'	2	X					VOC (062; 063)
		1120					1		X				CN/Metals (064)
FCR-SB-SB6-17.0-01		1140				SB6 17'	2	X					VOC (065; 066)
		1140					1		X				CN/Metals (067)
							~~4~~						
FCR-SB-SB6-0.0-01b		1118				Equip blank	2	X					VOC (056; 057)
		1118					1		X				CN/Metals (058)

Relinquished By	Date	Time	Received By	Date	Time
J. Bryan	2/12/92	1800	James H Kirk	2/12/92	1800
James H. Kirk	2/13/92	0933	Received For Lab By	Date	Time

Remarks: CN includes both total & amenable CN. Non-Appendix IX parameters. See Franklin-Curtis QAPP JHK

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1904

W W Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: CURTIS/FRANKLIN RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: JD Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE 125 Glass	250 Glass				ANALYSIS
FCR-SB-MW-23-21.5-01	021392	1445	SOIL		X	MW 23-21.5 feet	2	X					Volatiles (068, 099)
							1		X				Metals/CN (070)

Relinquished By	Date	Time	Received By	Date	Time
JD Bryan	2/13/92	1805	James H Kelly	2/13/92	1805
James H Kelly	2/14/92	1430	Received For Lab By ✓		

Remarks: CN - both Total and Amenable Non Appendix IX; see Franklin Curtis QAPP for parameters JHK

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1905

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis-Franklin RFI/CMS

PROJECT NO.: 0702-6.00

SAMPLERS: J D Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE 125	250				ANALYSIS
FCR-SB-MW25-10.0-01	021892	1017	SOIL		X	MW25-10 feet	2	X					Volatiles (014; 015)
							1		X				CN/Metals (076)

Relinquished By	Date	Time	Received By	Date	Time
J D Bryan	2/18/92	1805	[illegible]	2/18/92	1805
[illegible]	2/19/92	0930	Received For Lab By	Date	Time

Remarks

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1906

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT Curtis Franklin

PROJECT NO. 07026.00

SAMPLERS JD Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE 250	125				ANALYSIS
FCR-SB-MW25-350-01	02/19/92	1110	SOIL		X		1	X					CN/Metals
							2		X				Volatiles

Relinquished By	Date	Time	Received By	Date	Time	Remarks
JD Bryan	2/20/92	8:30	Released to custody seal	2/20/92	8:30	
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1907

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis Franklin Refinery
PROJECT NO.: 0702600
SAMPLERS: Jeffrey Q. Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE 125 Glass	250 Glass				ANALYSIS
FCR-SB-MW21-12.0-01	02/20/92	1330	Soil		X	MW 21 - 12 feet	2	X					Volatiles (080; 081)
							1		X				CN/Metals (082)
FCR-SB-MW21-12.0-01D		1331				MW21-12 feet - Duplicate	2	X					Volatiles (083; 084)
							1		X				CN/Metals (085)
FCR-SB-MW21-12.0-01MS		1332				MW21-12 feet Matrix spike	2	X					Volatiles (086; 087)
							1		X				CN/Metals (088)
FCRSB-MW21-18.0-01		1343				MW21-18.0 feet - fill?	2	X					Volatiles (089; 090)
							1		X				CN/Metals (091)

Relinquished By	Date	Time	Received By	Date	Time	Remarks
[illegible]	02/19/92	1930	[illegible]	02/19/92	1930	
[illegible]	2/21/92	0913				

Received For Lab By	Date	Time

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2022

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Franklin-Curtis RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: Jeff Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE: 125 ml wide mouth	250 ml wide mouth	125 ml narrow mouth			ANALYSIS
FCR-SB-SB7-8.0-01	2/21/92	1025	Soil		X	SB-7 8.0 feet	3	2					VOC's (093, 094)
									1				Metals, Total + Amenable CN (092)
FCR-SB-SB7-0.0016	2/21/92	1013	Soil		X	Equipment blank	3			2			VOC's (095, 096)
									1				Metals, T+A Cyanide (097)
FCR-SB-SB7-18.0-01	2/21/92	1040	Soil		X	SB7 18.0 feet	3	2					VOC's (098, 099)
									1				Metals, T+A Cyanide (100)
FCR-SB-SB9-12.0-01	2/21/92	1342	Soil		X	SB9 12.0 feet	3	2					VOC's (102, 103)
									1				Metals, T+A Cyanide (101)
FCR-SB-SB9-18.0-01	2/21/92	1408	Soil		X	SB9 18.0 feet	3	2					VOC's (104, 105)
									1				Metals, T+A Cyanide (106)
FCR-SB-SB7-18.0-01d	2/21/92	1109	Soil		X	SB9 18.0 feet dupe	3	2					VOC's (108, 109)
									1				Metals, T+A Cyanide (110)

Relinquished By	Date	Time	Received By	Date	Time	Remarks
[illegible signature]	2/21/92	1810	[illegible signature]	2/21/92	1810	
Relinquished By: [illegible signature]	Date: 2/21/92	Time: 1820	Received For Lab By: [illegible signature]	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2027

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Franklin Curtis RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: J. Bryan & J. Bassett

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE 125 ml Wide mouth	250 ml Wide mouth				ANALYSIS
FCR-SB-SB01-12.0-01	2/26/92	1240	Soil		X	SB#1 ~~9.5'-10.0'~~ 11.5'-12'	3	2					VOC's
									1				Metals: Total & Amenable CN
FCR-SB-SB01-10.0-01	2/26/92	1215	Soil		X	SB#1 9.5'-10.0'	3	2					VOC's
									1				Metals: Total & Amenable CN
FCR-SB-SB02-10.0-01	2/26/92	1331	Soil		X	SB#2 9.5'-10.0'	3	2					VOC's
									1				Metals: Total & Amenable CN

Relinquished By	Date	Time	Received By	Date	Time	Remarks
J D Bryan	2/26/92	1545	James H Kieffer	2/26/92	1545	[illegible] JHK
Relinquished By	Date	Time	Received For Lab By	Date	Time	
James H Kieffer	2/26/92	1615				

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

pg 1 of 2 2023

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis Franklin RFI/CMS
PROJECT NO.: 07026.00
SAMPLERS: JD Bryan / BJ Conway

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	125 Glass/Teflon 4°C	250 Glass/Teflon 4°C	40 Glass/Teflon HCl 4°C	1000 Polyethylene NaOH 4°C	ANALYSIS
FCR-SS-SD01-01	022592	1130	SOIL	X		Hurricane Creek 04	2	X				Volatiles (120, 121) JK (111, 112)
"		"	"	X		" " "	1		X			Cyanide / Metals (122) JK (113)
FCR-SS-SD03-01		1435	SOIL	X		" " 03	2	X				VOC (114, 115)
"		"		X		" " 03	1		X			CN⁻ / Metals (116)
FCR-SW-SW01-01		1535	WTR		X	" " 01	2			X		Volatiles
"		"	"		X	" " "	1				X	CN⁻ (117, 118)
FCR-SS-SD01-01		1537	SOIL	X		" " "	2	X				VOC (119)
"		"	"	X		" " "	1		X			CN⁻ / Metals (121)
FCR-SW-SW02-01		1625	WTR		X	" " 02	2			X		VOC (123, 125)
"		"	"		X	" " "	1				X	CN⁻ (126)
FCR-SW-SW02-old		1626	"		X	" " "	2			X		VOC (127, 128)
"		"	"		X	" " "	1				X	CN⁻ (129)
FCR-SW-SW02-01m		1627	"		X	" " "	2			X		VOC
FCR-SW-SW02-01md		1628	"		X	" " "	2			X		VOC (130, 131) (132, 133)
FCR-SS-SD02-01		1629	SOIL		X	" " "	2	X				VOC (134, 135)
"		"	"		X	" " "	1		X			CN⁻ / Metals (136)
FCR-SS-SD02-01d		1630	"		X	" " "	2	X				VOC (137, 138)
"		"	"		X	" " "	1		X			CN / Metals (139)
FCR-SW-SW05-01	↓	~~1755~~ 1800 JK	WTR		X	Storm Sewer 05	2			X		VOC ~~(144, 145)~~ JK (141, 142)
							1				X	CN⁻ ~~(146)~~

Relinquished By	Date	Time	Received By	Date	Time
JD Bryan	022692	845	To Custody Seal	2/26/92	0905
Relinquished By	Date	Time	Received For Lab By	Date	Time

Remarks: CN = Total And Amenable CN
Non Appendix IX parameters

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

pg 2 of 2 2024

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis Franklin RFI ICMS
PROJECT NO: 07026.00
SAMPLERS: JD Burgan / BJ Conway

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	125 ml	250 ml	40 ml			ANALYSIS
								CONTAINER TYPE/ PRESERVATIVE					
FCR-SS-SD05-01	022592	1800	SOIL		X	~~FTA AM Shop~~ 0.5	2	X					Volatiles (142, 143)
"	"	"	"		X	" "	1		X				CN⁻ / Metals (140)
TB-1	"	735	WTR		X		2			X			Volatiles (No total #)
FCR-SS-SD0-01	022692	835	SOIL		X	Equip Blank	2	X					Vol (147, 148)
							1		X				CN / Metals (149)

Relinquished By	Date	Time	Received By	Date	Time
JD Burgan	022692	845	To Custodian Seal	2/26/92	0905
Relinquished By	Date	Time	Received For Lab By	Date	Time

Remarks: CN⁻ = Total and Amenable CN
Non-Appendix IX parameters

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2030

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis Franklin RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: JDB/JAD/RWC

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	40 VOA	1000 Poly HNO3 4°C	1000 Poly NaOH 4°C			ANALYSIS	TAG NO.
FCR-GW-MW17-01	030292	1145	WTR		X		2	X					VOLATILES	162 163
"		"					1		X				TOT. METALS	167
"		"					1			X			TOT/AMEN CN⁻	165
FCR-GW-MW22-01		1450					2	X						172 173
"		"					1		X					174
"		"					1			X				176
FCR-GW-MW24-01		1520					2	X						186 187
"		"					1		X					189
"		"					1			X				188
FCR-GW-MW2-01cb		1630					2	X						190 192
"		"					1		X					194
"		"					1			X				191
FCR-GW-MW3-01		1635					2	X						195 196
"		"					1		X					198
"		"					1			X				197
TB-2		2000					2	X					VOLATILES	

Relinquished By	Date	Time	Received By	Date	Time	Remarks
JD Lyman			RELEASED TO CH. TODD SGT	3/3/92	10:30A	REMOVED w/ NEW BLUE ICE 3/3/92 9:40A CB
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2025

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: FRANKLIN CURTIS RFI/CMS

PROJECT NO.: 02026.00

SAMPLERS: Jeff Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE: 1L Amber Glass					ANALYSIS
FCR-GW-IT2-01	3/3/92	1550	Water		X	Well IT-2	1	X					Total & Amenable CN (248)
FCR-GW-IT3-01	3/3/92	1303	Water		X	Well IT-3	1	X					" (244)
FCR-GW-MW23-01d	3/3/92	1150	Water		X	MW23 duplicate	1	X					" (240)
FCR-GW-MW23-01	3/3/92	1150	Water		X	MW-23	1	X					" (236)
FCR-GW-MW9-01	3/3/92	1120	Water		X	MW 9	1	X					" (232)
FCR-GW-MW26-01	3/3/92	1112	Water		X	MW26	1	X					" (224)
FCR-GW-IT1A-01	3/3/92	1005	Water		X	Well IT-1A	1	X					" (220)
FCR-GW-MW22-01	3/3/92	1000	Water		X	MW 20	1	X					" (216)
FCR-GW-10b-01EB	3/3/92	0940	Water		X	Equip Blank Bailer-ex	1	X					" (212)
FCR-GW-MW21-01d	3/3/92	0920	Water		X	MW21 duplicate	1	X					" (205)
FCR-GW-MW21-01	3/3/92	0915	Water		X	MW 21	1	X					" (204)

Broken in Shipment

3/3/92 AHK

Relinquished By	Date	Time	Received By	Date	Time	Remarks
J.P. Bryan	03/3/92	1745	To Custody Seal	3/3/92	1815	NaOH preservative
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2026

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis Franklin RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: JD Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO CONTAINERS	40 VOA HCL	1000 Poly HNO3				ANALYSIS
FCR-GW-MW-21-01	030392	0915	WTR		X	MW21	2	X					Volatiles (201 202)
FCR-GW-MW21-01	"	"				MW21	1		X				Tot Metals (203)
FCR-GW-MW21-01d	"	0920				MW21 duplicate	2	X					VOLATILES (205, 206)
FCR-GW-MW21-01d	"	0920				MW21 duplicate	1		X				TOT METALS (209)
FCR-GW-106EB	"	0940				Equipment Blank Baker 106	2	X					Volatiles (210, 211)
FCR-GW-106EB	"	"				"	1		X				Total Metals (213)
FCR-GW-MW20-01	"	1000				MW20	2	X					Volatiles (214, 215)
"	"	"				"	1		X				Total Metals (217)
FCR-GW-IT-1A-01	"	1005				Well IT-1A	2	X					Volatiles (218, 219)
"	"	"				"	1		X				Total Metals (221)
FCR-GW-MW26-01	"	1112				Well MW-26	2	X					Volatiles (222, 223)
"	"	"				"	1		X				Total Metals (225)
FCR-GW-MW9-01	"	1120				Well MW-9	2	X					Volatiles (226, 227)
FCR-GW-MW9-01MS	"	"				" Matrix spike	2	X					Volatiles (228, 229)
FCR-GW-MW9-01MSd	"	"				" spike Duplicate	2	X					Volatiles (230, 231)
FCR-GW-MW9-01	"	1120				"	1		X				Total Metals (233)
FCR-GW-MW23-01	"	1150				MW-23	2	X					Volatiles (234, 235)
FCR-GW-MW23-01	"	"				"	1		X				Total Metals (237)
FCR-GW-MW23-01d	"	"				MW-23 duplicate	2	X					Volatiles (238, 239)
"	"	"				"	1		X				Total Metals (241)

Relinquished By	Date	Time	Received By	Date	Time	Remarks
JD Bryan	3/4/92	1355	James [illegible] to Custody Seal	3/5/92	1815	
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2031

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: FRANKLIN CURTIS RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: Jeff Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE: 40 ml VOA/HCL	1000 poly HNO3				ANALYSIS
FCR-GW-IT3-01	3/3/92	1330	Water		X	Well IT-3	2	X					Volatiles (242,243)
"	"	"	"		"	"	1		X				Total Metals (245)
FCR-GW-IT2-01	3/3/92	1400	Water		x	Well IT-2	2	X					Volatiles (246,247)
							1		x				Total Metals (249)
TB-3	3/13/92	0715	Water		x	Trip Blank	2	X					Volatiles (no numbers)

Relinquished By	Date	Time	Received By	Date	Time	Remarks
—	3/3/92	1755	[illegible]	3/3/92	1815	
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2032

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis - Franklin RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: Diana R. Klem

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE					ANALYSIS
FCR-GW-IT2-01	3-9-92	12:00	WTR		X		1	X					Total Amen. CN- 251
FCR-GW-MW26-01(2)		13:20					1	X					" 252
FCR-GW-IT-1A-01(2)		15:05					1	X					" 254
FCR-GW-MW21-01(2)		15:45					1	X					" 253
FCR-GW-106-01(2)		9:30					1	X					" 250

Broken in Shipment

Relinquished By	Date	Time	Received By	Date	Time	Remarks
Diana R. Klem	3-6-92	17:07	[illegible]			
Relinquished By	**Date**	**Time**	**Received For Lab By**	**Date**	**Time**	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

1908

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis - Franklin RFI - CMS

PROJECT NO.: 07026

SAMPLERS: JD Bryan / MB Lytle

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE: 40 VOA HCl	1000 Amber GT NaOH	1000 Poly HNO3			ANALYSIS
FCR-GW-MW25-01	031092	1205	WTR		X		2	X					Volatiles (255/256)
							1		X				Tot/Amer CN (257)
							1			X			Tot Metals (258)

Relinquished By	Date	Time	Received By	Date	Time	Remarks
[signature]	3/10/92	1505	To Custody Seal			
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

202

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Curtis Franklin RFI/CMS

PROJECT NO.: 0702600

SAMPLERS: JDBryan / JA Dunwelin / RW Conway

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	2000 Amber G/T 4°C	500 Poly NaOH Zn Ac 4°C	1000 Amber G/T None 4°C	1000 Amber G/T NaOH 4°C	1000 Poly HNO3 4°C	ANALYSIS	TAG NO.
FCR-GW-103-01cb?	030292	1020	WTR		X		1	X					PCB/Pest/Dioxin/Furan	159
"		"					1		X				S⁻	161
"		"					1			X			SVOA/Phenol	160
FCR-GW-MW12-01		~~1740~~ ~~1745~~					1				X		Dissolved CN⁻ Tot/Amen	171
"		1740					1					X	" Metals	170
FCR-GW-MW22-01		1750					1				X		Dis CN⁻	200
"		1750					1					X	Dis Metals	199
FCR-GW-MW12-01		1145					1	X					PCB/PEST/Dioxin/Furan	169
"		"					1		X				S⁻	166
"		"					1			X			SVOA/Phenol	168
FCR-GW-MW22-01		1450					1	X					PCB/PEST/Dioxin/Furan	177
"		"					1		X				S⁻	175
"		"					1			X			SVOA/Phenol	178
FCR-GW-MW22-01d		1455					1	X					PCB/PEST/Dioxin/Furan	180
"		"					1		X				S⁻	181
"		"					1			X			SVOA/Phenol	179
FCR-GW-MW22-01m		1456					1	X					PCB/PEST/Dioxin/Furan	183
"		"					1			X			SVOA/~~Phenol~~ JB	182
FCR-GW-MW22-01md		1458					1	X					PCB/PEST/Dioxin/Furan	185
"		"				RELEASED TO	1			X			SVOA/~~Phenol~~ JB	184

COOLER 2029-1

COOLER 2029-2

Relinquished By	Date	Time	Received By	Date	Time	Remarks
JD Bryan			CUSTODY SEAL [signature]	3/3/92	10:00A	REPLACED W/ NEW BLUE ICE 3/3/92 8:30A JCB
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2040

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: Franklin Curtis

PROJECT NO.:

SAMPLERS: [illegible] / Rob Conway

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE: 1L Amber Glass / No. 04					ANALYSIS	Fig. #
FCR-GW-106-01ch (3)	4-3-92	10:30	WTR		X		1	X					Total Cyanide and Amenable Cyanide	259
FCR-GW-MW-26-01(3)	4-3-92	13:40	WTR		X		1	X						260

Relinquished By	Date	Time	Received By	Date	Time	Remarks
[illegible]	4-13-92	17:40	Custody Seal			
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2041

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PROJECT: CURTIS - FRANKLIN

PROJECT NO.: 07026.00

SAMPLERS: M. LYTLE

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE (Liter glass / No OH)					ANALYSIS
MW-26	4/16/92	10:20A	WTR		X		1	X					CN-
													NOTE: SAMPLE ~~[illegible]~~ SHIPPED WITH OUT SERIAL NUMBERED TAG

Relinquished By	Date	Time	Received By	Date	Time	Remarks
Martin Lytle	4/16/92	11:30A	Custody Seal			
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2001

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

PS 1/2

PROJECT: Curtis Franklin RFI/CMS

PROJECT NO.: 07026.00

SAMPLERS: JD Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/PRESERVATIVE: 1000 Poly HNO3	1000 Poly NaOH	1000 Poly HCl	40 VOA HCl		ANALYSIS
FCR-SW-SW02-02	072792	1015	WTR	X			1	X					Tot Metals 274
"	"	"					1		X				Tot/Amen CN 271
"	"	"					2			X			VOC 272, 273
FCR-GW-MW22-02		1130	WTR	X			1	X					Tot Metals 277
"		"					1		X				Tot/Amen CN 278
"		"					2			X			VOC 275, 276
FCR-GW-MW12-02		1145					1	X					Tot Metals 281
"		"					1		X				Tot/Amen CN 282
"		"					2			X			VOC 279, 280
~~FCR-IT3~~													
FCR-GW-IT3-02		1240					1	X					Tot Metals 285
"		"					1		X				Tot/Amen CN 286
"		"					2			X			VOC 283, 284
FCR-GW-IT2-02		1255					1	X					Tot Met 290
							1		X				Tot/Amen CN 289
							2			X			VOC 287, 288
FCR-GW-103-02eb		0910					1	X					Tot Met 270
"		"					1		X				Tot/Amen CN 269
"		"					2			X			VOC 267, 268

Relinquished By	Date	Time	Received By	Date	Time	Remarks
JD Bryan	4/28	1030	To Custody Seal			
Relinquished By	Date	Time	Received For Lab By	Date	Time	

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

2092

WW Engineering & Science, Inc.
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812)336-0972 Fax (812)336-3991

Pg 2/2

PROJECT: Curtis Franklin RFI/CMS

PROJECT NO.: 07026

SAMPLERS: S.D. Bryan

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE: AD VOC					ANALYSIS
ECR-GW-TB4	072792						2	X					VOC

Relinquished By	Date	Time	Received By	Date	Time
S.D. Bryan	7/28	1030	To Custodian Lab		
Relinquished By	**Date**	**Time**	**Received For Lab By**	**Date**	**Time**

Remarks

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

WW Engineering & Science
A Summit Company
5010 Stone Mill Road • Bloomington, Indiana 47408

Chain of Custody Record
Analytical Services

COC No. № 30018

WWES Proj. Mgr.	Project Name	No's Correspond to Bottle Packing List	For Lab Use Only
J. Keith	Franklin-Curtis RFI		Rack/Tray No:
WWES Proj. No. 07026.05	Sampler (Print): J D BRYAN		Lab Project #
	Sampler Signature: J D Bryan		

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
13 JAN 1993	1130	SOIL		X	FCR-SB-MW27 15.0-03	2		60 ml. CWM: VOC 125 ml CWM Vial: CN_1; CN_A; metals		
↓	1135	↓		↓	FCR-SB-MW27 15.0-03 d	2		Same		
↓	1305	↓		↓	FCR-SB-MW27 EB-03	2		same		
↓	1307	↓		↓	FCR-SB-MW27 23.0-03	2		same		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
J D Bryan	1/13/92 1712	James H. [illegible]				

Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

SLC/Chain of Custody

WW Engineering & Science
A Summit Company
5010 Stone Mill Road • Bloomington, Indiana 47408

page 1/2

Chain of Custody Record
Analytical Services

COC No. № 30025

WWES Proj. Mgr.	Project Name	
Jim Kell	Franklin Curtis RFI	
WWES Proj. No.	Sampler (Print)	J D BRYAN
0702605	Sampler Signature	D Bryan

For Lab Use Only: Rack/Tray No: Lab Project #

Date Sampled	Time Sampled	Matrix*	Composite	#	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments (Label #)	Sample No.	Filtered Date/Time
16 FEB 93	1415	WTR		1	FCR-GW-MW24-03	4		40 VOA = VOC (301, 302); 1L Poly HNO3 = Tot. Metals (303); 1L Poly NaOH = Tot & Am CN (304)		
	1440			1	FCR-GW-MW2-03	5		40 VOA HCL = VOC (305, 306); 1L POLY HNO3 = TOT METALS (311); 1L POLY HNO3 = DISS METALS (333); 1L POLY NaOH = TOT & AM CN (312)		
	1440			1	FCR-GW-MW2-03MS	2		40 VOA HCL = VOC (307, 308)		
	1440			1	FCR-GW-MW2-03MSD	2		40 VOA HCL = VOC (309, 310)		
	1520			1	FCR-GW-IT3-03	4		40 VOA + HCL = VOC (317, 318); 1L Poly HNO3 = TOT METALS (321); 1L Poly NaOH = Tot & AMER CN (323)		
	1520			1	FCR-GW-IT3-03d	4		as above (319, 320) (322) (324)		
	1515			1	FCR-GW-PBP-03	4		as above (313, 314) (315) (316)		
	1650				FCR-GW-IT2-03	4		as above (325, 326) (327) HNO3 (328) NaOH		
	1715				FCR-GW-MW1-03	5		40 VOA + HCL = VOC (329, 330); 1L POLY HNO3 = TOTAL METALS (331); 1L POLY NaOH = TOT & AM CN (332); 1L POLY HNO3 = DISS METALS (334)		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
D Bryan	2/16 2020	Samuel H. Kirk				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

ESI Charts/Chain of Custody

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Chain of Custody Record
Analytical Services

COC No. N2 30022

WWES Proj. Mgr.	Project Name
JH Keith	Franklin Curtis RFI
WWES Proj. No.	Sampler (Print) J D BRYAN
07026.05	Sampler Signature J D Bryan

For Lab Use Only
Rack/Tray No:
Lab Project #

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments (Label #)	Sample No.	Filtered Date/Time
16 Feb 93	1727	WTR		X	FCR-GW-PGP 2-03	4		40 VOA + HCl - VOC (335, 336) 1L Poly + HNO3 = Tot Metals (337) 1L Poly + NaOH = Tot/Am CN (338)		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
JD Bryan	2/16 2020	[signature]				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

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Chain of Custody Record
Analytical Services

COC No. N2 30023

WWES Proj. Mgr.	Project Name		For Lab Use Only
JH Keith	Franklin Curtis KEI		Rack/Tray No:
WWES Proj. No. 0702605	Sampler (Print) J D BRYAN		Lab Project #
	Sampler Signature JD Bryan		

No's Correspond to Bottle Packing List

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments (Label #)	Sample No.	Filtered Date/Time
17 Feb 93	0920	WTR			FCR-GW-10 5EB-03	4		40 VOA + HCl - VOC (342, 343) 1L POLY + HNO3 = Tot. METALS (344) 1L POLY + No. OH - Tot. & Am. CN (345)		
	0920				FCR-GW-PGP 4-EB	4		as above VOC (346, 347) METL (348) CN (349)		
	1130				FCR-GW-MW2 8-03	4		as above (339, 340) (341) (350)		
	1145				FCR-GW-MW2 7-03	4		as above (351, 352) (353) (354)		
	1200				FCR-GW-MW3 0-03	4		as above (355)(356) (357) (358)		
	1225				FCR-GW-MW2 9-03	4		as above (359)(360) (361) (362)		
	1200				FCR-GW-PGP 4S-03	4		as above (363, 364) (365) (366)		
	1230				FCR-GW-PGP 4D-03	4		as above (367, 368) (369) (370)		
	1505				FCR-GW-IT1 A-03	4		as above (371, 372) (373) (374)		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

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Chain of Custody Record
Analytical Services

COCNo. N2 30024

WWES Proj. Mgr.	Project Name		For Lab Use Only
JH Keith	Franklin-Curtis RFI		Rack/Tray No:
WWES Proj. No.	Sampler (Print)	JD BRYAN	Lab Project #
07026.05	Sampler Signature	JD Bryan	

No's Correspond to Bottle Packing List

(Label #)

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
17Feb93	1520	WTR		1	FCR-GW-MW2 3-03	4		VOC (375, 376) Total Metals (377) Tot & Am CN⁻ (378)		
	1525			1	FCR-GW-MW2 3-03d	4		as above (379 380) (381) (382)		
	1600			1	FCR-GW-MW2 5-03	4		as above (383 384) (385) (386)		
	1630			1	FCR-SW-SW0 2-03	3		VOC (387 388) Tot & Am CN⁻ (389)		
	1632			1	FCR-SW-SW0 2-03d	3		as above (390 391) (392)		
	1634			1	FCR-SW-SW0 2-03MS	2		VOC (393, 394)		
	1634			1	FCR-SW-SW0 2-03MSD	2		VOC (395, 396)		
	1650			1	FCR-GW-LL0 -03eb	4		VOC (397, 398) Tot Metals (399) Tot & Am CN⁻ (400)		
	1700			1	FCR-SW-ØØ- 03eb	3		VOC (401, 402) Tot & Am CN⁻ (403)		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
JD Bryan	2/18 1115	To Custody Seal				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

ESL/Charts/Chain of Custody

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Cooler 2 of 2

Chain of Custody Record
Analytical Services

COC No. N2 30051

WWES Proj. Mgr.	Project Name	No's Correspond to Bottle Packing List	For Lab Use Only
JH Keith	Franklin Curtis RFI		Rack/Tray No:
WWES Proj. No. 07026.05 ~~07206~~	Sampler (Print): J D B R Y A N		Lab Project #
	Sampler Signature: JD Bryan		

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments (Label #)	Sample No.	Filtered Date/Time
17FEB93	1700	WTR		X	FCR-GW-03t 6	2		VOC (404,405)		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
JD Bryan	2/18 1115	To Custody Seal				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

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Chain of Custody Record
Analytical Services

COCNo. M2 30054

WWES Proj. Mgr.: JH Keith
Project Name: Franklin - Curtis RFI
WWES Proj. No.: 07026.05
Sampler (Print): J D BRYAN
Sampler Signature: JD Bryan

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type (No's Correspond to Bottle Packing List)	Analysis Required/Comments (Label #)	Sample No.	Filtered Date/Time
18 Feb 03	1600	WTR			FCR-GW-PGP 3-03	4		40 VOA + HCl = VOC (406, 407) 1L Poly HNO3 = Tot Metals (410) 1L Poly NaOH = Tot + Am CN⁻ (409)		
	1615				FCR-GW-PGP 3-03d	4		as above (411, 412) (408) (413)		
	1630				FCR-GW-PGP 3-03MS	2		VOC (414, 415)		
	1645				FCR-GW-PGP 3-03MSD	2		VOC (416, 417)		
	1700				FCR-GW-PGP ØØ-03tb	2		VOC 418		

For Lab Use Only
Rack/Tray No:
Lab Project #

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
JD Bryan	2/19 1540	To Custody Seal				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

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Chain of Custody Record
Analytical Services

2 Coolers

COCNo. 30064

WWES Proj. Mgr.	Project Name	Sampler (Print)	Sampler Signature
M Veith	Franklin RFI	J D BRYAN	J D Bryan
WWES Proj. No. 1.1.2605			

For Lab Use Only: Rack/Tray No: ; Lab Project #:

Date Sampled	Time Sampled	Matrix*	Comp	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
24 FEB 93	1700	WTR			FCR-GW-PGP 6-13.0-15.0- 03	4		40 ml VOA = VOC; 1L Poly HNO3 = Total Metals; 1L Poly NaOH = Tot & Am CN (Label the)	(419 420) (421) (422)	
25 FEB 93	0920				FCR-GW-PGP 6-18.0-20.0- 03	4		VOC (423, 424); T Metals (425); T&A CN- (426)		
25 FEB 93	1015				FCR-GW-PGP 6-25.0-27.0- 03	4		VOC (431) (432); T. Metals (433); T&A. CN- (434)		
25 FEB 93	1515				FCR-GW-PGP 7-13.0-15.0- 03	4		VOC (427, 428); T. Metal (429); T&A. CN- (430)		
25 FEB 93	1620				FCR-GW-PGP 7-19.0-21.0- 03	4		VOC (435, 436); T. Metals (437); T&A. CN- (438)		
25 FEB 93	1730				FCR-GW-PGP 7-24.5-26.5- 03	4		VOC (443, 444); T Metals (445); T&A. CN- (446)		
25 FEB 93	1625				FCR-GW-PGP 7-17.0-21.0- 03 d	4		VOC. (439, 440); T. Metals (441); T&A. CN- (442)		
26 FEB 93	1200				FCR-GW-PGP 9-13.0-15.0- 03	4		VOC (447) (448); T. Metal (449); T&A. CN- (450)		
26 FEB 93	1440				FCR-GW-PGP 8-03eb	4		VOC (451) (452); T Metal (453); T&A. CN- (454)		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
J D Bryan	3/1 1400	To Custodian Seal				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

0025

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Chain of Custody Record
Analytical Services

Blanters

COCNo. N2 30066

WWES Proj. Mgr.	Project Name	No's Correspond to Bottle Packing List	For Lab Use Only
JHK	Curtis Franklin RFI		Rack/Tray No:
WWES Proj. No. 07026	Sampler (Print): J D BRYAN		Lab Project #
	Sampler Signature: J D Bryan		

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
26 FEB 93	1630	WTR			FCR-GW-PGP B-20.0-22.0-P 03	4		VOC (455, 456) T. Metal (461) T. + A. CN- (462)		
26 FEB 93	1630				FCR-GW-PGP B-20.0-22.0-P 03 MS	2		VOC (457, 458)		
26 FEB 93	1630				FCR-GW-PGP B-20.0-22.0-P 03 MSD	2		VOC (459, 460)		
26 FEB 93	1900				FCR-SW-SW0 2-03 eb	1		Tot + Am CN (463)		
26 FEB 93	1900				FCR-GW-PGP -03 tb	2		VOC (465, 466)		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
J D Bryan	3/1 1000	To Custody Seal				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

0025

ESI/Charts/Chain of Custody

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Chain of Custody Record
Analytical Services

COC No. NO 30083

WWES Proj. Mgr.: KLITH
Project Name: FRANKLIN - CURTIS
WWES Proj. No.:
Sampler (Print): L Y T L C
Sampler Signature: Martin Lytle

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	For Lab Use Only: Sample No.	Filtered Date/Time
3/2/93	9:30A	WTR		X	FCR-GW-PGP 03CB	2	X	40ml VOA/HCl VOC TAG# 467 468		
						1	X	1L poly/HNO3 METALS TAG# 469		
						1	X	1L poly/NaOH CN- TAG# 470		
	9:45A				FCR-GW-PGP 1003	2	X	VOC TAG# 471 472		
						1	X	METALS TAG# 473		
						1	X	CN- TAG# 474		
	9:45A				FCR-GW-PGP 10 03D	2	X	VOC TAG# 475 476		
						1	X	METALS TAG# 477		
						1	X	CN- TAG# 478		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
Martin Lytle	3/2/93 3:00P	Custody Seal				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

0025

ESL/Charts/Chain of Custody

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Chain of Custody Record
Analytical Services

COCNo. N2 30041

WWES Proj. Mgr.: KEITH
WWES Proj. No.:
Project Name: FRANKLIN - CURTIS
Sampler (Print): L Y T L C
Sampler Signature: Martin Lytle

No's Correspond to Bottle Packing List

For Lab Use Only
Rack/Tray No:
Lab Project #

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
3/2/93	9:35A	WTR		X	FCR-GW-PGPLO 03MS	2	X	40ml VOA / HCl TAG# 479 480 VOC		
	9:35A				FCR-GW-PGPLO 03MSD	2	X	VOC TAG# 481 482		
	11:00A				FCR-GW-PGPLO 03TB	2.	X	VOC TAG# 483 484		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
Martin Lytle	3/2/93 3:00P	Custody Seal				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

0025

ESL/Charts/Chain of Custody

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSWSW0101, FCRSWSW0201, FCRSWSW0201D, FCRSWSW0501, TB-1, FCRSWSW0201MS, FCRSWSW0201MSD, SDSB0110001, SDSB0112001, SBSB0210001, SSSD0101, SSSD0201, SSS0201D, SSD0301, SSSD0401, SSSD0401B, SSSD0501

b. **Holding Times:**
All samples were analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria except for samples analyzed on 3/2/92. Data estimated for dichloro ethylene, dichloropropene & 1,1,2,2 tetrachloroethane due to poor RPD (J).

e. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
No lab duplicate performed on soil samples. All soils estimated (J). Water duplicate met QAPP criteria.

h. **Field Duplicates:**
Field duplicate for soil samples had poor RPD for Methylene Chloride. Data estimated (J).

i. **Matrix Spike Recoveries:**
No matrix spike performed on soil samples. All soils estimated (J). Matrix spike for water samples met QAPP criteria.

j. Trip Blanks:

No contamination found in trip blanks.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

dc FCl SBSB0110001

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885512

Sample wt/vol: 2.0 (g/mL) G Lab File ID: IC719

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 6 Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	27	UJ
74-83-9	Bromomethane	27	UJ
75-01-4	Vinyl Chloride	27	UJ
75-00-3	Chloroethane	27	UJ
75-09-2	Methylene Chloride	64	J
67-64-1	Acetone	27	UJ
75-15-0	Carbon Disulfide	13	UJ
75-35-4	1,1-Dichloroethene	13	UJ
75-34-3	1,1-Dichloroethane	13	UJ
540-59-0	1,2-Dichloroethene (total)	13	UJ
67-66-3	Chloroform	13	UJ
107-06-2	1,2-Dichloroethane	13	UJ
78-93-3	2-Butanone	27	UJ
71-55-6	1,1,1-Trichloroethane	29	J
56-23-5	Carbon Tetrachloride	13	UJ
108-05-4	Vinyl Acetate	27	UJ
75-27-4	Bromodichloromethane	13	UJ
78-87-5	1,2-Dichloropropane	13	UJ
10061-01-5	cis-1,3-Dichloropropene	13	UJ
79-01-6	Trichloroethene	140	J
124-48-1	Dibromochloromethane	13	UJ
79-00-5	1,1,2-Trichloroethane	13	UJ
71-43-2	Benzene	13	UJ
10061-02-6	Trans-1,3-Dichloropropene	13	UJ
75-25-2	Bromoform	13	UJ
108-10-1	4-Methyl-2-Pentanone	27	UJ
591-78-6	2-Hexanone	27	UJ
127-18-4	Tetrachloroethene	390	J
79-34-5	1,1,2,2-Tetrachloroethane	13	UJ
108-88-3	Toluene	13	UJ
108-90-7	Chlorobenzene	13	UJ
100-41-4	Ethylbenzene	13	UJ
100-42-5	Styrene	13	UJ
1330-20-7	Xylene (total)	13	UJ

FORM I VOA 1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCSBSB0112001

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885511

Sample wt/vol: 2.0 (g/mL) G Lab File ID: IC718

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 6 Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	27	U J
74-83-9	Bromomethane	27	U J
75-01-4	Vinyl Chloride	27	U J
75-00-3	Chloroethane	27	U J
75-09-2	Methylene Chloride	77	J
67-64-1	Acetone	27	U J
75-15-0	Carbon Disulfide	13	U J
75-35-4	1,1-Dichloroethene	13	U J
75-34-3	1,1-Dichloroethane	13	U J
540-59-0	1,2-Dichloroethene (total)	13	U J
67-66-3	Chloroform	13	U J
107-06-2	1,2-Dichloroethane	13	U J
78-93-3	2-Butanone	27	U J
71-55-6	1,1,1-Trichloroethane	23	J
56-23-5	Carbon Tetrachloride	13	U J
108-05-4	Vinyl Acetate	27	U J
75-27-4	Bromodichloromethane	13	U J
78-87-5	1,2-Dichloropropane	13	U J
10061-01-5	cis-1,3-Dichloropropene	13	U J
79-01-6	Trichloroethene	120	J
124-48-1	Dibromochloromethane	13	U J
79-00-5	1,1,2-Trichloroethane	13	U J
71-43-2	Benzene	13	U J
10061-02-6	Trans-1,3-Dichloropropene	13	U J
75-25-2	Bromoform	13	U J
108-10-1	4-Methyl-2-Pentanone	27	U J
591-78-6	2-Hexanone	27	U J
127-18-4	Tetrachloroethene	310	J
79-34-5	1,1,2,2-Tetrachloroethane	13	U J
108-88-3	Toluene	13	U J
108-90-7	Chlorobenzene	13	U J
100-41-4	Ethylbenzene	13	U J
100-42-5	Styrene	13	U J
1330-20-7	Xylene (total)	13	U J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

dee FCLSBSB0210001

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885513

Sample wt/vol: 2.0 (g/mL) G Lab File ID: IC720

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 7 Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	27	U J
74-83-9	Bromomethane	27	U J
75-01-4	Vinyl Chloride	27	U J
75-00-3	Chloroethane	27	U J
75-09-2	Methylene Chloride	63	J
67-64-1	Acetone	35	B J
75-15-0	Carbon Disulfide	13	U J
75-35-4	1,1-Dichloroethene	13	U J
75-34-3	1,1-Dichloroethane	13	U J
540-59-0	1,2-Dichloroethene (total)	13	U J
67-66-3	Chloroform	13	U J
107-06-2	1,2-Dichloroethane	13	U J
78-93-3	2-Butanone	27	U J
71-55-6	1,1,1-Trichloroethane	26	J
56-23-5	Carbon Tetrachloride	13	U J
108-05-4	Vinyl Acetate	27	U J
75-27-4	Bromodichloromethane	13	U J
78-87-5	1,2-Dichloropropane	13	U J
~~10061-01-5~~	~~cis-1,3-Dichloropropene~~	13	U J
79-01-6	Trichloroethene	140	J
124-48-1	Dibromochloromethane	13	U J
79-00-5	1,1,2-Trichloroethane	13	U J
71-43-2	Benzene	13	U J
10061-02-6	Trans-1,3-Dichloropropene	13	U J
75-25-2	Bromoform	13	U J
108-10-1	4-Methyl-2-Pentanone	27	U J
591-78-6	2-Hexanone	27	U J
127-18-4	Tetrachloroethene	370	J
79-34-5	1,1,2,2-Tetrachloroethane	13	U J
108-88-3	Toluene	13	U J
108-90-7	Chlorobenzene	13	U J
100-41-4	Ethylbenzene	13	U J
100-42-5	Styrene	13	U J
1330-20-7	Xylene (total)	13	U J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SSSD0101

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885504

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC714

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 15 Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U J
74-83-9	Bromomethane	12	U J
75-01-4	Vinyl Chloride	12	U J
75-00-3	Chloroethane	12	U J
75-09-2	Methylene Chloride	35	J
67-64-1	Acetone	12	U J
75-15-0	Carbon Disulfide	6	U J
75-35-4	1,1-Dichloroethene	6	U J
75-34-3	1,1-Dichloroethane	6	U J
540-59-0	1,2-Dichloroethene (total)	6	U J
67-66-3	Chloroform	6	U J
107-06-2	1,2-Dichloroethane	6	U J
78-93-3	2-Butanone	12	U J
71-55-6	1,1,1-Trichloroethane	6	U J
56-23-5	Carbon Tetrachloride	6	U J
108-05-4	Vinyl Acetate	12	U J
75-27-4	Bromodichloromethane	6	U J
78-87-5	1,2-Dichloropropane	6	U J
10061-01-5	cis-1,3-Dichloropropene	6	U J
79-01-6	Trichloroethene	6	U J
124-48-1	Dibromochloromethane	6	U J
79-00-5	1,1,2-Trichloroethane	6	U J
71-43-2	Benzene	6	U J
10061-02-6	Trans-1,3-Dichloropropene	6	U J
75-25-2	Bromoform	6	U J
108-10-1	4-Methyl-2-Pentanone	12	U J
591-78-6	2-Hexanone	12	U J
127-18-4	Tetrachloroethene	5	J J
79-34-5	1,1,2,2-Tetrachloroethane	6	U J
108-88-3	Toluene	6	U J
108-90-7	Chlorobenzene	6	U J
100-41-4	Ethylbenzene	6	U J
100-42-5	Styrene	6	U J
1330-20-7	Xylene (total)	6	U J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SSSD0201

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885509

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC715

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 44 Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	18	U J
~~74-83-9~~	~~Bromomethane~~	18	U J
75-01-4	Vinyl Chloride	18	U J
75-00-3	Chloroethane	18	U J
75-09-2	Methylene Chloride	42	J
67-64-1	Acetone	33	B J
75-15-0	Carbon Disulfide	9	U J
75-35-4	1,1-Dichloroethene	9	U J
75-34-3	1,1-Dichloroethane	9	U J
540-59-0	1,2-Dichloroethene (total)	9	U J
67-66-3	Chloroform	9	U J
107-06-2	1,2-Dichloroethane	9	U J
78-93-3	2-Butanone	18	U J
71-55-6	1,1,1-Trichloroethane	9	U J
56-23-5	~~Carbon Tetrachloride~~	9	U J
108-05-4	Vinyl Acetate	18	U J
~~75-27-4~~	~~Bromodichloromethane~~	9	U J
78-87-5	1,2-Dichloropropane	9	U J
10061-01-5	cis-1,3-Dichloropropene	9	U J
79-01-6	Trichloroethene	9	U J
124-48-1	Dibromochloromethane	9	U J
79-00-5	1,1,2-Trichloroethane	9	U J
71-43-2	Benzene	9	U J
10061-02-6	Trans-1,3-Dichloropropene	9	U J
75-25-2	Bromoform	9	U J
108-10-1	4-Methyl-2-Pentanone	18	U J
591-78-6	2-Hexanone	18	U J
127-18-4	Tetrachloroethene	9	U J
79-34-5	1,1,2,2-Tetrachloroethane	9	U J
108-88-3	Toluene	9	U J
108-90-7	Chlorobenzene	9	U J
100-41-4	Ethylbenzene	9	U J
100-42-5	Styrene	9	U J
1330-20-7	Xylene (total)	9	U J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SSD0201D

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885517

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC717

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 35 Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	15	U J
74-83-9	Bromomethane	15	U J
75-01-4	Vinyl Chloride	15	U J
75-00-3	Chloroethane	15	U J
75-09-2	Methylene Chloride	28	J
67-64-1	Acetone	28	B J
75-15-0	Carbon Disulfide	8	U J
75-35-4	1,1-Dichloroethene	8	U J
75-34-3	1,1-Dichloroethane	8	U J
540-59-0	1,2-Dichloroethene (total)	8	U J
67-66-3	Chloroform	8	U J
107-06-2	1,2-Dichloroethane	8	U J
~~78-93-3~~	~~2-Butanone~~	15	U J
~~71-55-6~~	~~1,1,1-Trichloroethane~~	8	U J
56-23-5	Carbon Tetrachloride	8	U J
108-05-4	Vinyl Acetate	15	U J
75-27-4	Bromodichloromethane	8	U J
78-87-5	1,2-Dichloropropane	8	U J
10061-01-5	cis-1,3-Dichloropropene	8	U J
79-01-6	Trichloroethene	8	U J
124-48-1	Dibromochloromethane	8	U J
79-00-5	1,1,2-Trichloroethane	8	U J
71-43-2	Benzene	8	U J
10061-02-6	Trans-1,3-Dichloropropene	8	U J
75-25-2	Bromoform	8	U J
108-10-1	4-Methyl-2-Pentanone	15	U J
591-78-6	2-Hexanone	15	U J
127-18-4	Tetrachloroethene	4	J
79-34-5	1,1,2,2-Tetrachloroethane	8	U J
108-88-3	Toluene	8	U J
108-90-7	Chlorobenzene	8	U J
100-41-4	Ethylbenzene	8	U J
100-42-5	Styrene	8	U J
1330-20-7	Xylene (total)	8	U J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SSSD0301

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885502

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC701

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 16 Date Analyzed: 02/28/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	12	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
~~107-06-2~~	~~1,2-Dichloroethane~~	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

WFCSSD0401

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885501

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC700

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 14 Date Analyzed: 02/28/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U J
74-83-9	Bromomethane	12	U J
75-01-4	Vinyl Chloride	12	U J
~~75-00-3~~	~~Chloroethane~~	12	U J
75-09-2	Methylene Chloride	6	U J
67-64-1	Acetone	12	U J
75-15-0	Carbon Disulfide	6	U J
75-35-4	1,1-Dichloroethene	6	U J
75-34-3	1,1-Dichloroethane	6	U J
540-59-0	1,2-Dichloroethene (total)	6	U J
67-66-3	Chloroform	6	U J
107-06-2	1,2-Dichloroethane	6	U J
78-93-3	2-Butanone	12	U J
71-55-6	1,1,1-Trichloroethane	6	U J
56-23-5	Carbon Tetrachloride	6	U J
108-05-4	Vinyl Acetate	12	U J
~~75-27-4~~	~~Bromodichloromethane~~	6	U J
78-87-5	1,2-Dichloropropane	6	U J
10061-01-5	cis-1,3-Dichloropropene	6	U J
79-01-6	Trichloroethene	6	U J
~~124-48-1~~	~~Dibromochloromethane~~	6	U J
79-00-5	1,1,2-Trichloroethane	6	U J
71-43-2	Benzene	6	U J
10061-02-6	Trans-1,3-Dichloropropene	6	U J
75-25-2	Bromoform	6	U J
108-10-1	4-Methyl-2-Pentanone	12	U J
591-78-6	2-Hexanone	12	U J
127-18-4	Tetrachloroethene	6	U J
79-34-5	1,1,2,2-Tetrachloroethane	6	U J
108-88-3	Toluene	6	U J
108-90-7	Chlorobenzene	6	U J
100-41-4	Ethylbenzene	6	U J
100-42-5	Styrene	6	U J
1330-20-7	Xylene (total)	6	U J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SSD0401B

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885516

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC699

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 1 Date Analyzed: 02/28/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U J
74-83-9	Bromomethane	10	U J
75-01-4	Vinyl Chloride	10	U J
75-00-3	Chloroethane	10	U J
75-09-2	Methylene Chloride	5	U J
67-64-1	Acetone	10	U J
75-15-0	Carbon Disulfide	5	U J
75-35-4	1,1-Dichloroethene	5	U J
75-34-3	1,1-Dichloroethane	5	U J
540-59-0	1,2-Dichloroethene (total)	5	U J
67-66-3	Chloroform	5	U J
107-06-2	1,2-Dichloroethane	5	U J
78-93-3	2-Butanone	10	U J
71-55-6	1,1,1-Trichloroethane	5	U J
56-23-5	Carbon Tetrachloride	5	U J
108-05-4	Vinyl Acetate	10	U J
75-27-4	Bromodichloromethane	5	U J
78-87-5	1,2-Dichloropropane	5	U J
10061-01-5	cis-1,3-Dichloropropene	5	U J
79-01-6	Trichloroethene	5	U J
124-48-1	Dibromochloromethane	5	U J
79-00-5	1,1,2-Trichloroethane	5	U J
71-43-2	Benzene	5	U J
10061-02-6	Trans-1,3-Dichloropropene	5	U J
75-25-2	Bromoform	5	U J
108-10-1	4-Methyl-2-Pentanone	10	U J
591-78-6	2-Hexanone	10	U J
127-18-4	Tetrachloroethene	5	U J
79-34-5	1,1,2,2-Tetrachloroethane	5	U J
108-88-3	Toluene	5	U J
108-90-7	Chlorobenzene	5	U J
100-41-4	Ethylbenzene	5	U J
100-42-5	Styrene	5	U J
1330-20-7	Xylene (total)	5	U J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SSD0501

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) SOIL Lab Sample ID: 885514

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC716

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. 23 Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U J
74-83-9	Bromomethane	13	U J
75-01-4	Vinyl Chloride	13	U J
75-00-3	Chloroethane	13	U J
75-09-2	Methylene Chloride	36	J
67-64-1	Acetone	13	U J
75-15-0	Carbon Disulfide	6	U J
75-35-4	1,1-Dichloroethene	6	U J
75-34-3	1,1-Dichloroethane	6	U J
540-59-0	1,2-Dichloroethene (total)	6	U J
67-66-3	Chloroform	6	U J
107-06-2	1,2-Dichloroethane	6	U J
78-93-3	2-Butanone	13	U J
71-55-6	1,1,1-Trichloroethane	6	U J
56-23-5	Carbon Tetrachloride	6	U J
108-05-4	Vinyl Acetate	13	U J
75-27-4	Bromodichloromethane	6	U J
78-87-5	1,2-Dichloropropane	6	U J
10061-01-5	cis-1,3-Dichloropropene	6	U J
79-01-6	Trichloroethene	6	U J
124-48-1	Dibromochloromethane	6	U J
79-00-5	1,1,2-Trichloroethane	6	U J
71-43-2	Benzene	6	U J
10061-02-6	Trans-1,3-Dichloropropene	6	U J
75-25-2	Bromoform	6	U J
108-10-1	4-Methyl-2-Pentanone	13	U J
591-78-6	2-Hexanone	13	U J
127-18-4	Tetrachloroethene	5	J
79-34-5	1,1,2,2-Tetrachloroethane	6	U J
108-88-3	Toluene	6	U J
108-90-7	Chlorobenzene	6	U J
100-41-4	Ethylbenzene	6	U J
100-42-5	Styrene	6	U J
1330-20-7	Xylene (total)	6	U J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SWSW0101

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) WATER Lab Sample ID: 885503

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM069

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. ____ Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
~~75-35-4~~	~~1,1-Di~~chloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

doc SWSW0201D

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) WATER Lab Sample ID: 885506

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM071

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. ____ Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
~~75-09-2~~	~~Methylene Chloride~~	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
~~540-59-0~~	~~1,2-Dichloroethene~~ (total)	5	U
67-66-3	Chloroform	5	U
~~107-06-2~~	~~1,2-Dichloroethane~~	5	U
78-93-3	2-Butanone	10	U
~~71-55-6~~	~~1,1,1-Trichloroethane~~	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
~~124-48-1~~	~~Dibromochloromethane~~	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

service SWSW0201

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8855

Matrix: (soil/water) WATER Lab Sample ID: 885505

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM070

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. ____ Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

WSW0501

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: SDG No.: 8855

Matrix: (soil/water) WATER Lab Sample ID: 885510

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM074

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. Date Analyzed: 03/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
~~74-83-9~~	~~Bromomethane~~	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
~~78-87-5~~	~~1,2-Dichloropropane~~	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB-1

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: SDG No.: 8855

Matrix: (soil/water) WATER Lab Sample ID: 885515

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM051

Level: (low/med) LOW Date Received: 02/27/92

% Moisture: not dec. Date Analyzed: 02/28/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	~~1,2-Dichloroethene~~ (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
~~75-27-4~~	~~Bromodichloromethane~~	5	U
78-87-5	1,2-Dichloropropane	5	U
~~10061-01-5~~	~~cis-1,3-Dichloropropene~~	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

DATA VALIDATION
FRANKLIN CURTIS SITE

Inorganic Analysis

a. **Sample Numbers:**
FC0031, FC0241, FC1021, FC0241L

b. **Holding Times:**
All analyses were performed within holding times.

c. **Calibration:**
Calibration for ICP & GFAA met QAPP criteria.

d. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

e. **ICP Serial Dilution:**
ICP serial dilution for Copper, Nickel, Sodium & Zinc showed a matrix interference. Data estimated (J).

f. **Laboratory Duplicates:**
Laboratory duplicates were not performed. All data estimated (J).

g. **Laboratory Matrix Spikes:**
Matrix spikes not performed. Data estimated (J).

h. **Field Duplicates:**
No field duplicates were collected.

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

002

FC0031

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8929 SAS No.: SDG No.: FC0031

Matrix (soil/water): WATER Lab Sample ID: 892911

Level (low/med): LOW Date Received: 3/04/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4860.00		J	P
7440-36-0	Antimony	17.00	U	J	P
7440-38-2	Arsenic	3.30	B	J	F
7440-39-3	Barium	269.00		J	P
7440-41-7	Beryllium	1.00	U	J	P
7440-43-9	Cadmium	2.00	U	J	P
7440-70-2	Calcium	340000.00		J	P
7440-47-3	Chromium	15.60		J	P
7440-48-4	Cobalt	8.00	B	J	P
7440-50-8	Copper	90.60		J	P
7439-89-6	Iron	8790.00		J	P
7439-92-1	Lead	29.50		SJ	F
7439-95-4	Magnesium	65700.00		J	P
7439-96-5	Manganese	982.00		J	P
7439-97-6	Mercury	.26		J	CV
7440-02-0	Nickel	58.80		J	P
7440-09-7	Potassium	3540.00	B	J	P
7782-49-2	Selenium	3.40	B	J	F
7440-22-4	Silver	12.10		J	P
7440-23-5	Sodium	8790.00		J	P
7440-28-0	Thallium	2.00	U	J	F
7440-62-2	Vanadium	20.00	B	J	P
7440-66-6	Zinc	94.40		EJ	P
	Cyanide	10.00	U	J	CA

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
FC0031 REFLECTS CLIENT ID FCR-GW-MW3-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

003

FC0241

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8929 SAS No.: SDG No.: FC0031

Matrix (soil/water): WATER Lab Sample ID: 892909

Level (low/med): LOW Date Received: 3/04/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15600.00		J	P
7440-36-0	Antimony	17.00	U	J	P
7440-38-2	Arsenic	4.40	B	J	F
7440-39-3	Barium	505.00		J	P
7440-41-7	Beryllium	2.30	B	J	P
7440-43-9	Cadmium	2.00	U	J	P
7440-70-2	Calcium	774000.00		J	P
7440-47-3	Chromium	37.10		J	P
7440-48-4	Cobalt	23.10	B	J	P
7440-50-8	Copper	142.00		J	P
7439-89-6	Iron	18100.00		J	P
7439-92-1	Lead	89.40		WJ	F
7439-95-4	Magnesium	178000.00		J	P
7439-96-5	Manganese	2170.00		J	P
7439-97-6	Mercury	.67		J	CV
7440-02-0	Nickel	65.20		J	P
7440-09-7	Potassium	5530.00		J	P
7782-49-2	Selenium	4.90	B	SJ	F
7440-22-4	Silver	2.00	U	J	P
7440-23-5	Sodium	5840.00		J	P
7440-28-0	Thallium	2.00	U	J	F
7440-62-2	Vanadium	53.80		J	P
7440-66-6	Zinc	224.00		EJ	P
	Cyanide	10.00	U	J	CA

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
FC0241 REFLECTS CLIENT ID FCR-GW-MW24-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

004

FC1021

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8929 SAS No.: SDG No.: FC0031

Matrix (soil/water): WATER Lab Sample ID: 892910

Level (low/med): LOW Date Received: 3/04/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	108.00	B	J	P
7440-36-0	Antimony	17.00	U	J	P
7440-38-2	Arsenic	2.00	U	WJ	F
7440-39-3	Barium	6.00	U	J	P
7440-41-7	Beryllium	1.00	U	J	P
7440-43-9	Cadmium	2.00	U	J	P
7440-70-2	Calcium	266.00	U	J	P
7440-47-3	Chromium	4.00	U	J	P
7440-48-4	Cobalt	4.00	U	J	P
7440-50-8	Copper	6.00	U	J	P
7439-89-6	Iron	40.00	U	J	P
7439-92-1	Lead	2.50	B	J	F
7439-95-4	Magnesium	112.00	U	J	P
7439-96-5	Manganese	2.00	U	J	P
7439-97-6	Mercury	.20	U	J	CV
7440-02-0	Nickel	7.00	U	J	P
7440-09-7	Potassium	402.00	U	J	P
7782-49-2	Selenium	2.00	U	J	F
7440-22-4	Silver	2.00	U	J	P
7440-23-5	Sodium	682.00	B	J	P
7440-28-0	Thallium	2.00	U	WJ	F
7440-62-2	Vanadium	4.00	U	J	P
7440-66-6	Zinc	6.50	B	EJ	P
	Cyanide	10.00	U	J	CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
FC1021 REFLECTS CLIENT ID FCR-GW-MW102-01EB

DATA VALIDATION
FRANKLIN CURTIS SITE

Inorganic Analysis

a. **Sample Numbers:**
MF0101, MF0201, MF0301, MF0401, MF0401D, MF0401S, MF0501, MF1011, MF1021, MF1201, MFD001, MFD201, MFW101, MF101D, MFW201, MFW201S, MFW2D1, MFW501

b. **Holding Times:**
All samples were analyzed within holding times.

c. **Calibration:**
ICP & GFAA calibrations met QAPP criteria.

d. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

e. **ICP Serial Dilution:**
ICP serial dilutions for Nickel & Calcium exceeded 10%. Data is estimated (J).

f. **Laboratory Duplicates:**
Duplicate results for Aluminum, Antimony, Iron, Manganese, Nickel & Zinc exceed QAPP criteria. Data is estimated (J).

g. **Laboratory Matrix Spikes:**
Data for Antimony & Selenium exceed QAPP criteria. Data is estimated (J).
Post Digestion Spike for Thallium was out of control. Data estimated (J).

h. **Field Duplicates:**
Field duplicates were not performed.

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

003

MF0101

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885504

Level (low/med): LOW Date Received: 2/27/92

% Solids: 84.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3830.00		*J	P
7440-36-0	Antimony	9.10	B	NJ	P
7440-38-2	Arsenic	3.60			F
7440-39-3	Barium	37.20	B		P
7440-41-7	Beryllium	1.20	B		P
7440-43-9	Cadmium	.71	U		P
7440-70-2	Calcium	97600.00		EJ	P
7440-47-3	Chromium	2.20	B		P
7440-48-4	Cobalt	4.10	B		P
7440-50-8	Copper	11.40			P
7439-89-6	Iron	7170.00		*J	P
7439-92-1	Lead	12.40			F
7439-95-4	Magnesium	35400.00			P
7439-96-5	Manganese	308.00		*J	P
7439-97-6	Mercury	.12	U		CV
7440-02-0	Nickel	8.20	B	J	P
7440-09-7	Potassium	455.00	B		P
7782-49-2	Selenium	.71	U	NJ	F
7440-22-4	Silver	1.90	U		P
7440-23-5	Sodium	108.00	U		P
7440-28-0	Thallium	.48	U	WJ	F
7440-62-2	Vanadium	9.90	B		P
7440-66-6	Zinc	36.00		*J	P
	Cyanide	.59	U		CA

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0101 REFLECTS CLIENT ID FCR-SS-SD01-01

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EPA SAMPLE NO.

004

1

INORGANIC ANALYSIS DATA SHEET

MF0201

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885509

Level (low/med): LOW Date Received: 2/27/92

% Solids: 56.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8780.00		*J	P
7440-36-0	Antimony	11.70	U	NJ	P
7440-38-2	Arsenic	3.60			F
7440-39-3	Barium	70.50	B		P
7440-41-7	Beryllium	.82	B		P
7440-43-9	Cadmium	1.10	U		P
7440-70-2	Calcium	31400.00		EJ	P
7440-47-3	Chromium	12.90			P
7440-48-4	Cobalt	6.20	B		P
7440-50-8	Copper	32.90			P
7439-89-6	Iron	13400.00		*J	P
7439-92-1	Lead	40.70			F
7439-95-4	Magnesium	10900.00			P
7439-96-5	Manganese	400.00		*J	P
7439-97-6	Mercury	.18	U		CV
7440-02-0	Nickel	14.70		J	P
7440-09-7	Potassium	1020.00	B		P
7782-49-2	Selenium	1.10	U	NJ	F
7440-22-4	Silver	2.80	U		P
7440-23-5	Sodium	162.00	U		P
7440-28-0	Thallium	.71	U	WJ	F
7440-62-2	Vanadium	20.70			P
7440-66-6	Zinc	194.00		*J	P
	Cyanide	.89	U		CA

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0201 REFLECTS CLIENT ID FCR-SS-SD02-01

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EPA SAMPLE NO.

005

1

INORGANIC ANALYSIS DATA SHEET

MF0301

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8885 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885502

Level (low/med): LOW Date Received: 2/27/92

% Solids: 85.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1210.00		*J	P
7440-36-0	Antimony	7.70	U	NJ	P
7440-38-2	Arsenic	2.90			F
7440-39-3	Barium	12.20	B		P
7440-41-7	Beryllium	1.30			P
7440-43-9	Cadmium	.70	U		P
7440-70-2	Calcium	128000.00		EJ	P
7440-47-3	Chromium	1.20	U		P
7440-48-4	Cobalt	3.10	B		P
7440-50-8	Copper	6.70			P
7439-89-6	Iron	5040.00		*J	P
7439-92-1	Lead	4.20		S	F
7439-95-4	Magnesium	46900.00			P
7439-96-5	Manganese	306.00		*J	P
7439-97-6	Mercury	.12	U		CV
7440-02-0	Nickel	4.80	B	J	P
7440-09-7	Potassium	220.00	B		P
7782-49-2	Selenium	.70	U	NJ	F
7440-22-4	Silver	1.90	U		P
7440-23-5	Sodium	107.00	U		P
7440-28-0	Thallium	.47	U	WJ	F
7440-62-2	Vanadium	6.80	B		P
7440-66-6	Zinc	20.40		*J	P
	Cyanide	.59	U		CA

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0301 REFLECTS CLIENT ID FCR-SS-SD03-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

008

MF0401

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885501

Level (low/med): LOW Date Received: 2/27/92

% Solids: 85.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1910.00		*J	P
7440-36-0	Antimony	8.50	B	N J	P
7440-38-2	Arsenic	2.90			F
7440-39-3	Barium	15.00	B		P
7440-41-7	Beryllium	1.50			P
7440-43-9	Cadmium	.70	U		P
7440-70-2	Calcium	180000.00		E J	P
7440-47-3	Chromium	1.20	U		P
7440-48-4	Cobalt	3.50	B		P
7440-50-8	Copper	9.20			P
7439-89-6	Iron	5000.00		*J	P
7439-92-1	Lead	5.90		W J	F
7439-95-4	Magnesium	51500.00			P
7439-96-5	Manganese	299.00		*J	P
7439-97-6	Mercury	.12	U		CV
7440-02-0	Nickel	5.50	B	J	P
7440-09-7	Potassium	276.00	B		P
7782-49-2	Selenium	.70	U	N J	F
7440-22-4	Silver	1.90	U		P
7440-23-5	Sodium	106.00	U		P
7440-28-0	Thallium	.47	U	W J	F
7440-62-2	Vanadium	6.70	B		P
7440-66-6	Zinc	27.20		*J	P
	Cyanide	.58	U		CA

Color Before: GREY Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0401 REFLECTS CLIENT ID FCR-SS-SD04-01

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EPA SAMPLE NO.

007

1

INORGANIC ANALYSIS DATA SHEET

MF0501

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885514

Level (low/med): LOW Date Received: 2/27/92

% Solids: 74.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentraatio	C	Q	M
7429-90-5	Aluminum	7900.00		*J	P
7440-36-0	Antimony	8.90	U	NJ	P
7440-38-2	Arsenic	4.40			F
7440-39-3	Barium	63.70			P
7440-41-7	Beryllium	.70	B		P
7440-43-9	Cadmium	.81	U		P
7440-70-2	Calcium	23200.00		EJ	P
7440-47-3	Chromium	12.20			P
7440-48-4	Cobalt	5.60	B		P
7440-50-8	Copper	29.20			P
7439-89-6	Iron	16200.00		*J	P
7439-92-1	Lead	72.40		WJ	F
7439-95-4	Magnesium	8730.00			P
7439-96-5	Manganese	368.00		*J	P
7439-97-6	Mercury	.13	U		CV
7440-02-0	Nickel	14.30			P
7440-09-7	Potassium	802.00	B		P
7782-49-2	Selenium	.81	U	NJ	F
7440-22-4	Silver	2.20	U		P
7440-23-5	Sodium	123.00	U		P
7440-28-0	Thallium	.54	U	WJ	F
7440-62-2	Vanadium	20.70			P
7440-66-6	Zinc	119.00		*J	P
	Cyanide	.67	U		CA

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0501 REFLECTS CLIENT ID FCR-SS-SD05-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

008

MF1011

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885512

Level (low/med): LOW Date Received: 2/27/92

% Solids: 90.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6850.00		*J	P
7440-36-0	Antimony	7.30	U	NJ	P
7440-38-2	Arsenic	6.30			F
7440-39-3	Barium	34.00	B		P
7440-41-7	Beryllium	.81	B		P
7440-43-9	Cadmium	.66	U		P
7440-70-2	Calcium	51400.00		EJ	P
7440-47-3	Chromium	8.50			P
7440-48-4	Cobalt	3.90	B		P
7440-50-8	Copper	516.00			P
7439-89-6	Iron	11700.00		*J	P
7439-92-1	Lead	9.30		SJ	F
7439-95-4	Magnesium	13200.00			P
7439-96-5	Manganese	417.00		*J	P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	12.90			P
7440-09-7	Potassium	1090.00	B		P
7782-49-2	Selenium	.66	U	NJ	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	101.00	U		P
7440-28-0	Thallium	.44	U	WJ	F
7440-62-2	Vanadium	16.10			P
7440-66-6	Zinc	43.90		*J	P
	Cyanide	21.60			CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF1011 REFLECTS CLIENT ID FCR-SB-SB01-10.0-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

009

MF1021

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885513

Level (low/med): LOW Date Received: 2/27/92

% Solids: 87.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3180.00		*J	P
7440-36-0	Antimony	7.60	U	NJ	P
7440-38-2	Arsenic	5.90			F
7440-39-3	Barium	12.40	B		P
7440-41-7	Beryllium	1.10	B		P
7440-43-9	Cadmium	.69	U		P
7440-70-2	Calcium	99200.00		EJ	P
7440-47-3	Chromium	1.80	B		P
7440-48-4	Cobalt	3.60	B		P
7440-50-8	Copper	65.10			P
7439-89-6	Iron	8460.00		*J	P
7439-92-1	Lead	5.90			F
7439-95-4	Magnesium	29100.00			P
7439-96-5	Manganese	267.00		*J	P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	9.70		J	P
7440-09-7	Potassium	622.00	B		P
7782-49-2	Selenium	.69	U	NJ	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	104.00	U		P
7440-28-0	Thallium	.46	U	WJ	F
7440-62-2	Vanadium	10.80	B		P
7440-66-6	Zinc	31.80		*J	P
	Cyanide	.94			CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF1021 REFLECTS CLIENT ID FCR-SB-SB02-10.0-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

010

MF1201

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885511

Level (low/med): LOW Date Received: 2/27/92

% Solids: 94.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1860.00		*J	P
7440-36-0	Antimony	12.30	B	NJ	P
7440-38-2	Arsenic	4.60			F
7440-39-3	Barium	8.60	B		P
7440-41-7	Beryllium	1.10			P
7440-43-9	Cadmium	.63	U		P
7440-70-2	Calcium	101000.00		EJ	P
7440-47-3	Chromium	1.10	U		P
7440-48-4	Cobalt	2.70	B		P
7440-50-8	Copper	1970.00			P
7439-89-6	Iron	6030.00		*J	P
7439-92-1	Lead	5.10			F
7439-95-4	Magnesium	30000.00			P
7439-96-5	Manganese	225.00		*J	P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	5.50	B	J	P
7440-09-7	Potassium	412.00	B		P
7782-49-2	Selenium	.63	U	NJ	F
7440-22-4	Silver	1.70	U		P
7440-23-5	Sodium	96.20	U		P
7440-28-0	Thallium	.42	U	WJ	F
7440-62-2	Vanadium	6.90	B		P
7440-66-6	Zinc	27.70		*J	P
	Cyanide	20.50			CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF1201 REFLECTS CLIENT ID FCR-SB-SB01-12.0-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

011

MFD001

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885516

Level (low/med): LOW Date Received: 2/27/92

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	22.30	B	*J	P
7440-36-0	Antimony	6.60	U	N J	P
7440-38-2	Arsenic	1.40	U		F
7440-39-3	Barium	2.00	U		P
7440-41-7	Beryllium	.20	U		P
7440-43-9	Cadmium	.60	U		P
7440-70-2	Calcium	100.00	U	E J	P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	1.00	U		P
7440-50-8	Copper	1.40	U		P
7439-89-6	Iron	54.40		*J	P
7439-92-1	Lead	.44	B		F
7439-95-4	Magnesium	55.80	U		P
7439-96-5	Manganese	.26	B	*J	P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	1.40	U	J	P
7440-09-7	Potassium	52.80	U		P
7782-49-2	Selenium	.60	U	N J	F
7440-22-4	Silver	1.60	U		P
7440-23-5	Sodium	91.00	U		P
7440-28-0	Thallium	.40	U	J	F
7440-62-2	Vanadium	1.40	U		P
7440-66-6	Zinc	.80	B	*J	P
	Cyanide	.50	U		CA

Color Before: WHITE Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MFD001 REFLECTS CLIENT ID FCR-SS-SD0-016

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

012

MFD201

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): SOIL Lab Sample ID: 885517

Level (low/med): LOW Date Received: 2/27/92

% Solids: 54.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8080.00		*J	P
7440-36-0	Antimony	12.20	U	NJ	P
7440-38-2	Arsenic	3.10	B		F
7440-39-3	Barium	64.80	B		P
7440-41-7	Beryllium	.74	B		P
7440-43-9	Cadmium	1.10	U		P
7440-70-2	Calcium	29000.00		EJ	P
7440-47-3	Chromium	11.60			P
7440-48-4	Cobalt	5.00	B		P
7440-50-8	Copper	23.70			P
7439-89-6	Iron	11800.00		*J	P
7439-92-1	Lead	30.30			F
7439-95-4	Magnesium	9440.00			P
7439-96-5	Manganese	318.00		*J	P
7439-97-6	Mercury	.51			CV
7440-02-0	Nickel	12.60	B	J	P
7440-09-7	Potassium	957.00	B		P
7782-49-2	Selenium	1.10	U	NWJ	F
7440-22-4	Silver	3.00	U		P
7440-23-5	Sodium	168.00	U		P
7440-28-0	Thallium	.74	U	WJ	F
7440-62-2	Vanadium	18.20	B		P
7440-66-6	Zinc	173.00		*J	P
	Cyanide	.92	U		CA

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MFD201 REFLECTS CLIENT ID FCR-SS-SD02-01D

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

013

MFW101

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): WATER Lab Sample ID: 885503

Level (low/med): LOW Date Received: 2/27/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide	10.00	U		CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
MFW101 REFLECTS CLIENT ID FCR-SW-SW01-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

014

MFW201

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): WATER Lab Sample ID: 885505

Level (low/med): LOW Date Received: 2/27/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide	10.00	U		CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
MFW201 REFLECTS CLIENT ID FCR-SW-SW02-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

015

MFW2D1

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): WATER Lab Sample ID: 885506

Level (low/med): LOW Date Received: 2/27/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide	10.00	U		CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
MFW2D1 REFLECTS CLIENT ID FCR-SW-SW02-01D

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

016

MFW501

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8855 SAS No.: SDG No.: MF0101

Matrix (soil/water): WATER Lab Sample ID: 885510

Level (low/med): LOW Date Received: 2/27/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide	10.00	U		CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
MFW501 REFLECTS CLIENT ID FCR-SW-SW05-01

DATA VALIDATION
FRANKLIN CURTIS SITE

Inorganic Analysis

a. **Sample Numbers:**
MF0700, MF0708, MF0718, MF0912, MF0918, MF2112, MF2118, MF2122, MF2535, MFD918

b. **Holding Times:**
Sample analysis was performed within holding times.

c. **Calibration:**
Calibration for ICP & GFAA met QAPP criteria.

d. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

e. **ICP Serial Dilution:**
ICP serial dilution indicates no interference.

f. **Laboratory Duplicates:**
Duplicate samples for Arsenic, Chromium, Lead, Manganese & Cyanide exceeded QAPP limits. Data estimated (J).

g. **Laboratory Matrix Spikes:**
Matrix spikes for antimony, Cadmium, Lead & Manganese did not meet QAPP limits. Lead data was rejected (R) due to poor recovery (-60%). All other data estimated (J). Selenium Post Digestion Spike out of control. Data estimated (J).

h. **Field Duplicates:**
No field duplicate performed.

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

002

MF0700

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882102

Level (low/med): LOW Date Received: 2/22/92

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	39.50	B	E	P
7440-36-0	Antimony	3.40	U	NJ	P
7440-38-2	Arsenic	1.40	U	J	P
7440-39-3	Barium	1.20	U		P
7440-41-7	Beryllium	.20	U		P
7440-43-9	Cadmium	.40	U	NJ	P
7440-70-2	Calcium	67.10	B		P
7440-47-3	Chromium	.80	U	*	P
7440-48-4	Cobalt	.80	U		P
7440-50-8	Copper	9.70			P
7439-89-6	Iron	37.20		E	P
7439-92-1	Lead	.26	B	NW*R	F
7439-95-4	Magnesium	26.90	B		P
7439-96-5	Manganese	.40	U	EN*J	P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	1.40	U		P
7440-09-7	Potassium	80.40	U		P
7782-49-2	Selenium	.40	U	WJ	F
7440-22-4	Silver	.40	U		P
7440-23-5	Sodium	106.00	B		P
7440-28-0	Thallium	.40	U		F
7440-62-2	Vanadium	.80	U		P
7440-66-6	Zinc	.40	U		P
	Cyanide	.50	U	*J	CA

Color Before: WHITE Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0700 = CLIENT ID FCR-SB-SB7-0.0-01B

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EPA SAMPLE NO. 003

1

INORGANIC ANALYSIS DATA SHEET

MF0708

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882101

Level (low/med): LOW Date Received: 2/22/92

% Solids: 95.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1580.00		E	P
7440-36-0	Antimony	3.60	U	NJ	P
7440-38-2	Arsenic	2.50		WJ	F
7440-39-3	Barium	7.60	B		P
7440-41-7	Beryllium	.21	U	J	P
7440-43-9	Cadmium	.42	U	NJ	P
7440-70-2	Calcium	77000.00			P
7440-47-3	Chromium	4.20		*J	P
7440-48-4	Cobalt	1.20	B	-	P
7440-50-8	Copper	19.10			P
7439-89-6	Iron	4520.00		E R	P
7439-92-1	Lead	3.40		NW*J	F
7439-95-4	Magnesium	17100.00			P
7439-96-5	Manganese	174.00		EN*J	P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	5.20	B		P
7440-09-7	Potassium	228.00	B		P
7782-49-2	Selenium	.42	U		F
7440-22-4	Silver	.42	U		P
7440-23-5	Sodium	171.00	B		P
7440-28-0	Thallium	.42	U		F
7440-62-2	Vanadium	5.60	B		P
7440-66-6	Zinc	15.40			P
	Cyanide	.53	U	*J	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0708 = CLIENT ID FCR-SB-SB7-8.0-01

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EPA SAMPLE NO.
004

1

INORGANIC ANALYSIS DATA SHEET

MF0718

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882103

Level (low/med): LOW Date Received: 2/22/92

% Solids: 94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2520.00		E	P
7440-36-0	Antimony	3.60	U	NJ	P
7440-38-2	Arsenic	1.70	B	J	P
7440-39-3	Barium	8.50	B		P
7440-41-7	Beryllium	.21	U		P
7440-43-9	Cadmium	.43	U	NJ	P
7440-70-2	Calcium	138000.00			P
7440-47-3	Chromium	6.50		*J	P
7440-48-4	Cobalt	1.50	B		P
7440-50-8	Copper	18.00			P
7439-89-6	Iron	5420.00		E	P
7439-92-1	Lead	6.40		N*+R	P
7439-95-4	Magnesium	43800.00			P
7439-96-5	Manganese	165.00		EN*J	P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	6.30	B		P
7440-09-7	Potassium	516.00	B		P
7782-49-2	Selenium	.43	U	WJ	P
7440-22-4	Silver	.45	B		P
7440-23-5	Sodium	271.00	B		P
7440-28-0	Thallium	.43	U		P
7440-62-2	Vanadium	10.50	B		P
7440-66-6	Zinc	19.50			P
	Cyanide	.53	U	*J	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0718 = CLIENT ID FCR-SB-SB7-18.0-01

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

005

MF0912

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882104

Level (low/med): LOW Date Received: 2/22/92

% Solids: 94.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2970.00		E	P
7440-36-0	Antimony	3.60	U	NJ	P
7440-38-2	Arsenic	3.80		J	P
7440-39-3	Barium	10.50	B		P
7440-41-7	Beryllium	.21	U		P
7440-43-9	Cadmium	2.40		NJ	P
7440-70-2	Calcium	88800.00			P
7440-47-3	Chromium	7.10		*J	P
7440-48-4	Cobalt	1.90	B		P
7440-50-8	Copper	19.40			P
7439-89-6	Iron	6480.00		E	P
7439-92-1	Lead	5.10		N*R	P
7439-95-4	Magnesium	31800.00			P
7439-96-5	Manganese	235.00		EN*J	P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	9.90			P
7440-09-7	Potassium	560.00	B		P
7782-49-2	Selenium	.42	U	WJ	P
7440-22-4	Silver	.42	U		P
7440-23-5	Sodium	244.00	B		P
7440-28-0	Thallium	.42	U		P
7440-62-2	Vanadium	10.00	B		P
7440-66-6	Zinc	21.60			P
	Cyanide	.53	U	*J	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0912 = CLIENT ID FCR-SB-SB9-12.0-01

INORGANIC ANALYSIS DATA SHEET

MF0918

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882105

Level (low/med): LOW Date Received: 2/22/92

% Solids: 80.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2160.00		E	P
7440-36-0	Antimony	4.20	U	NJ	P
7440-38-2	Arsenic	2.20	B	J	F
7440-39-3	Barium	7.60	B		P
7440-41-7	Beryllium	.25	U		P
7440-43-9	Cadmium	2.50		NJ	P
7440-70-2	Calcium	105000.00			P
7440-47-3	Chromium	12.80		*J	P
7440-48-4	Cobalt	1.90	B		P
7440-50-8	Copper	106.00			P
7439-89-6	Iron	15500.00		E	P
7439-92-1	Lead	4.30		NS*R	F
7439-95-4	Magnesium	26800.00			P
7439-96-5	Manganese	165.00		ENWJ	P
7439-97-6	Mercury	.12	U		CV
7440-02-0	Nickel	30.50			P
7440-09-7	Potassium	372.00	B		P
7782-49-2	Selenium	.50	U	WJ	F
7440-22-4	Silver	.50	U		P
7440-23-5	Sodium	219.00	B		P
7440-28-0	Thallium	.50	U		F
7440-62-2	Vanadium	7.70	B		P
7440-66-6	Zinc	80.60			P
	Cyanide	.62	U	*J	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0918 = CLIENT ID FCR-SB-SB9-18.0-01

U.S. EPA - CLP

EPA SAMPLE NO.

007

1

INORGANIC ANALYSIS DATA SHEET

MF2112

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882107

Level (low/med): LOW Date Received: 2/22/92

% Solids: 95.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2610.00		E	P
7440-36-0	Antimony	3.60	U	NJ	P
7440-38-2	Arsenic	3.20		J	P
7440-39-3	Barium	8.80	B		P
7440-41-7	Beryllium	.21	U		P
7440-43-9	Cadmium	.42	U	NJ	P
7440-70-2	Calcium	146000.00			P
7440-47-3	Chromium	7.80		*J	P
7440-48-4	Cobalt	1.80	B		P
7440-50-8	Copper	16.50			P
7439-89-6	Iron	5950.00		E	P
7439-92-1	Lead	11.40		NS*J	P
7439-95-4	Magnesium	47900.00			P
7439-96-5	Manganese	241.00		EN*J	P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	8.30	B		P
7440-09-7	Potassium	528.00	B		P
7782-49-2	Selenium	.42	U	WJ	P
7440-22-4	Silver	.42	U		P
7440-23-5	Sodium	281.00	B		P
7440-28-0	Thallium	.42	U		P
7440-62-2	Vanadium	9.80	B		P
7440-66-6	Zinc	18.90			P
	Cyanide	1.00		*J	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2112 = CLIENT ID FCR-SB-MW21-12.0-01

U.S. EPA - CLP

EPA SAMPLE NO. 003

1

INORGANIC ANALYSIS DATA SHEET

MF2118

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882111

Level (low/med): LOW Date Received: 2/22/92

% Solids: 83.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1990.00		E	P
7440-36-0	Antimony	4.10	U	NJ	P
7440-38-2	Arsenic	2.30	B	J	F
7440-39-3	Barium	6.10	B		P
7440-41-7	Beryllium	.24	U		P
7440-43-9	Cadmium	.48	U	N	P
7440-70-2	Calcium	91200.00			P
7440-47-3	Chromium	6.00		*J	P
7440-48-4	Cobalt	2.10	B		P
7440-50-8	Copper	27.40			P
7439-89-6	Iron	5440.00		E	P
7439-92-1	Lead	3.30		N*R	F
7439-95-4	Magnesium	24400.00			P
7439-96-5	Manganese	137.00		EN*J	P
7439-97-6	Mercury	.12	U		CV
7440-02-0	Nickel	15.80			P
7440-09-7	Potassium	267.00	B		P
7782-49-2	Selenium	.48	U	WJ	F
7440-22-4	Silver	.48	U		P
7440-23-5	Sodium	203.00	B		P
7440-28-0	Thallium	.48	U		F
7440-62-2	Vanadium	7.20	B		P
7440-66-6	Zinc	23.10			P
	Cyanide	.60	U	*J	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2118 = CLIENT ID FCR-SB-MW21-18.0-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MF2122

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882110

Level (low/med): LOW Date Received: 2/22/92

% Solids: 94.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2380.00		E	P
7440-36-0	Antimony	3.60	U	N J	P
7440-38-2	Arsenic	4.60		J	F
7440-39-3	Barium	15.20	B		P
7440-41-7	Beryllium	.21	B		P
7440-43-9	Cadmium	.42	U	N	P
7440-70-2	Calcium	139000.00			P
7440-47-3	Chromium	6.30		*J	P
7440-48-4	Cobalt	1.80	B		P
7440-50-8	Copper	21.00			P
7439-89-6	Iron	6580.00		E	P
7439-92-1	Lead	4.80		N*R	F
7439-95-4	Magnesium	59900.00			P
7439-96-5	Manganese	426.00		EN*J	P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	11.10			P
7440-09-7	Potassium	479.00	B		P
7782-49-2	Selenium	.42	U	WJ	F
7440-22-4	Silver	.42	U		P
7440-23-5	Sodium	238.00	B		P
7440-28-0	Thallium	.42	U	W	F
7440-62-2	Vanadium	9.10	B		P
7440-66-6	Zinc	25.90			P
	Cyanide	.53	U	*J	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2122 = CLIENT ID FCR-SB-MW21-12.0-01D

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G10

MF2535

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 881101

Level (low/med): LOW Date Received: 2/21/92

% Solids: 90.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6100.00		E	P
7440-36-0	Antimony	3.80	U	N J	P
7440-38-2	Arsenic	6.00		S J	P
7440-39-3	Barium	59.70			P
7440-41-7	Beryllium	.39	B		P
7440-43-9	Cadmium	.44	U	N J	P
7440-70-2	Calcium	111000.00			P
7440-47-3	Chromium	11.40		* J	P
7440-48-4	Cobalt	5.00	B		P
7440-50-8	Copper	35.80			P
7439-89-6	Iron	12800.00		E	P
7439-92-1	Lead	9.00		NW* R	P
7439-95-4	Magnesium	37400.00			P
7439-96-5	Manganese	328.00		EN* J	P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	19.40			P
7440-09-7	Potassium	1390.00			P
7782-49-2	Selenium	.44	U	J	P
7440-22-4	Silver	.44	U		P
7440-23-5	Sodium	275.00	B		P
7440-28-0	Thallium	.44	U		P
7440-62-2	Vanadium	15.60			P
7440-66-6	Zinc	44.50			P
	Cyanide	.55	U	* J	CA

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2535 = CLIENT ID FCR-SB-MW25-35.0-01

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

011

MFD918

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0084

Lab Code: SWOK Case No.: 8811 SAS No.: SDG No.: MF2535

Matrix (soil/water): SOIL Lab Sample ID: 882106

Level (low/med): LOW Date Received: 2/22/92

% Solids: 84.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2370.00		E	P
7440-36-0	Antimony	4.00	U	NJ	P
7440-38-2	Arsenic	2.20	B	SJ	F
7440-39-3	Barium	8.60	B		P
7440-41-7	Beryllium	.24	U		P
7440-43-9	Cadmium	13.20		NJ	P
7440-70-2	Calcium	103000.00			P
7440-47-3	Chromium	11.90		*J	P
7440-48-4	Cobalt	1.60	B		P
7440-50-8	Copper	137.00			P
7439-89-6	Iron	5980.00		E	P
7439-92-1	Lead	5.90		N*R	F
7439-95-4	Magnesium	28500.00			P
7439-96-5	Manganese	181.00		EN*J	P
7439-97-6	Mercury	.12	U		CV
7440-02-0	Nickel	38.30			P
7440-09-7	Potassium	360.00	B		P
7782-49-2	Selenium	.47	U	WJ	F
7440-22-4	Silver	1.20	B		P
7440-23-5	Sodium	244.00	B		P
7440-28-0	Thallium	.47	U		F
7440-62-2	Vanadium	8.20	B		P
7440-66-6	Zinc	88.40			P
	Cyanide	21.90		*J	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MFD918 = CLIENT ID FCR-SB-SB9-18.0-01D

DATA VALIDATION
FRANKLIN CURTIS SITE

Inorganic Analysis

a. **Sample Numbers:**
MF0502, MF0502D, MF0502S, MF0608, MF0617, MF06B8, MF06D8, MF0802, MF0819, MF2202, MF2210, MF2219, MF2321, MF2510

b. **Holding Times:**
Samples were analyzed within holding times.

c. **Calibration:**
Calibration for ICP & GFAA met QAPP criteria

d. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

e. **ICP Serial Dilution:**
ICP serial dilution indicates no interference.

f. **Laboratory Duplicates:**
Duplicate result for Aluminum exceed QAPP limits. Data estimated (J).

g. **Laboratory Matrix Spikes:**
Matrix spike recoveries for Arsenic, Manganese, & Selenium were outside QAPP limits. Data estimated (J). Post Digestion GFAA spike for Thallium <50%. Data estimated (J).

h. **Field Duplicates:**
No field duplicate performed.

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EPA SAMPLE NO. 002

1

INORGANIC ANALYSIS DATA SHEET

MF0502

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 870101

Level (low/med): LOW Date Received: 2/12/92

% Solids: 85.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12400.00		*J	P
7440-36-0	Antimony	7.70	U		P
7440-38-2	Arsenic	5.90		NSJ	F
7440-39-3	Barium	115.00			P
7440-41-7	Beryllium	.70	B		P
7440-43-9	Cadmium	.70	U		P
7440-70-2	Calcium	2540.00			P
7440-47-3	Chromium	14.40			P
7440-48-4	Cobalt	11.20	B		P
7440-50-8	Copper	14.60			P
7439-89-6	Iron	14700.00			P
7439-92-1	Lead	20.50			F
7439-95-4	Magnesium	1970.00			P
7439-96-5	Manganese	1000.00			P
7439-97-6	Mercury	.12	U		CV
7440-02-0	Nickel	14.80			P
7440-09-7	Potassium	1310.00			P
7782-49-2	Selenium	.47	U	NJ	F
7440-22-4	Silver	1.90	U		P
7440-23-5	Sodium	106.00	U		P
7440-28-0	Thallium	.47	U	WJ	F
7440-62-2	Vanadium	28.00			P
7440-66-6	Zinc	53.30			P
	Cyanide	.58	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0502 = CLIENT ID FCR-SB-SB5-2.0-01

U.S. EPA - CLP

EPA SAMPLE 003

1

INORGANIC ANALYSIS DATA SHEET

MF0608

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 873601

Level (low/med): LOW Date Received: 2/14/92

% Solids: 96.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2760.00		*J	P
7440-36-0	Antimony	6.80	U		P
7440-38-2	Arsenic	4.20		N J	P
7440-39-3	Barium	12.10	B		P
7440-41-7	Beryllium	.49	B		P
7440-43-9	Cadmium	.62	U		P
7440-70-2	Calcium	35400.00			P
7440-47-3	Chromium	4.90			P
7440-48-4	Cobalt	3.80	B		P
7440-50-8	Copper	9.30			P
7439-89-6	Iron	7160.00			P
7439-92-1	Lead	4.20			F
7439-95-4	Magnesium	10900.00			P
7439-96-5	Manganese	235.00			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	8.20	B		P
7440-09-7	Potassium	370.00	B		P
7782-49-2	Selenium	.41	U	N J	F
7440-22-4	Silver	1.70	U		P
7440-23-5	Sodium	94.10	U		P
7440-28-0	Thallium	.41	U		F
7440-62-2	Vanadium	7.50	B		P
7440-66-6	Zinc	23.30			P
	Cyanide	.52	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0608 = CLIENT ID FCR-SB-SB6-8.0-01

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EPA SAMPLE NO. 004

1

INORGANIC ANALYSIS DATA SHEET

MF0617

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 873603

Level (low/med): LOW Date Received: 2/14/92

% Solids: 87.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1760.00		*J	P
7440-36-0	Antimony	7.50	U		P
7440-38-2	Arsenic	2.20	B	NJ	F
7440-39-3	Barium	7.00	B		P
7440-41-7	Beryllium	1.10	B		P
7440-43-9	Cadmium	.68	U		P
7440-70-2	Calcium	109000.00			P
7440-47-3	Chromium	1.10	U		P
7440-48-4	Cobalt	2.60	B		P
7440-50-8	Copper	7.40			P
7439-89-6	Iron	4390.00			P
7439-92-1	Lead	3.70		S	F
7439-95-4	Magnesium	26500.00			P
7439-96-5	Manganese	189.00			P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	4.40	B		P
7440-09-7	Potassium	426.00	B		P
7782-49-2	Selenium	.46	U	NWJ	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	104.00	U		P
7440-28-0	Thallium	.46	U		F
7440-62-2	Vanadium	5.10	B		P
7440-66-6	Zinc	14.20			P
	Cyanide	.57	U		CA

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0617 = CLIENT ID FCR-SB-SB6-17.0-01

U.S. EPA - CLP

EPA SAMPLE 005

1

INORGANIC ANALYSIS DATA SHEET

MF06B8

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 873604

Level (low/med): LOW Date Received: 2/14/92

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	37.40	B	*J	P
7440-36-0	Antimony	6.60	U		P
7440-38-2	Arsenic	.60	U	NJ	F
7440-39-3	Barium	2.00	U		P
7440-41-7	Beryllium	.20	U		P
7440-43-9	Cadmium	.60	U		P
7440-70-2	Calcium	100.00	U		P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	1.00	U		P
7440-50-8	Copper	1.40	U		P
7439-89-6	Iron	38.90			P
7439-92-1	Lead	.35	B		F
7439-95-4	Magnesium	55.80	U		P
7439-96-5	Manganese	.23	B		P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	1.40	U		P
7440-09-7	Potassium	52.80	U		P
7782-49-2	Selenium	.40	U	NJ	F
7440-22-4	Silver	1.60	U		P
7440-23-5	Sodium	91.00	U		P
7440-28-0	Thallium	.40	U		F
7440-62-2	Vanadium	1.40	U		P
7440-66-6	Zinc	.40	U		P
	Cyanide	.50	U		CA

Color Before: WHITE Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF06B8 = CLIENT ID FCR-SB-SB6-0.0-01B

U.S. EPA - CLP

EPA SAMPLE 006

1

INORGANIC ANALYSIS DATA SHEET

MF06D8

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 873602

Level (low/med): LOW Date Received: 2/14/92

% Solids: 97.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4950.00		*J	P
7440-36-0	Antimony	6.80	U		P
7440-38-2	Arsenic	5.40		NSJ	F
7440-39-3	Barium	21.80	B		P
7440-41-7	Beryllium	.29	B		P
7440-43-9	Cadmium	.62	U		P
7440-70-2	Calcium	1610.00			P
7440-47-3	Chromium	8.70			P
7440-48-4	Cobalt	4.10	B		P
7440-50-8	Copper	11.90			P
7439-89-6	Iron	9430.00			P
7439-92-1	Lead	6.00			F
7439-95-4	Magnesium	1800.00			P
7439-96-5	Manganese	325.00			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	11.30			P
7440-09-7	Potassium	710.00	B		P
7782-49-2	Selenium	.41	U	NJ	F
7440-22-4	Silver	1.60	U		P
7440-23-5	Sodium	93.80	U		P
7440-28-0	Thallium	.41	U		F
7440-62-2	Vanadium	11.40			P
7440-66-6	Zinc	31.40			P
	Cyanide	.52	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF06D8 = CLIENT ID FCR-SB-SB6-8.0-01D

U.S. EPA - CLP

EPA SAMPLE 007

1

INORGANIC ANALYSIS DATA SHEET

MF0802

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 870102

Level (low/med): LOW Date Received: 2/12/92

% Solids: 87.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000.00		* J	P
7440-36-0	Antimony	7.60	U		P
7440-38-2	Arsenic	3.60		N J	F
7440-39-3	Barium	105.00			P
7440-41-7	Beryllium	.62	B		P
7440-43-9	Cadmium	.69	U		P
7440-70-2	Calcium	1980.00			P
7440-47-3	Chromium	13.40			P
7440-48-4	Cobalt	8.60	B		P
7440-50-8	Copper	9.30			P
7439-89-6	Iron	13700.00			P
7439-92-1	Lead	15.20			F
7439-95-4	Magnesium	1990.00			P
7439-96-5	Manganese	754.00			P
7439-97-6	Mercury	2.30			CV
7440-02-0	Nickel	13.50			P
7440-09-7	Potassium	939.00	B		P
7782-49-2	Selenium	.46	U	N J	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	105.00	U		P
7440-28-0	Thallium	.46	U	W J	F
7440-62-2	Vanadium	21.80			P
7440-66-6	Zinc	42.70			P
	Cyanide	.57	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0802 = CLIENT ID FCR-SB-SB8-2.0-01

EPA SAMPLE NO. 008

1

INORGANIC ANALYSIS DATA SHEET

MF0819

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 870103

Level (low/med): LOW Date Received: 2/12/92

% Solids: 89.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2420.00		* J	P
7440-36-0	Antimony	7.40	U		P
7440-38-2	Arsenic	2.60		N J	F
7440-39-3	Barium	9.30	B		P
7440-41-7	Beryllium	1.20			P
7440-43-9	Cadmium	.67	U		P
7440-70-2	Calcium	115000.00			P
7440-47-3	Chromium	1.90	B		P
7440-48-4	Cobalt	3.00	B		P
7440-50-8	Copper	13.70			P
7439-89-6	Iron	6280.00			P
7439-92-1	Lead	5.50			F
7439-95-4	Magnesium	26400.00			P
7439-96-5	Manganese	188.00			P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	8.30	B		P
7440-09-7	Potassium	510.00	B		P
7782-49-2	Selenium	.45	U	N J	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	102.00	U		P
7440-28-0	Thallium	.45	U		F
7440-62-2	Vanadium	8.00	B		P
7440-66-6	Zinc	33.90			P
	Cyanide	.56	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF0819 = CLIENT ID FCR-SB-SB8-19.0-01

U.S. EPA - CLP

EPA SAMPLE NO.

009

1

INORGANIC ANALYSIS DATA SHEET

MF2202

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 872201

Level (low/med): LOW Date Received: 2/13/92

% Solids: 88.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6890.00		*J	P
7440-36-0	Antimony	7.50	U		P
7440-38-2	Arsenic	7.40		NJ	F
7440-39-3	Barium	58.70			P
7440-41-7	Beryllium	.96	B		P
7440-43-9	Cadmium	.68	U		P
7440-70-2	Calcium	66300.00			P
7440-47-3	Chromium	6.20			P
7440-48-4	Cobalt	6.20	B		P
7440-50-8	Copper	14.20			P
7439-89-6	Iron	11800.00			P
7439-92-1	Lead	52.90		WJ	F
7439-95-4	Magnesium	17100.00			P
7439-96-5	Manganese	491.00			P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	10.50			P
7440-09-7	Potassium	811.00	B		P
7782-49-2	Selenium	.45	U	NJ	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	103.00	U		P
7440-28-0	Thallium	.45	U		F
7440-62-2	Vanadium	16.00			P
7440-66-6	Zinc	91.00			P
	Cyanide	.57	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2202 = CLIENT ID FCR-SB-MW-22A-2.0-01

U.S. EPA - CLP

EPA SAMPLE NO. 010

1

INORGANIC ANALYSIS DATA SHEET

MF2210

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 6701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 872202

Level (low/med): LOW Date Received: 2/13/92

% Solids: 95.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2970.00		* J	P
7440-36-0	Antimony	12.40	B		P
7440-38-2	Arsenic	6.80		N J	F
7440-39-3	Barium	11.50	B		P
7440-41-7	Beryllium	1.50			P
7440-43-9	Cadmium	.63	U		P
7440-70-2	Calcium	163000.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	5.50	B		P
7440-50-8	Copper	11.90			P
7439-89-6	Iron	10800.00			P
7439-92-1	Lead	11.20			F
7439-95-4	Magnesium	43500.00			P
7439-96-5	Manganese	290.00			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	8.20	B		P
7440-09-7	Potassium	721.00	B		P
7782-49-2	Selenium	.42	U	NW J	F
7440-22-4	Silver	1.70	U		P
7440-23-5	Sodium	146.00	B		P
7440-28-0	Thallium	.42	U		F
7440-62-2	Vanadium	10.40	B		P
7440-66-6	Zinc	33.60			P
	Cyanide	.52	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2210 = CLIENT ID FCR-SB-MW-22-10.0-01

U.S. EPA - CLP

EPA SAMPLE NO. 011

1

INORGANIC ANALYSIS DATA SHEET

MF2219

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 872203

Level (low/med): LOW Date Received: 2/13/92

% Solids: 87.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2300.00		*J	P
7440-36-0	Antimony	7.50	U		P
7440-38-2	Arsenic	2.20	B	NJ	F
7440-39-3	Barium	8.20	B		P
7440-41-7	Beryllium	1.00	B		P
7440-43-9	Cadmium	.68	U		P
7440-70-2	Calcium	102000.00			P
7440-47-3	Chromium	1.10	U		P
7440-48-4	Cobalt	3.20	B		P
7440-50-8	Copper	15.70			P
7439-89-6	Iron	5450.00			P
7439-92-1	Lead	4.10		S	F
7439-95-4	Magnesium	28000.00			P
7439-96-5	Manganese	189.00			P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	6.30	B		P
7440-09-7	Potassium	512.00	B		P
7782-49-2	Selenium	.46	U	NWJ	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	104.00	U		P
7440-28-0	Thallium	.46	U		F
7440-62-2	Vanadium	7.10	B		P
7440-66-6	Zinc	22.90			P
	Cyanide	.57	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2219 = CLIENT ID FCR-SB-MW-22-19.0-01

U.S. EPA - CLP

EPA SAMPLE 012

1

INORGANIC ANALYSIS DATA SHEET

MF2321

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 875701

Level (low/med): LOW Date Received: 2/15/92

% Solids: 92.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5650.00		* J	P
7440-36-0	Antimony	7.10	U		P
7440-38-2	Arsenic	5.00		N J	F
7440-39-3	Barium	38.40	B		P
7440-41-7	Beryllium	1.10			P
7440-43-9	Cadmium	.65	U		P
7440-70-2	Calcium	93000.00			P
7440-47-3	Chromium	3.60			P
7440-48-4	Cobalt	6.20	B		P
7440-50-8	Copper	13.70			P
7439-89-6	Iron	9130.00			P
7439-92-1	Lead	11.10		S	F
7439-95-4	Magnesium	27500.00			P
7439-96-5	Manganese	292.00			P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	13.20			P
7440-09-7	Potassium	1250.00			P
7782-49-2	Selenium	.43	U	NW J	F
7440-22-4	Silver	1.70	U		P
7440-23-5	Sodium	98.20	U		P
7440-28-0	Thallium	.43	U		F
7440-62-2	Vanadium	13.40			P
7440-66-6	Zinc	35.00			P
	Cyanide	.54	U		CA

Color Before: GREY Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2321 = CLIENT ID FCR-SB-MW-23-21.5-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

013

MF2510

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8701 SAS No.: SDG No.: MF0502

Matrix (soil/water): SOIL Lab Sample ID: 878301

Level (low/med): LOW Date Received: 2/20/92

% Solids: 95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2580.00		* J	P
7440-36-0	Antimony	8.50	B		P
7440-38-2	Arsenic	6.30		N J	F
7440-39-3	Barium	10.60	B		P
7440-41-7	Beryllium	1.30			P
7440-43-9	Cadmium	.63	U		P
7440-70-2	Calcium	143000.00			P
7440-47-3	Chromium	1.10	U		P
7440-48-4	Cobalt	4.80	B		P
7440-50-8	Copper	10.10			P
7439-89-6	Iron	8400.00			P
7439-92-1	Lead	12.00			F
7439-95-4	Magnesium	37200.00			P
7439-96-5	Manganese	303.00			P
7439-97-6	Mercury	.11	U		CV
7440-02-0	Nickel	6.20	B		P
7440-09-7	Potassium	399.00	B		P
7782-49-2	Selenium	.44	B	MNW J	F
7440-22-4	Silver	1.70	U		P
7440-23-5	Sodium	95.60	U		P
7440-28-0	Thallium	.42	U		F
7440-62-2	Vanadium	9.50	B		P
7440-66-6	Zinc	30.00			P
	Cyanide	.53	U		CA

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
EPA SAMPLE ID MF2510 = CLIENT ID FCR-SB-MW-25-10.0-01

DATA VALIDATION
FRANKLIN CURTIS SITE

Inorganic Analysis

a. **Sample Numbers:**
MF0300, MF0306, MF0306D, MF306S, MF0310, MF0405, MF0410, MF2006, MF2012, MF2406, MF2415, MF2606, MF2606D, MF2606S, MF2612, MFD410

b. **Holding Times:**
All samples were analyzed within holding times.

c. **Calibration:**
Calibrations for ICP & GFAA met QAPP criteria.

d. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

e. **ICP Serial Dilution:**
ICP serial dilutions indicated no interference.

f. **Laboratory Duplicates:**
Laboratory duplicates met QAPP criteria.

g. **Laboratory Matrix Spikes:**
Matrix spikes for Arsenic, Mercury & Selenium, exceeded QAPP criteria. Data is estimated (J). Post digestion spike for Lead was out of control. Data estimated (J).

h. **Field Duplicates:**
Field duplicates were not collected.

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

002

MF0300

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 867406

Level (low/med): LOW Date Received: 2/08/92

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.40	B		P
7440-36-0	Antimony	6.60	U		P
7440-38-2	Arsenic	.60	U	N J	F
7440-39-3	Barium	2.00	U		P
7440-41-7	Beryllium	.20	U		P
7440-43-9	Cadmium	.60	U		P
7440-70-2	Calcium	100.00	U		P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	1.00	U		P
7440-50-8	Copper	1.40	U		P
7439-89-6	Iron	52.40			P
7439-92-1	Lead	.53	B	W J	F
7439-95-4	Magnesium	55.80	U		P
7439-96-5	Manganese	.44	B		P
7439-97-6	Mercury	.10	U	N J	CV
7440-02-0	Nickel	1.40	U		P
7440-09-7	Potassium	52.80	U		P
7782-49-2	Selenium	.40	U	N J	F
7440-22-4	Silver	1.60	U		P
7440-23-5	Sodium	91.00	U		P
7440-28-0	Thallium	.60	U		F
7440-62-2	Vanadium	1.40	U		P
7440-66-6	Zinc	.40	U		P
	Cyanide	.50	U		CA

Color Before: WHITE Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0300 REFLECTS CLIENT ID FCR-SB-SB3-0.0-01

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

003

MF0306

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 867401

Level (low/med): LOW Date Received: 2/08/92

% Solids: 83.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18200.00			P
7440-36-0	Antimony	9.20	B		P
7440-38-2	Arsenic	9.50		NS J	F
7440-39-3	Barium	113.00			P
7440-41-7	Beryllium	.62	B		P
7440-43-9	Cadmium	.72	U		P
7440-70-2	Calcium	1980.00			P
7440-47-3	Chromium	19.40			P
7440-48-4	Cobalt	9.30	B		P
7440-50-8	Copper	12.70			P
7439-89-6	Iron	23000.00			P
7439-92-1	Lead	17.00			F
7439-95-4	Magnesium	3120.00			P
7439-96-5	Manganese	554.00			P
7439-97-6	Mercury	.12	U	N J	CV
7440-02-0	Nickel	17.50			P
7440-09-7	Potassium	1470.00			P
7782-49-2	Selenium	.48	U	N J	F
7440-22-4	Silver	1.90	U		P
7440-23-5	Sodium	109.00	U		P
7440-28-0	Thallium	.72	U		F
7440-62-2	Vanadium	33.80			P
7440-66-6	Zinc	58.30			P
	Cyanide	.60	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0306 REFLECTS CLIENT ID FCR-SB-SB3-6.0-01
CLAY

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

004

MF0310

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 867402

Level (low/med): LOW Date Received: 2/08/92

% Solids: 90.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6130.00			P
7440-36-0	Antimony	7.30	U		P
7440-38-2	Arsenic	7.30		NS J	F
7440-39-3	Barium	29.60	B		P
7440-41-7	Beryllium	.45	B		P
7440-43-9	Cadmium	.67	U		P
7440-70-2	Calcium	19300.00			P
7440-47-3	Chromium	10.50			P
7440-48-4	Cobalt	5.20	B		P
7440-50-8	Copper	14.80			P
7439-89-6	Iron	12400.00			P
7439-92-1	Lead	11.90			P
7439-95-4	Magnesium	11900.00			P
7439-96-5	Manganese	574.00			P
7439-97-6	Mercury	.11	U	N J	CV
7440-02-0	Nickel	20.90			P
7440-09-7	Potassium	748.00	B		P
7782-49-2	Selenium	.44	U	N J	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	102.00	B		P
7440-28-0	Thallium	.67	U		F
7440-62-2	Vanadium	14.30			P
7440-66-6	Zinc	44.90			P
	Cyanide	.56	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0310 REFLECTS CLIENT ID FCR-SB-SB3-10.0-01

U.S. EPA - CLP

EPA SAMPLE NO.

005

MF0406

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 867403

Level (low/med): LOW Date Received: 2/08/92

% Solids: 84.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8520.00			P
7440-36-0	Antimony	8.60	B		P
7440-38-2	Arsenic	5.50		NS J	F
7440-39-3	Barium	89.10			P
7440-41-7	Beryllium	.75	B		P
7440-43-9	Cadmium	.71	U		P
7440-70-2	Calcium	28000.00			P
7440-47-3	Chromium	10.00			P
7440-48-4	Cobalt	8.50	B		P
7440-50-8	Copper	12.40			P
7439-89-6	Iron	12700.00			P
7439-92-1	Lead	34.00			F
7439-95-4	Magnesium	10500.00			P
7439-96-5	Manganese	806.00			P
7439-97-6	Mercury	.12	U	N J	CV
7440-02-0	Nickel	12.40			P
7440-09-7	Potassium	822.00	B		P
7782-49-2	Selenium	.47	U	N J	F
7440-22-4	Silver	1.90	U		P
7440-23-5	Sodium	111.00	B		P
7440-28-0	Thallium	.71	U		F
7440-62-2	Vanadium	18.20			P
7440-66-6	Zinc	46.10			P
	Cyanide	.59	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0406 REFLECTS CLIENT ID FCR-SB-SB4-6.0-01
CLAY

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

006

MF0410

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 867404

Level (low/med): LOW Date Received: 2/08/92

% Solids: 89.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4140.00			P
7440-36-0	Antimony	8.10	B		P
7440-38-2	Arsenic	4.30		N J	F
7440-39-3	Barium	19.30	B		P
7440-41-7	Beryllium	.89	B		P
7440-43-9	Cadmium	.67	U		P
7440-70-2	Calcium	78400.00			P
7440-47-3	Chromium	10.70			P
7440-48-4	Cobalt	5.10	B		P
7440-50-8	Copper	12.60			P
7439-89-6	Iron	9100.00			P
7439-92-1	Lead	7.40			F
7439-95-4	Magnesium	31800.00			P
7439-96-5	Manganese	521.00			P
7439-97-6	Mercury	.11	U	N J	CV
7440-02-0	Nickel	12.00			P
7440-09-7	Potassium	466.00	B		P
7782-49-2	Selenium	.45	U	N J	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	126.00	B		P
7440-28-0	Thallium	.67	U		F
7440-62-2	Vanadium	10.40	B		P
7440-66-6	Zinc	33.10			P
	Cyanide	.56	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF0410 REFLECTS CLIENT ID FCR-SB-SB4-10.0-01

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

007

MF2006

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK CaseNo.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 866501

Level (low/med): LOW Date Received: 2/07/92

% Solids: 83.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15200.00			P
7440-36-0	Antimony	7.90	U		P
7440-38-2	Arsenic	4.10		NSJ	F
7440-39-3	Barium	83.10			P
7440-41-7	Beryllium	.66	B		P
7440-43-9	Cadmium	.72	U		P
7440-70-2	Calcium	4180.00			P
7440-47-3	Chromium	20.70			P
7440-48-4	Cobalt	6.40	B		P
7440-50-8	Copper	14.00			P
7439-89-6	Iron	20100.00			P
7439-92-1	Lead	16.50			F
7439-95-4	Magnesium	3820.00			P
7439-96-5	Manganese	350.00			P
7439-97-6	Mercury	.11	U	NJ	CV
7440-02-0	Nickel	17.10			P
7440-09-7	Potassium	1120.00	B		P
7782-49-2	Selenium	.48	U	NJ	F
7440-22-4	Silver	1.90	U		P
7440-23-5	Sodium	109.00	U		P
7440-28-0	Thallium	.72	U		F
7440-62-2	Vanadium	27.80			P
7440-66-6	Zinc	77.30			P
	Cyanide	.60	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF2006 REFLECTS CLIENT ID FCR-SB-MW20-6.0-01

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

008

MF2012

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 866502

Level (low/med): LOW Date Received: 2/07/92

% Solids: 89.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2220.00			P
7440-36-0	Antimony	7.40	U		P
7440-38-2	Arsenic	2.60		NSJ	F
7440-39-3	Barium	26.60	B		P
7440-41-7	Beryllium	.49	B		P
7440-43-9	Cadmium	.67	U		P
7440-70-2	Calcium	37600.00			P
7440-47-3	Chromium	3.70			P
7440-48-4	Cobalt	3.40	B		P
7440-50-8	Copper	11.20			P
7439-89-6	Iron	6770.00			P
7439-92-1	Lead	6.70			F
7439-95-4	Magnesium	20100.00			P
7439-96-5	Manganese	266.00			P
7439-97-6	Mercury	.11	U	NJ	CV
7440-02-0	Nickel	9.10			P
7440-09-7	Potassium	400.00	B		P
7782-49-2	Selenium	.45	U	NJ	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	117.00	B		P
7440-28-0	Thallium	.67	U		F
7440-62-2	Vanadium	7.60	B		P
7440-66-6	Zinc	25.00			P
	Cyanide	.56	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF2012 REFLECTS CLIENT ID FCR-SB-MW20-12.0-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

009

MF2406

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 867407

Level (low/med): LOW Date Received: 2/08/92

% Solids: 96.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1400.00			P
7440-36-0	Antimony	6.80	U		P
7440-38-2	Arsenic	2.00	B	N J	P
7440-39-3	Barium	5.90	B		P
7440-41-7	Beryllium	.69	B		P
7440-43-9	Cadmium	.62	U		P
7440-70-2	Calcium	66900.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	2.10	B		P
7440-50-8	Copper	5.90			P
7439-89-6	Iron	4090.00			P
7439-92-1	Lead	4.70			P
7439-95-4	Magnesium	16900.00			P
7439-96-5	Manganese	145.00			P
7439-97-6	Mercury	.10	U	N J	CV
7440-02-0	Nickel	4.40	B		P
7440-09-7	Potassium	238.00	B		P
7782-49-2	Selenium	.41	U	N J	P
7440-22-4	Silver	1.70	U		P
7440-23-5	Sodium	94.00	U		P
7440-28-0	Thallium	.62	U		P
7440-62-2	Vanadium	3.80	B		P
7440-66-6	Zinc	16.50			P
	Cyanide	.52	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF2406 REFLECTS CLIENT ID FCR-SB-MW24-6.0-01

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

010

MF2415

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 867408

Level (low/med): LOW Date Received: 2/08/92

% Solids: 95.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2850.00			P
7440-36-0	Antimony	10.70	B		P
7440-38-2	Arsenic	1.90	B	NS J	F
7440-39-3	Barium	13.30	B		P
7440-41-7	Beryllium	1.20			P
7440-43-9	Cadmium	.63	U		F
7440-70-2	Calcium	106000.00			P
7440-47-3	Chromium	1.60	B		P
7440-48-4	Cobalt	3.70	B		P
7440-50-8	Copper	15.30			P
7439-89-6	Iron	8360.00			P
7439-92-1	Lead	10.90			F
7439-95-4	Magnesium	29600.00			P
7439-96-5	Manganese	229.00			P
7439-97-6	Mercury	.10	U	N J	CV
7440-02-0	Nickel	9.40			P
7440-09-7	Potassium	568.00	B		P
7782-49-2	Selenium	.42	U	N J	F
7440-22-4	Silver	1.70	U		P
7440-23-5	Sodium	116.00	B		P
7440-28-0	Thallium	.63	U		F
7440-62-2	Vanadium	8.20	B		P
7440-66-6	Zinc	28.70			P
	Cyanide	.52	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF2415 REFLECTS CLIENT ID FCR-SB-MW24-15.0-01

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

011

MF2606

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 865201

Level (low/med): LOW Date Received: 2/06/92

% Solids: 86.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12500.00			P
7440-36-0	Antimony	7.60	U		P
7440-38-2	Arsenic	6.70		N J	F
7440-39-3	Barium	49.80			P
7440-41-7	Beryllium	.57	B		P
7440-43-9	Cadmium	.69	U		P
7440-70-2	Calcium	1620.00			P
7440-47-3	Chromium	15.80			P
7440-48-4	Cobalt	8.00	B		P
7440-50-8	Copper	22.80			P
7439-89-6	Iron	20500.00			P
7439-92-1	Lead	20.30			F
7439-95-4	Magnesium	2560.00			P
7439-96-5	Manganese	687.00			P
7439-97-6	Mercury	.12	U	N J	CV
7440-02-0	Nickel	18.90			P
7440-09-7	Potassium	921.00	B		P
7782-49-2	Selenium	.46	U	N J	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	105.00	U		P
7440-28-0	Thallium	.69	U		F
7440-62-2	Vanadium	24.30			P
7440-66-6	Zinc	56.20			P
	Cyanide	.58	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF2606 REFLECTS CLIENT ID FCR-SB-MW26-6.0-01
CLAY

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

012

MF2612

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 865202

Level (low/med): LOW Date Received: 2/06/92

% Solids: 93.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2440.00			P
7440-36-0	Antimony	10.40	B		P
7440-38-2	Arsenic	2.20		NS J	F
7440-39-3	Barium	15.90	B		P
7440-41-7	Beryllium	.97	B		P
7440-43-9	Cadmium	.64	U		P
7440-70-2	Calcium	91700.00			P
7440-47-3	Chromium	1.10	U		P
7440-48-4	Cobalt	3.30	B		P
7440-50-8	Copper	10.90			P
7439-89-6	Iron	6050.00			P
7439-92-1	Lead	4.80			F
7439-95-4	Magnesium	33500.00			P
7439-96-5	Manganese	217.00			P
7439-97-6	Mercury	.11	U	N J	CV
7440-02-0	Nickel	6.40	B		P
7440-09-7	Potassium	540.00	B		P
7782-49-2	Selenium	.43	U	N J	F
7440-22-4	Silver	1.70	U		P
7440-23-5	Sodium	142.00	B		P
7440-28-0	Thallium	.64	U		F
7440-62-2	Vanadium	6.90	B		P
7440-66-6	Zinc	22.90			P
	Cyanide	.53	U		CA

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MF2612 REFLECTS CLIENT ID FCR-SB-MW26-12.0-01

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFD410 013

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8652 SAS No.: SDG No.: MF0300

Matrix (soil/water): SOIL Lab Sample ID: 867405

Level (low/med): LOW Date Received: 2/08/92

% Solids: 88.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3520.00			P
7440-36-0	Antimony	10.50	B		P
7440-38-2	Arsenic	4.10		NS J	F
7440-39-3	Barium	15.90	B		P
7440-41-7	Beryllium	.90	B		P
7440-43-9	Cadmium	.68	U		P
7440-70-2	Calcium	80200.00			P
7440-47-3	Chromium	5.00			P
7440-48-4	Cobalt	3.80	B		P
7440-50-8	Copper	12.70			P
7439-89-6	Iron	7790.00			P
7439-92-1	Lead	7.30			F
7439-95-4	Magnesium	42600.00			P
7439-96-5	Manganese	215.00			P
7439-97-6	Mercury	.11	U	N J	CV
7440-02-0	Nickel	7.60	B		P
7440-09-7	Potassium	587.00	B		P
7782-49-2	Selenium	.45	U	N J	F
7440-22-4	Silver	1.80	U		P
7440-23-5	Sodium	116.00	B		P
7440-28-0	Thallium	.68	U		F
7440-62-2	Vanadium	9.20	B		P
7440-66-6	Zinc	25.40			P
	Cyanide	.57	U		CA

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: Artifacts:

Comments:
MFD410 REFLECTS CLIENT ID FCR-SB-SB4-10.0-01D

DATA VALIDATION
FRANKLIN CURTIS SITE

Inorganic Analysis

a. **Sample Numbers:**
MF0106, MF0201, MF0301, MF0301D, MF0901, MF1A01, MF2001, MF2101, MF21D1, MF2301, MF23D1, MF23D1S, MF2601

b. **Holding Times:**
All samples were analyzed within holding times.

c. **Calibration:**
Calibration for ICP & GFAA met QAPP criteria.

d. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

e. **ICP Serial Dilution:**
ICP serial dilution for chromium, cobalt & sodium indicates an interference. Data estimated (J).

f. **Laboratory Duplicates:**
Duplicate analyses for Arsenic, Lead & Selenium did not meet QAPP criteria. Data is estimated (J).

g. **Laboratory Matrix Spikes:**
Data for Aluminum, Antimony, Iron, Lead & Thallium did not meet QAPP criteria. Lead was rejected due -115% RDD (R). All other metals are estimated (J). Post digestion spike for Lead & Thallium was out of control.

h. **Field Duplicates:**
No field duplicates were collected.

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EPA SAMPLE NO.

002

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INORGANIC ANALYSIS DATA SHEET

MF0106

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894310

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	64.00	U	J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	6.00	U	NJ	F
7440-39-3	Barium	6.00	U		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	346.00	B		P
7440-47-3	Chromium	4.00	U	J	F
7440-48-4	Cobalt	4.00	U	J	P
7440-50-8	Copper	6.00	U		P
7439-89-6	Iron	40.00	U	J	P
7439-92-1	Lead	25.30		W*MR	F
7439-95-4	Magnesium	112.00	U		P
7439-96-5	Manganese	3.70	B		P
7439-97-6	Mercury	.20	U		CV
7440-02-0	Nickel	7.00	U		P
7440-09-7	Potassium	402.00	U		P
7782-49-2	Selenium	3.00	U	J	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	626.00	B	J	P
7440-28-0	Thallium	2.00	U	NWJ	F
7440-62-2	Vanadium	4.00	U		P
7440-66-6	Zinc	2.00	U	E	P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
EPA SAMPLE ID MF0106 = CLIENT ID FCR-GW-106EB

EPA SAMPLE 003

1

INORGANIC ANALYSIS DATA SHEET

MF0201

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894313

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6020.00		J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	6.00	U	NJ	F
7440-39-3	Barium	694.00			P
7440-41-7	Beryllium	1.10	B		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	394000.00			P
7440-47-3	Chromium	16.90		J	P
7440-48-4	Cobalt	15.30	B	J	P
7440-50-8	Copper	76.70			P
7439-89-6	Iron	21200.00		J	P
7439-92-1	Lead	41.70		S*R	F
7439-95-4	Magnesium	123000.00			P
7439-96-5	Manganese	1730.00			P
7439-97-6	Mercury	.20			CV
7440-02-0	Nickel	50.10			P
7440-09-7	Potassium	3610.00	B		P
7782-49-2	Selenium	3.00	U	J	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	20900.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	23.00	B		P
7440-66-6	Zinc	110.00		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF0201 = CLIENT ID FCR-GW-IT2-01

U.S. EPA - CLP

EPA SAMPLE NO.

004

1

INORGANIC ANALYSIS DATA SHEET

MF0301

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894301

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000.00		J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	6.00	U	NWMJ	F
7440-39-3	Barium	423.00			P
7440-41-7	Beryllium	1.80	B		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	567000.00			P
7440-47-3	Chromium	32.80		J	P
7440-48-4	Cobalt	34.40	B	J	P
7440-50-8	Copper	94.90			P
7439-89-6	Iron	28400.00		J	P
7439-92-1	Lead	79.00		*Q	F
7439-95-4	Magnesium	187000.00			P
7439-96-5	Manganese	2800.00			P
7439-97-6	Mercury	.30			CV
7440-02-0	Nickel	64.60			P
7440-09-7	Potassium	3510.00	B		P
7782-49-2	Selenium	5.30		J	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	7390.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	36.90	B		P
7440-66-6	Zinc	177.00		E	P
	Cyanide	10.00	U		CA

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF0301 = CLIENT ID FCR-GW-IT3-01

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

005

MF0901

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894304

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8610.00		J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	6.00	U	NJ	F
7440-39-3	Barium	270.00			P
7440-41-7	Beryllium	1.40	B		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	525000.00			P
7440-47-3	Chromium	27.00		J	P
7440-48-4	Cobalt	15.60	B	J	P
7440-50-8	Copper	72.70			P
7439-89-6	Iron	16700.00		J	P
7439-92-1	Lead	58.50		*Q	F
7439-95-4	Magnesium	158000.00			P
7439-96-5	Manganese	1030.00			P
7439-97-6	Mercury	.38			CV
7440-02-0	Nickel	47.60			P
7440-09-7	Potassium	3840.00	B		P
7782-49-2	Selenium	4.30	B	J	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	9530.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	42.10	B		P
7440-66-6	Zinc	198.00		E	P
	Cyanide	10.00	U		CA

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF0901 = CLIENT ID FCR-GW-MW9-01

U.S. EPA - CLP

EPA SAMPLE NO.

006

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INORGANIC ANALYSIS DATA SHEET

MF1A01

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894311

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	484.00		J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	77.00		NJ	P
7440-39-3	Barium	114.00	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	63000.00			P
7440-47-3	Chromium	4.00	U	J	P
7440-48-4	Cobalt	4.00	U	J	P
7440-50-8	Copper	6.00	U		P
7439-89-6	Iron	2920.00		J	P
7439-92-1	Lead	2.70	B	*R	P
7439-95-4	Magnesium	30800.00			P
7439-96-5	Manganese	202.00			P
7439-97-6	Mercury	.20	U		CV
7440-02-0	Nickel	11.30	B		P
7440-09-7	Potassium	1830.00	B		P
7782-49-2	Selenium	3.00	U	J	P
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	34800.00		J	P
7440-28-0	Thallium	2.00	U	NJ	P
7440-62-2	Vanadium	4.00	U		P
7440-66-6	Zinc	9.20	B	E	P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
EPA SAMPLE ID MF1A01 = CLIENT ID FCR-GW-IT1A-01

U.S. EPA - CLP

EPA SAMPLE NO. 007

1

INORGANIC ANALYSIS DATA SHEET

MF2001

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894307

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5710.00		J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	6.00	U	NJ	F
7440-39-3	Barium	380.00			P
7440-41-7	Beryllium	1.10	B		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	612000.00			P
7440-47-3	Chromium	20.10		J	P
7440-48-4	Cobalt	12.50	B	J	P
7440-50-8	Copper	67.40			P
7439-89-6	Iron	13200.00		J	P
7439-92-1	Lead	40.80		*R	F
7439-95-4	Magnesium	232000.00			P
7439-96-5	Manganese	2840.00			P
7439-97-6	Mercury	.34			CV
7440-02-0	Nickel	40.90			P
7440-09-7	Potassium	4590.00	B		P
7782-49-2	Selenium	3.00	U	J	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	10300.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	35.40	B		P
7440-66-6	Zinc	1080.00		E	P
	Cyanide	10.00	U		CA

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF2001 = CLIENT ID FCR-GW-MW20-01

U.S. EPA - CLP

EPA SAMPLE NO. 008

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INORGANIC ANALYSIS DATA SHEET

MF2101

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894309

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8500.00		J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	6.00	U	NJ	F
7440-39-3	Barium	472.00			P
7440-41-7	Beryllium	2.60	B		P
7440-43-9	Cadmium	2.50	B		P
7440-70-2	Calcium	1000000.00			P
7440-47-3	Chromium	58.50		J	P
7440-48-4	Cobalt	75.00		J	P
7440-50-8	Copper	510.00			P
7439-89-6	Iron	7670.00		J	P
7439-92-1	Lead	162.00		*R	F
7439-95-4	Magnesium	342000.00			P
7439-96-5	Manganese	3520.00			P
7439-97-6	Mercury	.35			CV
7440-02-0	Nickel	538.00			P
7440-09-7	Potassium	3570.00	B		P
7782-49-2	Selenium	7.50		J	F
7440-22-4	Silver	46.70			P
7440-23-5	Sodium	6530.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	63.80			P
7440-66-6	Zinc	256.00		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF2101 = CLIENT ID FCR-GW-MW21-01

U.S. EPA - CLP

EPA SAMPLE NO. 009

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INORGANIC ANALYSIS DATA SHEET

MF21D1

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894308

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	101.00	B	J	P
7440-36-0	Antimony	17.00	U	NJ	F
7440-38-2	Arsenic	6.00	U	NJ	F
7440-39-3	Barium	528.00			P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	1170000.00			P
7440-47-3	Chromium	87.30		J	P
7440-48-4	Cobalt	11.00	B	J	P
7440-50-8	Copper	18.10	B		P
7439-89-6	Iron	407.00		J	P
7439-92-1	Lead	4.60		*Q	F
7439-95-4	Magnesium	323000.00			P
7439-96-5	Manganese	2440.00			P
7439-97-6	Mercury	.45			CV
7440-02-0	Nickel	122.00			P
7440-09-7	Potassium	3520.00	B		P
7782-49-2	Selenium	25.90		SMJ	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	7530.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	89.00			P
7440-66-6	Zinc	5.30	B	E	P
	Cyanide	10.00	U		CA

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF21D1 = CLIENT ID FCR-GW-MW21-01D

U.S. EPA - CLP

EPA SAMPLE NO.

010

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INORGANIC ANALYSIS DATA SHEET

MF2301

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894303

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15800.00		J	P
7440-36-0	Antimony	17.00	U	NJ	F
7440-38-2	Arsenic	7.60	B	NJ	F
7440-39-3	Barium	500.00			P
7440-41-7	Beryllium	2.10	B		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	193000.00			P
7440-47-3	Chromium	28.40		J	P
7440-48-4	Cobalt	13.60	B	J	P
7440-50-8	Copper	130.00			P
7439-89-6	Iron	26000.00		J	P
7439-92-1	Lead	69.30		*R	F
7439-95-4	Magnesium	73300.00			P
7439-96-5	Manganese	3250.00			P
7439-97-6	Mercury	.20	U		CV
7440-02-0	Nickel	41.70			P
7440-09-7	Potassium	2870.00	B		P
7782-49-2	Selenium	3.00	U	J	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	31200.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	37.00	B		P
7440-66-6	Zinc	261.00		E	P
	Cyanide	10.00	U		CA

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF2301 = CLIENT ID FCR-GW-MW23-01

U.S. EPA - CLP

EPA SAMPLE NO. 011

1

INORGANIC ANALYSIS DATA SHEET

MF23D1

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894302

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14700.00		J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	7.40	B	NJ	F
7440-39-3	Barium	473.00			P
7440-41-7	Beryllium	1.90	B		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	169000.00			P
7440-47-3	Chromium	25.60		J	P
7440-48-4	Cobalt	11.80	B	J	P
7440-50-8	Copper	121.00			P
7439-89-6	Iron	23100.00		J	P
7439-92-1	Lead	95.70		*R	F
7439-95-4	Magnesium	63200.00			P
7439-96-5	Manganese	2900.00			P
7439-97-6	Mercury	.20	U		CV
7440-02-0	Nickel	34.60	B		P
7440-09-7	Potassium	2880.00	B		P
7782-49-2	Selenium	3.00	U	J	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	30900.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	35.70	B		P
7440-66-6	Zinc	234.00		E	P
	Cyanide	10.00	U		CA

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF23D1 = CLIENT ID FCR-GW-MW23-01D

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

012

MF2601

Lab Name: SOUTHWEST LAB. OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8943 SAS No.: SDG No.: MF0106

Matrix (soil/water): WATER Lab Sample ID: 894312

Level (low/med): LOW Date Received: 3/05/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6020.00		J	P
7440-36-0	Antimony	17.00	U	NJ	P
7440-38-2	Arsenic	6.00	U	NJ	F
7440-39-3	Barium	223.00			P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	345000.00			P
7440-47-3	Chromium	23.20		J	P
7440-48-4	Cobalt	11.00	B	J	P
7440-50-8	Copper	47.40			P
7439-89-6	Iron	16900.00		J	P
7439-92-1	Lead	32.40		S*R	F
7439-95-4	Magnesium	114000.00			P
7439-96-5	Manganese	1020.00			P
7439-97-6	Mercury	.23			CV
7440-02-0	Nickel	43.40			P
7440-09-7	Potassium	7010.00			P
7782-49-2	Selenium	3.00	U	WJ	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	10000.00		J	P
7440-28-0	Thallium	2.00	U	NJ	F
7440-62-2	Vanadium	22.70	B		P
7440-66-6	Zinc	89.90		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:
EPA SAMPLE ID MF2601 = CLIENT ID FCR-GW-MW26-01

DATA VALIDATION
FRANKLIN CURTIS SITE

Inorganic Analysis

a. **Sample Numbers:**
MW2501

b. **Holding Times:**
Samples were analyzed within holding times.

c. **Calibration:**
Calibration of ICP & GFAA met QAPP criteria.

d. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

e. **ICP Serial Dilution:**
ICP serial dilution was not performed. All data estimated (J).

f. **Laboratory Duplicates:**
Laboratory duplicate not performed. All data estimated (J).

g. **Laboratory Matrix Spikes:**
Laboratory matrix spike not performed all data estimated (J).

h. **Field Duplicates:**
Field duplicates not collected.

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW2501 002

Lab Name: SOUTHWEST LABS OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 8979 SAS No.: SDG No.: MW2501

Matrix (soil/water): WATER Lab Sample ID: 897901

Level (low/med): LOW Date Received: 3/11/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	700.00		J	P
7440-36-0	Antimony	16.00	U	J	P
7440-38-2	Arsenic	6.00	U	J	F
7440-39-3	Barium	64.20	B	J	P
7440-41-7	Beryllium	1.00	U	J	P
7440-43-9	Cadmium	2.00	U	J	P
7440-70-2	Calcium	60000.00		J	P
7440-47-3	Chromium	3.00	U	J	P
7440-48-4	Cobalt	6.00	U	J	P
7440-50-8	Copper	4.00	U	J	P
7439-89-6	Iron	1220.00		J	P
7439-92-1	Lead	4.30		W J	F
7439-95-4	Magnesium	26600.00		J	P
7439-96-5	Manganese	357.00		J	P
7439-97-6	Mercury	.20	U	J	CV
7440-02-0	Nickel	8.00	U	J	P
7440-09-7	Potassium	2250.00	B	J	P
7782-49-2	Selenium	2.00	U	J	F
7440-22-4	Silver	1.00	U	J	P
7440-23-5	Sodium	25700.00		J	P
7440-28-0	Thallium	2.00	U	J	F
7440-62-2	Vanadium	6.00	U	J	P
7440-66-6	Zinc	17.20	B	J	P
	Cyanide	10.00	U	J	CA

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
MW2501 = FCR-GW-MW25-01

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRGWMW2501

b. **Holding Times:**
Sample analyzed within holding time.

c. **GC/MS Tuning:**
GC/MS Tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blank was not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Duplicate not analyzed. Data estimated (J).

h. **Field Duplicates:**
Field duplicate not collected.

i. **Matrix Spike Recoveries:**
Matrix spike not performed. Data estimated (J).

j. **Trip Blanks:**
No trip blank collected. Positive data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW2501

Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG3 SAS No.: _____ SDG No.: 8979

Matrix: (soil/water) WATER Lab Sample ID: 897901

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM371

Level: (low/med) LOW Date Received: 03/11/92

% Moisture: not dec. ____ Date Analyzed: 03/19/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U J
74-83-9	Bromomethane	10	U J
75-01-4	Vinyl Chloride	10	U J
75-00-3	Chloroethane	10	U J
75-09-2	Methylene Chloride	5	U J
67-64-1	Acetone	10	U J
75-15-0	Carbon Disulfide	5	U J
75-35-4	1,1-Dichloroethene	5	U J
75-34-3	1,1-Dichloroethane	5	U J
540-59-0	1,2-Dichloroethene (total)	5	U J
67-66-3	Chloroform	5	U J
107-06-2	1,2-Dichloroethane	5	U J
78-93-3	2-Butanone	10	U J
71-55-6	1,1,1-Trichloroethane	5	U J
56-23-5	Carbon Tetrachloride	5	U J
75-27-4	Bromodichloromethane	5	U J
78-87-5	1,2-Dichloropropane	5	U J
10061-01-5	cis-1,3-Dichloropropene	5	U J
79-01-6	Trichloroethene	5	U J
124-48-1	Dibromochloromethane	5	U J
79-00-5	1,1,2-Trichloroethane	5	U J
71-43-2	Benzene	5	U J
10061-02-6	trans-1,3-Dichloropropene	5	U J
75-25-2	Bromoform	5	U J
108-10-1	4-Methyl-2-Pentanone	10	U J
591-78-6	2-Hexanone	10	U J
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U J
108-88-3	Toluene	5	U J
108-90-7	Chlorobenzene	5	U J
100-41-4	Ethylbenzene	5	U J
100-42-5	Styrene	5	U J
1330-20-7	Xylene (total)	5	U J

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRGW106EB, FCRGWIT1A01, FCRGWIT201, FCRGWIT301, FCRGWMW2001, FCRGWMW2101, FCRGWMW2011D, FCRGWMW2301, FCRGWMW2301D, FCRGWMW2601, TB-3, FCRGWMW901, FCRGWMW901MS, FCRGWMW901MSD

b. **Holding Times:**
All samples analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blanks not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Lab duplicate met QAPP criteria.

h. **Field Duplicates:**
Field duplicates showed good precision.

i. **Matrix Spike Recoveries:**
Matrix spike met QAPP criteria.

j. **Trip Blanks:**
Trip blank contained Acetone, Tetrachloroethylene, 1,2-Dichloropropane. Data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGW106EB

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894310

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: L0033

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/11/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromometnane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroetnane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	7	J
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWIT1A01

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894311

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC015

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	8	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	9	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

:A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWIT201

Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894313

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC017

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	11	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	41	
540-59-0	1,2-Dichloroethene (total)	78	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	25	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	18	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWIT301

Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894301

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC005

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	4	J
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	83	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	34	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW2001

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894307

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC011

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW2101

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 834309

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC035

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/11/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	15	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	59	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW210LD

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894308

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC034

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/11/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS No.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	0.8	J
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	14	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	58	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW2301

Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894303

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC007

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	7	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	47	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW23DLD

Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: S943

Matrix: (soil/water) WATER Lab Sample ID: 894302

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC006

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroetnane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	40	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW2601

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894312

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC016

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	3	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW901

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894304

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC008

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	7	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	9	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB-3

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: 8943

Matrix: (soil/water) WATER Lab Sample ID: 894314

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: LC018

Level: (low/med) LOW Date Received: 03/05/92

% Moisture: not dec. ____ Date Analyzed: 03/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	14	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	29	
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	1	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	9	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBSB52001, FCRSBSB82001, FCRSBSB819001

b. **Holding Times:**
Samples were analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blank was not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Lab duplicate not analyzed. Data estimated (J).

h. **Field Duplicates:**
Field duplicate not collected.

i. **Matrix Spike Recoveries:**
Matrix spike not analyzed. Data estimated (J).

j. **Trip Blanks:**
No trip blank submitted. Positive data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRS8S85Z001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8701

Matrix: (soil/water) SOIL Lab Sample ID: 870101

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC4AB

Level: (low/med) LOW Date Received: 02/12/92

% Moisture: not dec. 15 Date Analyzed: 02/13/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	4	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBSB82001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: S701

Matrix: (soil/water) SOIL Lab Sample ID: 870102

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC469

Level: (low/med) LOW Date Received: 02/12/92

% Moisture: not dec. 13 Date Analyzed: 02/13/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	UJ
74-83-9	Bromomethane	11	UJ
75-01-4	Vinyl Chloride	11	UJ
75-00-3	Chloroethane	11	UJ
75-09-2	Methylene Chloride	6	UJ
67-64-1	Acetone	11	UJ
75-15-0	Carbon Disulfide	6	UJ
75-35-4	1,1-Dichloroethene	6	UJ
75-34-3	1,1-Dichloroethane	6	UJ
540-59-0	1,2-Dichloroethene (total)	6	UJ
67-66-3	Chloroform	6	UJ
107-06-2	1,2-Dichloroethane	6	UJ
78-93-3	2-Butanone	11	UJ
71-55-6	1,1,1-Trichloroethane	6	UJ
56-23-5	Carbon Tetrachloride	6	UJ
108-05-4	Vinyl Acetate	11	UJ
75-27-4	Bromodichloromethane	6	UJ
78-87-5	1,2-Dichloropropane	6	UJ
10061-01-5	cis-1,3-Dichloropropene	6	UJ
79-01-6	Trichloroethene	17	J
124-48-1	Dibromochloromethane	6	UJ
79-00-5	1,1,2-Trichloroethane	6	UJ
71-43-2	Benzene	6	UJ
10061-02-6	Trans-1,3-Dichloropropene	6	UJ
75-25-2	Bromoform	6	UJ
108-10-1	4-Methyl-2-Pentanone	11	UJ
591-78-6	2-Hexanone	11	UJ
127-18-4	Tetrachloroethene	53	J
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	UJ
108-90-7	Chlorobenzene	6	UJ
100-41-4	Ethylbenzene	6	UJ
100-42-5	Styrene	6	UJ
1330-20-7	Xylene (total)	6	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBSB819001

Name: SWL-TULSA Contract: WWENB-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 6701

Matrix: (soil/water) SOIL Lab Sample ID: 670103

Sample wt/vol: 4.0 (g/mL) G Lab File ID: IC481

Level: (low/med) MED Date Received: 02/12/92

% Moisture: not dec. 13 Date Analyzed: 02/14/92

Column: (pack/cap) CAP Dilution Factor: 2.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	2900	U
74-83-9	Bromomethane	2900	U
75-01-4	Vinyl Chloride	2900	U
75-00-3	Chloroethane	2900	U
75-09-2	Methylene Chloride	510	BJ
67-64-1	Acetone	680	J
75-15-0	Carbon Disulfide	1400	U
75-35-4	1,1-Dichloroethene	1400	U
75-34-3	1,1-Dichloroethane	1400	U
540-59-0	1,2-Dichloroethene (total)	1400	U
67-66-3	Chloroform	1400	U
107-06-2	1,2-Dichloroethane	1400	U
78-93-3	2-Butanone	2900	U
71-55-6	1,1,1-Trichloroethane	270	J
56-23-5	Carbon Tetrachloride	1400	U
108-05-4	Vinyl Acetate	2900	U
75-27-4	Bromodichloromethane	1400	U
78-87-5	1,2-Dichloropropane	1400	U
10061-01-5	cis-1,3-Dichloropropene	1400	U
79-01-6	Trichloroethene	3100	J
124-48-1	Dibromochloromethane	1400	U
79-00-5	1,1,2-Trichloroethane	1400	U
71-43-2	Benzene	1400	U
10061-02-6	Trans-1,3-Dichloropropene	1400	U
75-25-2	Bromoform	1400	U
108-10-1	4-Methyl-2-Pentanone	2900	U
591-78-6	2-Hexanone	2900	U
127-18-4	Tetrachloroethene	36000	J
79-34-5	1,1,2,2-Tetrachloroethane	1400	U
108-88-3	Toluene	1400	U
108-90-7	Chlorobenzene	1400	U
100-41-4	Ethylbenzene	1400	U
100-42-5	Styrene	1400	U
1330-20-7	Xylene (total)	1400	U

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBMW2415001, FCRSBMW246001, FCRSBSB30001, FCBSBSB310001, FCRSBSB36001, FCRSBSB410001, FCSBSB410001D, FCSBSB45001

b. **Holding Times:**
All samples analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blanks were not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Trichloroethylene, Methylene Chloride, Acetone & Tetrachloroethylene data qualified. Poor duplicate precision (J).

h. **Field Duplicates:**
Field duplicate not collected.

i. **Matrix Spike Recoveries:**
No matrix spike performed. All data qualified (J).

j. **Trip Blanks:**
No trip blank submitted. All positive data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCR:SBMW241500

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENGI SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 867408

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC460

Level: (low/med) LOW Date Received: 02/08/92

% Moisture: not dec. 6 Date Analyzed: 02/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	11	UJ
74-83-9	Bromomethane	11	UJ
75-01-4	Vinyl Chloride	11	UJ
75-00-3	Chloroethane	11	UJ
75-09-2	Methylene Chloride	27	J
67-64-1	Acetone	19	J
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	11	UJ
71-55-6	1,1,1-Trichloroethane	10	J
56-23-5	Carbon Tetrachloride	5	UJ
108-05-4	Vinyl Acetate	11	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	5	UJ
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	38	J
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	Trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	11	UJ
591-78-6	2-Hexanone	11	UJ
127-18-4	Tetrachloroethene	6	J
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	5	UJ
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRS8MW24S001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG3 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 867407

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC442

Level: (low/med) LOW Date Received: 02/08/92

% Moisture: not dec. 2 Date Analyzed: 02/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	UJ
74-83-9	Bromomethane	10	UJ
75-01-4	Vinyl Chloride	10	UJ
75-00-3	Chloroethane	10	UJ
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	10	UJ
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	10	UJ
71-55-6	1,1,1-Trichloroethane	5	UJ
56-23-5	Carbon Tetrachloride	5	UJ
108-05-4	Vinyl Acetate	10	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	5	UJ
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	5	UJ
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	Trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	10	UJ
591-78-6	2-Hexanone	10	UJ
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	5	UJ
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBGB30001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENGI SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: S67406

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC441

Level: (low/med) LOW Date Received: 02/08/92

% Moisture: not dec. 1 Date Analyzed: 02/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U J
74-83-9	Bromomethane	10	U J
75-01-4	Vinyl Chloride	10	U J
75-00-3	Chloroethane	10	U J
75-09-2	Methylene Chloride	5	U J
67-64-1	Acetone	10	J-
75-15-0	Carbon Disulfide	5	U J
75-35-4	1,1-Dichloroethene	5	U J
75-34-3	1,1-Dichloroethane	5	U J
540-59-0	1,2-Dichloroethene (total)	5	U J
67-66-3	Chloroform	5	U J
107-06-2	1,2-Dichloroethane	5	U J
78-93-3	2-Butanone	10	U J
71-55-6	1,1,1-Trichloroethane	5	U J
56-23-5	Carbon Tetrachloride	5	U J
108-05-4	Vinyl Acetate	10	U J
75-27-4	Bromodichloromethane	5	U J
78-87-5	1,2-Dichloropropane	5	U J
10061-01-5	cis-1,3-Dichloropropene	5	U J
79-01-6	Trichloroethene	5	U J
124-48-1	Dibromochloromethane	5	U J
79-00-5	1,1,2-Trichloroethane	5	U J
71-43-2	Benzene	5	U J
10061-02-6	Trans-1,3-Dichloropropene	5	U J
75-25-2	Bromoform	5	U J
108-10-1	4-Methyl-2-Pentanone	10	U J
591-78-6	2-Hexanone	10	U J
127-18-4	Tetrachloroethene	5	U J
79-34-5	1,1,2,2-Tetrachloroethane	5	U J
108-88-3	Toluene	5	U J
108-90-7	Chlorobenzene	5	U J
100-41-4	Ethylbenzene	5	U J
100-42-5	Styrene	5	U J
1330-20-7	Xylene (total)	5	U J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGBSB310001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG3 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 867402

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC437

Level: (low/med) LOW Date Received: 02/08/92

% Moisture: not dec. 9 Date Analyzed: 02/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		G
74-87-3	Chloromethane	11	UJ
74-83-9	Bromomethane	11	UJ
75-01-4	Vinyl Chloride	11	UJ
75-00-3	Chloroethane	11	UJ
75-09-2	Methylene Chloride	18	J
67-64-1	Acetone	11	UJ
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	11	UJ
71-55-6	1,1,1-Trichloroethane	15	J
56-23-5	Carbon Tetrachloride	5	UJ
108-05-4	Vinyl Acetate	11	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	5	UJ
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	52	J
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	Trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	11	UJ
591-78-6	2-Hexanone	11	UJ
127-18-4	Tetrachloroethene	60	J
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	5	UJ
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBSB36001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG3 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 867401

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC436

Level: (low/med) LOW Date Received: 02/08/92

% Moisture: not dec. 14 Date Analyzed: 02/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U J
74-83-9	Bromomethane	12	U J
75-01-4	Vinyl Chloride	12	U J
75-00-3	Chloroethane	12	U J
75-09-2	Methylene Chloride	8	J
67-64-1	Acetone	23	J
75-15-0	Carbon Disulfide	6	U J
75-35-4	1,1-Dichloroethene	6	U J
75-34-3	1,1-Dichloroethane	6	U J
540-59-0	1,2-Dichloroethene (total)	6	U J
67-66-3	Chloroform	6	U J
107-06-2	1,2-Dichloroethane	6	U J
78-93-3	2-Butanone	12	U J
71-55-6	1,1,1-Trichloroethane	6	U J
56-23-5	Carbon Tetrachloride	6	U J
108-05-4	Vinyl Acetate	12	U J
75-27-4	Bromodichloromethane	6	U J
78-87-5	1,2-Dichloropropane	6	U J
10061-01-5	cis-1,3-Dichloropropene	6	U J
79-01-6	Trichloroethene	6	U J
124-48-1	Dibromochloromethane	6	U J
79-00-5	1,1,2-Trichloroethane	6	U J
71-43-2	Benzene	6	U J
10061-02-6	Trans-1,3-Dichloropropene	6	U J
75-25-2	Bromoform	6	U J
108-10-1	4-Methyl-2-Pentanone	12	U J
591-78-6	2-Hexanone	12	U J
127-18-4	Tetrachloroethene	6	U J
79-34-5	1,1,2,2-Tetrachloroethane	6	U J
108-88-3	Toluene	6	U J
108-90-7	Chlorobenzene	6	U J
100-41-4	Ethylbenzene	6	U J
100-42-5	Styrene	6	U J
1330-20-7	Xylene (total)	6	U J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBSB410001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENGI SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 867404

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC439

Level: (low/med) LOW Date Received: 02/08/92

% Moisture: not dec. 10 Date Analyzed: 02/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	11	UJ
74-83-9	Bromomethane	11	UJ
75-01-4	Vinyl Chloride	11	UJ
75-00-3	Chloroethane	11	UJ
75-09-2	Methylene Chloride	18	J
67-64-1	Acetone	11	J
75-15-0	Carbon Disulfide	6	UJ
75-35-4	1,1-Dichloroethene	6	UJ
75-34-3	1,1-Dichloroethane	6	UJ
540-59-0	1,2-Dichloroethene (total)	6	UJ
67-66-3	Chloroform	6	UJ
107-06-2	1,2-Dichloroethane	6	UJ
78-93-3	2-Butanone	11	UJ
71-55-6	1,1,1-Trichloroethane	8	J
56-23-5	Carbon Tetrachloride	6	UJ
108-05-4	Vinyl Acetate	11	UJ
75-27-4	Bromodichloromethane	6	UJ
78-87-5	1,2-Dichloropropane	6	UJ
10061-01-5	cis-1,3-Dichloropropene	6	UJ
79-01-6	Trichloroethene	10	J
124-48-1	Dibromochloromethane	6	UJ
79-00-5	1,1,2-Trichloroethane	6	UJ
71-43-2	Benzene	6	UJ
10061-02-6	Trans-1,3-Dichloropropene	6	UJ
75-25-2	Bromoform	6	UJ
108-10-1	4-Methyl-2-Pentanone	11	UJ
591-78-6	2-Hexanone	11	UJ
127-18-4	Tetrachloroethene	16	J
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	UJ
108-90-7	Chlorobenzene	6	UJ
100-41-4	Ethylbenzene	6	UJ
100-42-5	Styrene	6	UJ
1330-20-7	Xylene (total)	6	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBSB410001d

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG3 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 867405

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC459

Level: (low/med) LOW Date Received: 02/08/92

% Moisture: not dec. 11 Date Analyzed: 02/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	UJ
74-83-9	Bromomethane	11	UJ
75-01-4	Vinyl Chloride	11	UJ
75-00-3	Chloroethane	11	UJ
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	13	J
75-15-0	Carbon Disulfide	6	UJ
75-35-4	1,1-Dichloroethene	6	UJ
75-34-3	1,1-Dichloroethane	6	UJ
540-59-0	1,2-Dichloroethene (total)	6	UJ
67-66-3	Chloroform	6	UJ
107-06-2	1,2-Dichloroethane	6	UJ
78-93-3	2-Butanone	11	UJ
71-55-6	1,1,1-Trichloroethane	3	J
56-23-5	Carbon Tetrachloride	6	UJ
108-05-4	Vinyl Acetate	11	UJ
75-27-4	Bromodichloromethane	6	UJ
78-87-5	1,2-Dichloropropane	6	UJ
10061-01-5	cis-1,3-Dichloropropene	6	UJ
79-01-6	Trichloroethene	5	J
124-48-1	Dibromochloromethane	6	UJ
79-00-5	1,1,2-Trichloroethane	6	UJ
71-43-2	Benzene	6	UJ
10061-02-6	Trans-1,3-Dichloropropene	6	UJ
75-25-2	Bromoform	6	UJ
108-10-1	4-Methyl-2-Pentanone	11	UJ
591-78-6	2-Hexanone	11	UJ
127-18-4	Tetrachloroethene	6	J
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	UJ
108-90-7	Chlorobenzene	6	UJ
100-41-4	Ethylbenzene	6	UJ
100-42-5	Styrene	6	UJ
1330-20-7	Xylene (total)	6	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBSB46001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG3 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 867403

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC438

Level: (low/med) LOW Date Received: 02/08/92

% Moisture: not dec. 16 Date Analyzed: 02/10/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	12	UJ
74-83-9	Bromomethane	12	UJ
75-01-4	Vinyl Chloride	12	UJ
75-00-3	Chloroethane	12	UJ
75-09-2	Methylene Chloride	11	J
67-64-1	Acetone	21	J
75-15-0	Carbon Disulfide	6	UJ
75-35-4	1,1-Dichloroethene	6	UJ
75-34-3	1,1-Dichloroethane	6	UJ
540-59-0	1,2-Dichloroethene (total)	6	UJ
67-66-3	Chloroform	6	UJ
107-06-2	1,2-Dichloroethane	6	UJ
78-93-3	2-Butanone	12	UJ
71-55-6	1,1,1-Trichloroethane	6	UJ
56-23-5	Carbon Tetrachloride	6	UJ
108-05-4	Vinyl Acetate	12	UJ
75-27-4	Bromodichloromethane	6	UJ
78-87-5	1,2-Dichloropropane	6	UJ
10061-01-5	cis-1,3-Dichloropropene	6	UJ
79-01-6	Trichloroethene	6	UJ
124-48-1	Dibromochloromethane	6	UJ
79-00-5	1,1,2-Trichloroethane	6	UJ
71-43-2	Benzene	6	UJ
10061-02-6	Trans-1,3-Dichloropropene	6	UJ
75-25-2	Bromoform	6	UJ
108-10-1	4-Methyl-2-Pentanone	12	UJ
591-78-6	2-Hexanone	12	UJ
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	UJ
108-90-7	Chlorobenzene	6	UJ
100-41-4	Ethylbenzene	6	UJ
100-42-5	Styrene	6	UJ
1330-20-7	Xylene (total)	6	UJ

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
SBMW2112001, SBMW2112001D, SBSB70001B, SBSB78001, SBSB912001, SBMW21120MS, SBSB21120MSD, SBMW2118001, SBSB718001, SBSB918001, SBSB918001D

b. **Holding Times:**
Samples analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blanks were not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Lab duplicates met QAPP criteria.

b. **Field Duplicates:**
Poor precision between field duplicates. Data estimated (J).

i. **Matrix Spike Recoveries:**
Trichloroethylene spike recovery was 39%. Data estimated (J).

j. **Trip Blanks:**
Trip blanks not submitted. All positive data estimated. (J).

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCR SBMW2112001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 882107

Sample wt/vol: 1.0 (g/mL) G Lab File ID: IC667

Level: (low/med) LOW Date Received: 02/22/92

% Moisture: not dec. 5 Date Analyzed: 02/26/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	53	U
74-83-9	Bromomethane	53	U
75-01-4	Vinyl Chloride	53	U
75-00-3	Chloroethane	53	U
75-09-2	Methylene Chloride	26	U
67-64-1	Acetone	53	U
75-15-0	Carbon Disulfide	26	U
75-35-4	1,1-Dichloroethene	26	U
75-34-3	1,1-Dichloroethane	26	U
540-59-0	1,2-Dichloroethene (total)	26	U
67-66-3	Chloroform	26	U
107-06-2	1,2-Dichloroethane	26	U
78-93-3	2-Butanone	53	U
71-55-6	1,1,1-Trichloroethane	26	U
56-23-5	Carbon Tetrachloride	26	U
108-05-4	Vinyl Acetate	53	U
75-27-4	Bromodichloromethane	26	U
78-87-5	1,2-Dichloropropane	26	U
10061-01-5	cis-1,3-Dichloropropene	26	U
79-01-6	Trichloroethene	300	J
124-48-1	Dibromochloromethane	26	U
79-00-5	1,1,2-Trichloroethane	26	U
71-43-2	Benzene	26	U
10061-02-6	Trans-1,3-Dichloropropene	26	U
75-25-2	Bromoform	26	U
108-10-1	4-Methyl-2-Pentanone	53	U
591-78-6	2-Hexanone	53	U
127-18-4	Tetrachloroethene	780	J
79-34-5	1,1,2,2-Tetrachloroethane	26	U
108-88-3	Toluene	26	U
108-90-7	Chlorobenzene	26	U
100-41-4	Ethylbenzene	26	U
100-42-5	Styrene	26	U
1330-20-7	Xylene (total)	26	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBMW2112001D

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG SAS No.: _____ SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 882110

Sample wt/vol: 1.0 (g/mL) G Lab File ID: IC698

Level: (low/med) LOW Date Received: 02/22/92

% Moisture: not dec. 6 Date Analyzed: 02/28/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	53	U
74-83-9	Bromomethane	53	U
75-01-4	Vinyl Chloride	53	U
75-00-3	Chloroethane	53	U
75-09-2	Methylene Chloride	27	U
67-64-1	Acetone	53	U
75-15-0	Carbon Disulfide	27	U
75-35-4	1,1-Dichloroethene	27	U
75-34-3	1,1-Dichloroethane	27	U
540-59-0	1,2-Dichloroethene (total)	27	U
67-66-3	Chloroform	27	U
107-06-2	1,2-Dichloroethane	27	U
78-93-3	2-Butanone	53	U
71-55-6	1,1,1-Trichloroethane	27	U
56-23-5	Carbon Tetrachloride	27	U
108-05-4	Vinyl Acetate	53	U
75-27-4	Bromodichloromethane	27	U
78-87-5	1,2-Dichloropropane	27	U
10061-01-5	cis-1,3-Dichloropropene	27	U
79-01-6	Trichloroethene	52	J
124-48-1	Dibromochloromethane	27	U
79-00-5	1,1,2-Trichloroethane	27	U
71-43-2	Benzene	27	U
10061-02-6	Trans-1,3-Dichloropropene	27	U
75-25-2	Bromoform	27	U
108-10-1	4-Methyl-2-Pentanone	53	U
591-78-6	2-Hexanone	53	U
127-18-4	Tetrachloroethene	160	J
79-34-5	1,1,2,2-Tetrachloroethane	27	U
108-88-3	Toluene	27	U
108-90-7	Chlorobenzene	27	U
100-41-4	Ethylbenzene	27	U
100-42-5	Styrene	27	U
1330-20-7	Xylene (total)	27	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCLSBMW2118001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 882111

Sample wt/vol: 4.0 (g/mL) G Lab File ID: IC687

Level: (low/med) MED Date Received: 02/22/92

% Moisture: not dec. 16 Date Analyzed: 02/27/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	1500	U
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	740	U
67-64-1	Acetone	1500	U
75-15-0	Carbon Disulfide	740	U
75-35-4	1,1-Dichloroethene	740	U
75-34-3	1,1-Dichloroethane	740	U
540-59-0	1,2-Dichloroethene (total)	740	U
67-66-3	Chloroform	740	U
107-06-2	1,2-Dichloroethane	740	U
78-93-3	2-Butanone	1500	U
71-55-6	1,1,1-Trichloroethane	750	J
56-23-5	Carbon Tetrachloride	740	U
108-05-4	Vinyl Acetate	1500	U
75-27-4	Bromodichloromethane	740	U
78-87-5	1,2-Dichloropropane	740	U
10061-01-5	cis-1,3-Dichloropropene	740	U
79-01-6	Trichloroethene	5300	J
124-48-1	Dibromochloromethane	740	U
79-00-5	1,1,2-Trichloroethane	740	U
71-43-2	Benzene	740	U
10061-02-6	Trans-1,3-Dichloropropene	740	U
75-25-2	Bromoform	740	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	25000	J
79-34-5	1,1,2,2-Tetrachloroethane	740	U
108-88-3	Toluene	740	U
108-90-7	Chlorobenzene	740	U
100-41-4	Ethylbenzene	740	U
100-42-5	Styrene	740	U
1330-20-7	Xylene (total)	740	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCL-SB5B700013

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 6821

Matrix: (soil/water) SOIL Lab Sample ID: 882102

Sample wt/vol: 5.0 (g/mL) G Lab File ID: ID636

Level: (low/med) LOW Date Received: 02/22/92

% Moisture: not dec. 0 Date Analyzed: 02/26/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroetnane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FC6583718001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 882103

Sample wt/vol: 4.0 (g/mL) G Lab File ID: IC684

Level: (low/med) MED Date Received: 02/22/92

% Moisture: not dec. 7 Date Analyzed: 02/27/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	1300	U
74-83-9	Bromomethane	1300	U
75-01-4	Vinyl Chloride	1300	U
75-00-3	Chloroethane	1300	U
75-09-2	Methylene Chloride	670	U
67-64-1	Acetone	1300	U
75-15-0	Carbon Disulfide	670	U
75-35-4	1,1-Dichloroethene	670	U
75-34-3	1,1-Dichloroethane	670	U
540-59-0	1,2-Dichloroethene (total)	670	U
67-66-3	Chloroform	670	U
107-06-2	1,2-Dichloroethane	670	U
78-93-3	2-Butanone	1300	U
71-55-6	1,1,1-Trichloroethane	670	U
56-23-5	Carbon Tetrachloride	670	U
108-05-4	Vinyl Acetate	1300	U
75-27-4	Bromodichloromethane	670	U
78-87-5	1,2-Dichloropropane	670	U
10061-01-5	cis-1,3-Dichloropropene	670	U
79-01-6	Trichloroethene	440	J
124-48-1	Dibromochloromethane	670	U
79-00-5	1,1,2-Trichloroethane	670	U
71-43-2	Benzene	670	U
10061-02-6	Trans-1,3-Dichloropropene	670	U
75-25-2	Bromoform	670	U
108-10-1	4-Methyl-2-Pentanone	1300	U
591-78-6	2-Hexanone	1300	U
127-18-4	Tetrachloroethene	17000	J
79-34-5	1,1,2,2-Tetrachloroethane	670	U
108-88-3	Toluene	670	U
108-90-7	Chlorobenzene	670	U
100-41-4	Ethylbenzene	670	U
100-42-5	Styrene	670	U
1330-20-7	Xylene (total)	670	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCL-SBSB78001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 882101

Sample wt/vol: 2.0 (g/mL) G Lab File ID: IC660

Level: (low/med) LOW Date Received: 02/22/92

% Moisture: not dec. 5 Date Analyzed: 02/26/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	26	U
74-83-9	Bromomethane	26	U
75-01-4	Vinyl Chloride	26	U
75-00-3	Chloroethane	26	U
75-09-2	Methylene Chloride	13	U
67-64-1	Acetone	26	U
75-15-0	Carbon Disulfide	13	U
75-35-4	1,1-Dichloroethene	13	U
75-34-3	1,1-Dichloroethane	13	U
540-59-0	1,2-Dichloroethene (total)	13	U
67-66-3	Chloroform	13	U
107-06-2	1,2-Dichloroethane	13	U
78-93-3	2-Butanone	26	U
71-55-6	1,1,1-Trichloroethane	13	U
56-23-5	Carbon Tetrachloride	13	U
108-05-4	Vinyl Acetate	26	U
75-27-4	Bromodichloromethane	13	U
78-87-5	1,2-Dichloropropane	13	U
10061-01-5	cis-1,3-Dichloropropene	13	U
79-01-6	Trichloroethene	19	J
124-48-1	Dibromochloromethane	13	U
79-00-5	1,1,2-Trichloroethane	13	U
71-43-2	Benzene	13	U
10061-02-6	Trans-1,3-Dichloropropene	13	U
75-25-2	Bromoform	13	U
108-10-1	4-Methyl-2-Pentanone	26	U
591-78-6	2-Hexanone	26	U
127-18-4	Tetrachloroethene	330	J
79-34-5	1,1,2,2-Tetrachloroethane	13	U
108-88-3	Toluene	13	U
108-90-7	Chlorobenzene	13	U
100-41-4	Ethylbenzene	13	U
100-42-5	Styrene	13	U
1330-20-7	Xylene (total)	13	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBSB912001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 882104

Sample wt/vol: 1.0 (g/mL) G Lab File ID: IC666

Level: (low/med) LOW Date Received: 02/22/92

% Moisture: not dec. 7 Date Analyzed: 02/26/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	54	U
74-83-9	Bromomethane	54	U
75-01-4	Vinyl Chloride	54	U
75-00-3	Chloroethane	54	U
75-09-2	Methylene Chloride	27	U
67-64-1	Acetone	54	U
75-15-0	Carbon Disulfide	27	U
75-35-4	1,1-Dichloroethene	27	U
75-34-3	1,1-Dichloroethane	27	U
540-59-0	1,2-Dichloroethene (total)	27	U
67-66-3	Chloroform	27	U
107-06-2	1,2-Dichloroethane	27	U
78-93-3	2-Butanone	54	U
71-55-6	1,1,1-Trichloroethane	10	J
56-23-5	Carbon Tetrachloride	27	U
108-05-4	Vinyl Acetate	54	U
75-27-4	Bromodichloromethane	27	U
78-87-5	1,2-Dichloropropane	27	U
10061-01-5	cis-1,3-Dichloropropene	27	U
79-01-6	Trichloroethene	150	J
124-48-1	Dibromochloromethane	27	U
79-00-5	1,1,2-Trichloroethane	27	U
71-43-2	Benzene	27	U
10061-02-6	Trans-1,3-Dichloropropene	27	U
75-25-2	Bromoform	27	U
108-10-1	4-Methyl-2-Pentanone	54	U
591-78-6	2-Hexanone	54	U
127-18-4	Tetrachloroethene	550	J
79-34-5	1,1,2,2-Tetrachloroethane	27	U
108-88-3	Toluene	27	U
108-90-7	Chlorobenzene	27	U
100-41-4	Ethylbenzene	27	U
100-42-5	Styrene	27	U
1330-20-7	Xylene (total)	27	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCG8SB918001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: S821

Matrix: (soil/water) SOIL Lab Sample ID: 882105

Sample wt/vol: 4.0 (g/mL) G Lab File ID: IC685

Level: (low/med) MED Date Received: 02/22/92

% Moisture: not dec. 16 Date Analyzed: 02/27/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	1500	U
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	740	U
67-64-1	Acetone	1500	U
75-15-0	Carbon Disulfide	740	U
75-35-4	1,1-Dichloroethene	740	U
75-34-3	1,1-Dichloroethane	740	U
540-59-0	1,2-Dichloroethene (total)	740	U
67-66-3	Chloroform	740	U
107-06-2	1,2-Dichloroethane	740	U
78-93-3	2-Butanone	1500	U
71-55-6	1,1,1-Trichloroethane	650	J
56-23-5	Carbon Tetrachloride	740	U
108-05-4	Vinyl Acetate	1500	U
75-27-4	Bromodichloromethane	740	U
78-87-5	1,2-Dichloropropane	740	U
10061-01-5	cis-1,3-Dichloropropene	740	U
79-01-6	Trichloroethene	3500	J
124-48-1	Dibromochloromethane	740	U
79-00-5	1,1,2-Trichloroethane	740	U
71-43-2	Benzene	740	U
10061-02-6	Trans-1,3-Dichloropropene	740	U
75-25-2	Bromoform	740	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	15000	J
79-34-5	1,1,2,2-Tetrachloroethane	740	U
108-88-3	Toluene	740	U
108-90-7	Chlorobenzene	740	U
100-41-4	Ethylbenzene	740	U
100-42-5	Styrene	740	U
1330-20-7	Xylene (total)	740	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCR-SBSB9120010

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 882106

Sample wt/vol: 4.0 (g/mL) G Lab File ID: IC686

Level: (low/med) MED Date Received: 02/22/92

% Moisture: not dec. 10 Date Analyzed: 02/27/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	690	U
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	690	U
75-35-4	1,1-Dichloroethene	690	U
75-34-3	1,1-Dichloroethane	690	U
540-59-0	1,2-Dichloroethene (total)	690	U
67-66-3	Chloroform	690	U
107-06-2	1,2-Dichloroethane	690	U
78-93-3	2-Butanone	1400	U
71-55-6	1,1,1-Trichloroethane	690	U
56-23-5	Carbon Tetrachloride	690	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	690	U
78-87-5	1,2-Dichloropropane	690	U
10061-01-5	cis-1,3-Dichloropropene	690	U
79-01-6	Trichloroethene	2500	J
124-48-1	Dibromochloromethane	690	U
79-00-5	1,1,2-Trichloroethane	690	U
71-43-2	Benzene	690	U
10061-02-6	Trans-1,3-Dichloropropene	690	U
75-25-2	Bromoform	690	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	10000	J
79-34-5	1,1,2,2-Tetrachloroethane	690	U
108-88-3	Toluene	690	U
108-90-7	Chlorobenzene	690	U
100-41-4	Ethylbenzene	690	U
100-42-5	Styrene	690	U
1330-20-7	Xylene (total)	690	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBMW21120MS

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 882108MS

Sample wt/vol: 1.0 (g/mL) G Lab File ID: IC697

Level: (low/med) LOW Date Received: 02/22/92

% Moisture: not dec. 5 Date Analyzed: 02/28/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	53	U
74-83-9	Bromomethane	53	U
75-01-4	Vinyl Chloride	53	U
75-00-3	Chloroethane	53	U
75-09-2	Methylene Chloride	26	U
67-64-1	Acetone	30	BJ
75-15-0	Carbon Disulfide	26	U
75-35-4	1,1-Dichloroethene	26	U
75-34-3	1,1-Dichloroethane	26	U
540-59-0	1,2-Dichloroethene (total)	26	U
67-66-3	Chloroform	26	U
107-06-2	1,2-Dichloroethane	26	U
78-93-3	2-Butanone	53	U
71-55-6	1,1,1-Trichloroethane	26	U
56-23-5	Carbon Tetrachloride	26	U
108-05-4	Vinyl Acetate	53	U
75-27-4	Bromodichloromethane	26	U
78-87-5	1,2-Dichloropropane	26	U
10061-01-5	cis-1,3-Dichloropropene	26	U
79-01-6	Trichloroethene	26	U
124-48-1	Dibromochloromethane	26	U
79-00-5	1,1,2-Trichloroethane	24	U
71-43-2	Benzene	26	U
10061-02-6	Trans-1,3-Dichloropropene	26	U
75-25-2	Bromoform	26	U
108-10-1	4-Methyl-2-Pentanone	53	U
591-78-6	2-Hexanone	53	U
127-18-4	Tetrachloroethene	340	J
79-34-5	1,1,2,2-Tetrachloroethane	26	U
108-88-3	Toluene	26	U
108-90-7	Chlorobenzene	26	U
100-41-4	Ethylbenzene	26	U
100-42-5	Styrene	26	U
1330-20-7	Xylene (total)	26	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCR-SBMW21120MSD

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 8821

Matrix: (soil/water) SOIL Lab Sample ID: 382109MSD

Sample wt/vol: 1.0 (g/mL) G Lab File ID: IC669

Level: (low/med) LOW Date Received: 02/22/92

% Moisture: not dec. 5 Date Analyzed: 02/26/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	53	U
74-83-9	Bromomethane	53	U
75-01-4	Vinyl Chloride	53	U
75-00-3	Chloroethane	53	U
75-09-2	Methylene Chloride	26	U
67-64-1	Acetone	53	U
75-15-0	Carbon Disulfide	26	U
75-35-4	1,1-Dichloroethene	26	U
75-34-3	1,1-Dichloroethane	26	U
540-59-0	1,2-Dichloroethene (total)	26	U
67-66-3	Chloroform	26	U
107-06-2	1,2-Dichloroethane	26	U
78-93-3	2-Butanone	53	U
71-55-6	1,1,1-Trichloroethane	26	U
56-23-5	Carbon Tetrachloride	26	U
108-05-4	Vinyl Acetate	53	U
75-27-4	Bromodichloromethane	26	U
78-87-5	1,2-Dichloropropane	26	U
10061-01-5	cis-1,3-Dichloropropene	26	U
79-01-6	Trichloroethene	26	U
124-48-1	Dibromochloromethane	26	U
79-00-5	1,1,2-Trichloroethane	26	U
71-43-2	Benzene	26	U
10061-02-6	Trans-1,3-Dichloropropene	26	U
75-25-2	Bromoform	26	U
108-10-1	4-Methyl-2-Pentanone	53	U
591-78-6	2-Hexanone	53	U
127-18-4	Tetrachloroethene	770	J
79-34-5	1,1,2,2-Tetrachloroethane	26	U
108-88-3	Toluene	26	U
108-90-7	Chlorobenzene	26	U
100-41-4	Ethylbenzene	26	U
100-42-5	Styrene	26	U
1330-20-7	Xylene (total)	26	U

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRGWMW301, FCRGWMW2401, FCRGWMW10201EB

b. **Holding Times:**
All samples analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogates/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Lab duplicate not performed. All data estimated (J).

b. **Field Duplicates:**
Field duplicate not performed.

i. **Matrix Spike Recoveries:**
Matrix spike not performed all data qualified (J).

j. **Trip Blanks:**
Trip blanks contaminated with 1,2-Dichloropropane. Not detected in samples.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB-2

Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG SAS No.: _____ SDG No.: 8927

Matrix: (soil/water) WATER Lab Sample ID: 892912

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM183

Level: (low/med) LOW Date Received: 03/04/92

% Moisture: not dec. ____ Date Analyzed: 03/08/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	32	
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW301

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG SAS No.: _____ SDG No.: 8929

Matrix: (soil/water) WATER Lab Sample ID: 892911

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM195

Level: (low/med) LOW Date Received: 03/04/92

% Moisture: not dec. ____ Date Analyzed: 03/08/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	UJ
74-83-9	Bromomethane	10	UJ
75-01-4	Vinyl Chloride	10	UJ
75-00-3	Chloroethane	10	UJ
75-09-2	Methylene Chloride	5	UJ
67-64-1	Acetone	10	UJ
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	10	UJ
71-55-6	1,1,1-Trichloroethane	4	J
56-23-5	Carbon Tetrachloride	5	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	5	UJ
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	81	J
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	10	UJ
591-78-6	2-Hexanone	10	UJ
127-18-4	Tetrachloroethene	160	J
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	5	UJ
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW2401

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG SAS No.: _____ SDG No.: 8939

Matrix: (soil/water) WATER Lab Sample ID: 892909

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM174

Level: (low/med) LOW Date Received: 03/04/92

% Moisture: not dec. ____ Date Analyzed: 03/06/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	UJ
74-83-9	Bromomethane	10	UJ
75-01-4	Vinyl Chloride	10	UJ
75-00-3	Chloroethane	10	UJ
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	10	UJ
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	10	UJ
71-55-6	1,1,1-Trichloroethane	44	J
56-23-5	Carbon Tetrachloride	5	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	5	UJ
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	40	J
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	10	UJ
591-78-6	2-Hexanone	10	UJ
127-18-4	Tetrachloroethene	8	J
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRGWMW10201EB

Lab Name: SWL-TULSA Contract: WWENG

Lab Code: SWOK Case No.: WWENG SAS No.: _____ SDG No.: 8929

Matrix: (soil/water) WATER Lab Sample ID: 892910

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CM190

Level: (low/med) LOW Date Received: 03/04/92

% Moisture: not dec. ____ Date Analyzed: 03/08/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	UJ
74-83-9	Bromomethane	10	UJ
75-01-4	Vinyl Chloride	10	UJ
75-00-3	Chloroethane	10	UJ
75-09-2	Methylene Chloride	5	UJ
67-64-1	Acetone	10	UJ
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	10	UJ
71-55-6	1,1,1-Trichloroethane	5	UJ
56-23-5	Carbon Tetrachloride	5	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	12	J
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	5	UJ
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	10	UJ
591-78-6	2-Hexanone	10	UJ
127-18-4	Tetrachloroethene	5	UJ
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	5	UJ
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBMW251001

b. **Holding Times:**
Sample analyzed within holding time.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blank was not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
No laboratory duplicate analyzed. All data estimated (J).

h. **Field Duplicates:**
No field duplicate collected.

i. **Matrix Spike Recoveries:**
No matrix spike analyzed. All data estimated (J).

j. **Trip Blanks:**
No trip blank collected. All positive data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCBMW2535001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: 8811

Matrix: (soil/water) SOIL Lab Sample ID: 881101

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC639

Level: (low/med) LOW Date Received: 02/21/92

% Moisture: not dec. 9 Date Analyzed: 02/25/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U J
74-83-9	Bromomethane	11	U J
75-01-4	Vinyl Chloride	11	U J
75-00-3	Chloroethane	11	U J
75-09-2	Methylene Chloride	41	J
67-64-1	Acetone	20	J
75-15-0	Carbon Disulfide	5	U J
75-35-4	1,1-Dichloroethene	5	U J
75-34-3	1,1-Dichloroethane	5	U J
540-59-0	1,2-Dichloroethene (total)	5	U J
67-66-3	Chloroform	5	U J
107-06-2	1,2-Dichloroethane	5	U J
78-93-3	2-Butanone	11	U J
71-55-6	1,1,1-Trichloroethane	5	U J
56-23-5	Carbon Tetrachloride	5	U J
108-05-4	Vinyl Acetate	11	U J
75-27-4	Bromodichloromethane	5	U J
78-87-5	1,2-Dichloropropane	5	U J
10061-01-5	cis-1,3-Dichloropropene	5	U J
79-01-6	Trichloroethene	5	U J
124-48-1	Dibromochloromethane	5	U J
79-00-5	1,1,2-Trichloroethane	5	U J
71-43-2	Benzene	5	U J
10061-02-6	Trans-1,3-Dichloropropene	5	U J
75-25-2	Bromoform	5	U J
108-10-1	4-Methyl-2-Pentanone	11	U J
591-78-6	2-Hexanone	11	U J
127-18-4	Tetrachloroethene	12	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U J
108-88-3	Toluene	5	U J
108-90-7	Chlorobenzene	5	U J
100-41-4	Ethylbenzene	5	U J
100-42-5	Styrene	5	U J
1330-20-7	Xylene (total)	5	U J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCESBMW253S001RE

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN1 SAS No.: _____ SDG No.: S811

Matrix: (soil/water) SOIL Lab Sample ID: S81101

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC658

Level: (low/med) LOW Date Received: 02/21/92

% Moisture: not dec. 0 Date Analyzed: 02/26/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	36	J
67-64-1	Acetone	30	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	12	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBMW2210001, FCRSBMW22A2001, FCRSBMW2219001

b. **Holding Times:**
Samples were analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blank contained Methylene Chloride. Data estimated (BJ).

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Lab duplicate not analyzed. All data estimated (J).

h. **Field Duplicates:**
Field duplicate not collected.

i. **Matrix Spike Recoveries:**
Matrix spike not analyzed. All data estimated (J).

j. **Trip Blanks:**
Trip blanks not collected. Positive data estimated (J).

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBMW221000l:dac

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN2 SAS No.: _____ SDG No.: 8722

Matrix: (soil/water) SOIL Lab Sample ID: 572202

Sample wt/vol: 2.0 (g/mL) G Lab File ID: IC493

Level: (low/med) LOW Date Received: 02/13/92

% Moisture: not dec. 6 Date Analyzed: 02/18/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	27	U J
74-83-9	Bromomethane	27	U J
75-01-4	Vinyl Chloride	27	U J
75-00-3	Chloroethane	27	U J
75-09-2	Methylene Chloride	13	U J
67-64-1	Acetone	27	U J
75-15-0	Carbon Disulfide	13	U J
75-35-4	1,1-Dichloroethene	13	U J
75-34-3	1,1-Dichloroethane	13	U J
540-59-0	1,2-Dichloroethene (total)	13	U J
67-66-3	Chloroform	13	U J
107-06-2	1,2-Dichloroethane	13	U J
78-93-3	2-Butanone	27	U J
71-55-6	1,1,1-Trichloroethane	13	U J
56-23-5	Carbon Tetrachloride	13	U J
108-05-4	Vinyl Acetate	27	U J
75-27-4	Bromodichloromethane	13	U J
78-87-5	1,2-Dichloropropane	13	U J
10061-01-5	cis-1,3-Dichloropropene	13	U J
79-01-6	Trichloroethene	43	J
124-48-1	Dibromochloromethane	13	U J
79-00-5	1,1,2-Trichloroethane	13	U J
71-43-2	Benzene	13	U J
10061-02-6	Trans-1,3-Dichloropropene	13	U J
75-25-2	Bromoform	13	U J
108-10-1	4-Methyl-2-Pentanone	27	U J
591-78-6	2-Hexanone	27	U J
127-18-4	Tetrachloroethene	300	J
79-34-5	1,1,2,2-Tetrachloroethane	13	U J
108-88-3	Toluene	13	U J
108-90-7	Chlorobenzene	13	U J
100-41-4	Ethylbenzene	13	U J
100-42-5	Styrene	13	U J
1330-20-7	Xylene (total)	13	U J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FORSBMW221901 dac

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG SAS No.: SDG No.: 8722

Matrix: (soil/water) SOIL Lab Sample ID: 872203

Sample wt/vol: 4.0 (g/mL) G Lab File ID: IC560

Level: (low/med) MED Date Received: 02/13/92

% Moisture: not dec. 12 Date Analyzed: 02/21/92

Column: (pack/cap) CAP Dilution Factor: 10

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		G	
74-87-3	Chloromethane	14000	U	J
74-83-9	Bromomethane	14000	U	J
75-01-4	Vinyl Chloride	14000	U	J
75-00-3	Chloroethane	14000	U	J
75-09-2	Methylene Chloride	15000	B	J
67-64-1	Acetone	14000	U	J
75-15-0	Carbon Disulfide	7100	U	J
75-35-4	1,1-Dichloroethene	7100	U	J
75-34-3	1,1-Dichloroethane	7100	U	J
540-59-0	1,2-Dichloroethene (total)	7100	U	J
67-66-3	Chloroform	7100	U	J
107-06-2	1,2-Dichloroethane	7100	U	J
78-93-3	2-Butanone	14000	U	J
71-55-6	1,1,1-Trichloroethane	7100	U	J
56-23-5	Carbon Tetrachloride	7100	U	J
108-05-4	Vinyl Acetate	14000	U	J
75-27-4	Bromodichloromethane	7100	U	J
78-87-5	1,2-Dichloropropane	7100	U	J
10061-01-5	cis-1,3-Dichloropropene	7100	U	J
79-01-6	Trichloroethene	1900	J	J
124-48-1	Dibromochloromethane	7100	U	J
79-00-5	1,1,2-Trichloroethane	7100	U	J
71-43-2	Benzene	7100	U	J
10061-02-6	Trans-1,3-Dichloropropene	7100	U	J
75-25-2	Bromoform	7100	U	J
108-10-1	4-Methyl-2-Pentanone	14000	U	J
591-78-6	2-Hexanone	14000	U	J
127-18-4	Tetrachloroethene	140000		J
79-34-5	1,1,2,2-Tetrachloroethane	7100	U	J
108-88-3	Toluene	7100	U	J
108-90-7	Chlorobenzene	7100	U	J
100-41-4	Ethylbenzene	7100	U	J
100-42-5	Styrene	7100	U	J
1330-20-7	Xylene (total)	7100	U	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBMW22A2001 dec

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG SAS No.: _____ SDG No.: 8722

Matrix: (soil/water) SOIL Lab Sample ID: 872201

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC486

Level: (low/med) LOW Date Received: 02/13/92

% Moisture: not dec. 10 Date Analyzed: 02/18/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U J
74-83-9	Bromomethane	11	U J
75-01-4	Vinyl Chloride	11	U J
75-00-3	Chloroethane	11	U J
75-09-2	Methylene Chloride	6	U J
67-64-1	Acetone	6	BJ
75-15-0	Carbon Disulfide	6	U J
75-35-4	1,1-Dichloroethene	6	U J
75-34-3	1,1-Dichloroethane	6	U J
540-59-0	1,2-Dichloroethene (total)	6	U J
67-66-3	Chloroform	6	U J
107-06-2	1,2-Dichloroethane	6	U J
78-93-3	2-Butanone	11	U J
71-55-6	1,1,1-Trichloroethane	6	U J
56-23-5	Carbon Tetrachloride	6	U J
108-05-4	Vinyl Acetate	11	U J
75-27-4	Bromodichloromethane	6	U J
78-87-5	1,2-Dichloropropane	6	U J
10061-01-5	cis-1,3-Dichloropropene	6	U J
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	6	U J
79-00-5	1,1,2-Trichloroethane	6	U J
71-43-2	Benzene	6	U J
10061-02-6	Trans-1,3-Dichloropropene	6	U J
75-25-2	Bromoform	6	U J
108-10-1	4-Methyl-2-Pentanone	11	U J
591-78-6	2-Hexanone	11	U J
127-18-4	Tetrachloroethene	36	J
79-34-5	1,1,2,2-Tetrachloroethane	6	U J
108-88-3	Toluene	6	U J
108-90-7	Chlorobenzene	6	U J
100-41-4	Ethylbenzene	6	U J
100-42-5	Styrene	6	U J
1330-20-7	Xylene (total)	6	U J

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBMW262001

b. **Holding Times:**
Sample analyzed within holding time.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blank was not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Lab duplicate not analyzed. All data estimated (J).

b. **Field Duplicates:**
Field duplicate not collected.

i. **Matrix Spike Recoveries:**
Matrix spike not analyzed. All data estimated (J).

j. **Trip Blanks:**
No trip blank collected. Positive data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RRSBMW2612001

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG1 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 865202

Sample wt/vol: 3.0 (g/mL) G Lab File ID: K6207

Level: (low/med) LOW Date Received: 02/06/92

% Moisture: not dec. 5 Date Analyzed: 02/07/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		G
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	28	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBMW2012001, FCRSBMW206001

b. **Holding Times:**
Samples analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blanks were not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Lab duplicate not analyzed. All data estimated (J).

h. **Field Duplicates:**
Field duplicate not collected.

i. **Matrix Spike Recoveries:**
Matrix spike not analyzed. All data estimated (J).

j. **Trip Blanks:**
Trip blank not submitted all positive data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBMW201200

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 866502

Sample wt/vol: 5.0 (g/mL) G Lab File ID: K8209

Level: (low/med) LOW Date Received: 02/07/92

% Moisture: not dec. ____ Date Analyzed: 02/07/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	UJ
74-83-9	Bromomethane	10	UJ
75-01-4	Vinyl Chloride	10	UJ
75-00-3	Chloroethane	10	UJ
75-09-2	Methylene Chloride	5	UJ
67-64-1	Acetone	9	J
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	10	UJ
71-55-6	1,1,1-Trichloroethane	5	UJ
56-23-5	Carbon Tetrachloride	5	UJ
108-05-4	Vinyl Acetate	10	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	5	UJ
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	5	UJ
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	Trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	10	UJ
591-78-6	2-Hexanone	10	UJ
127-18-4	Tetrachloroethene	5	UJ
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	5	UJ
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBMW206001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG2 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 966501

Sample wt/vol: 5.0 (g/mL) G Lab File ID: KB208

Level: (low/med) LOW Date Received: 02/07/92

% Moisture: not dec. ____ Date Analyzed: 02/07/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	UJ
74-83-9	Bromomethane	10	UJ
75-01-4	Vinyl Chloride	10	UJ
75-00-3	Chloroethane	10	UJ
75-09-2	Methylene Chloride	5	UJ
67-64-1	Acetone	9	J
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	10	UJ
71-55-6	1,1,1-Trichloroethane	5	UJ
56-23-5	Carbon Tetrachloride	5	UJ
108-05-4	Vinyl Acetate	10	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	5	UJ
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	5	UJ
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	Trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	10	UJ
591-78-6	2-Hexanone	10	UJ
127-18-4	Tetrachloroethene	5	UJ
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	3	J
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBMW2321501

b. **Holding Times:**
Sample was analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blank contained methylene chloride. Data estimated (J).

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
Lab duplicate not analyzed. Data estimated (J).

h. **Field Duplicates:**
Field duplicate not collected.

i. **Matrix Spike Recoveries:**
Matrix spike not analyzed. Data estimated (J).

j. **Trip Blanks:**
Trip blank not collected. All positive data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBMW232150Ia

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN5 SAS No.: _____ SDG No.: 8757

Matrix: (soil/water) SOIL Lab Sample ID: 875701

Sample wt/vol: 4.0 (g/mL) G Lab File ID: IC561

Level: (low/med) MED Date Received: 02/15/92

% Moisture: not dec. 7 Date Analyzed: 02/21/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1300	U J
74-83-9	Bromomethane	1300	U J
75-01-4	Vinyl Chloride	1300	U J
75-00-3	Chloroethane	1300	U J
75-09-2	Methylene Chloride	1500	B J
67-64-1	Acetone	1300	U J
75-15-0	Carbon Disulfide	670	U J
75-35-4	1,1-Dichloroethene	670	U J
75-34-3	1,1-Dichloroethane	3100	J
540-59-0	1,2-Dichloroethene (total)	670	U J
67-66-3	Chloroform	670	U J
107-06-2	1,2-Dichloroethane	670	U J
78-93-3	2-Butanone	1300	U J
71-55-6	1,1,1-Trichloroethane	390	J
56-23-5	Carbon Tetrachloride	670	U J
108-05-4	Vinyl Acetate	1300	U J
75-27-4	Bromodichloromethane	670	U J
78-87-5	1,2-Dichloropropane	670	U J
10061-01-5	cis-1,3-Dichloropropene	670	U J
79-01-6	Trichloroethene	460	J
124-48-1	Dibromochloromethane	670	U J
79-00-5	1,1,2-Trichloroethane	670	U J
71-43-2	Benzene	670	U J
10061-02-6	Trans-1,3-Dichloropropene	670	U J
75-25-2	Bromoform	670	U J
108-10-1	4-Methyl-2-Pentanone	1300	U J
591-78-6	2-Hexanone	1300	U J
127-18-4	Tetrachloroethene	280	J
79-34-5	1,1,2,2-Tetrachloroethane	670	U J
108-88-3	Toluene	670	U J
108-90-7	Chlorobenzene	670	U J
100-41-4	Ethylbenzene	670	U J
100-42-5	Styrene	670	U J
1330-20-7	Xylene (total)	670	U J

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBSB60001B, FCRSBSB517001, FCRSBSB68001, FCRSBSB68001D

b. **Holding Times:**
All samples were analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Laboratory blanks were not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards met QAPP criteria.

g. **Laboratory Duplicates:**
No lab duplicate performed. All data estimated (J).

h. **Field Duplicates:**
Poor agreement with field duplicate 68001 & 68001D. All positive data estimated (J).

i. **Matrix Spike Recoveries:**
No matrix spike performed. All data estimated.

j. **Trip Blanks:**
No trip blank collected. Positive data estimated (J).

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBSB600013

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENI SAS No.: _____ SDG No.: S736

Matrix: (soil/water) SOIL Lab Sample ID: S73604

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC505

Level: (low/med) LOW Date Received: 02/14/92

% Moisture: not dec. 0 Date Analyzed: 02/19/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U J
74-83-9	Bromomethane	10	U J
75-01-4	Vinyl Chloride	10	U J
75-00-3	Chloroethane	10	U J
75-09-2	Methylene Chloride	5	U J
67-64-1	Acetone	10	U J
75-15-0	Carbon Disulfide	5	U J
75-35-4	1,1-Dichloroethene	5	U J
75-34-3	1,1-Dichloroethane	5	U J
540-59-0	1,2-Dichloroethene (total)	5	U J
67-66-3	Chloroform	5	U J
107-06-2	1,2-Dichloroethane	5	U J
78-93-3	2-Butanone	10	U J
71-55-6	1,1,1-Trichloroethane	5	U J
56-23-5	Carbon Tetrachloride	5	U J
108-05-4	Vinyl Acetate	10	U J
75-27-4	Bromodichloromethane	5	U J
78-87-5	1,2-Dichloropropane	5	U J
10061-01-5	cis-1,3-Dichloropropene	5	U J
79-01-6	Trichloroethene	5	U J
124-48-1	Dibromochloromethane	5	U J
79-00-5	1,1,2-Trichloroethane	5	U J
71-43-2	Benzene	5	U J
10061-02-6	Trans-1,3-Dichloropropene	5	U J
75-25-2	Bromoform	5	U J
108-10-1	4-Methyl-2-Pentanone	10	U J
591-78-6	2-Hexanone	10	U J
127-18-4	Tetrachloroethene	5	U J
79-34-5	1,1,2,2-Tetrachloroethane	5	U J
108-88-3	Toluene	5	U J
108-90-7	Chlorobenzene	5	U J
100-41-4	Ethylbenzene	5	U J
100-42-5	Styrene	5	U J
1330-20-7	Xylene (total)	5	U J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FC RS86B617001

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWCK Case No.: WWENJ SAS No.: _____ SDG No.: 8706

Matrix: (soil/water) SOIL Lab Sample ID: 873603

Sample wt/vol: 1.0 (g/mL) G Lab File ID: IC569

Level: (low/med) LOW Date Received: 02/14/92

% Moisture: not dec. 18 Date Analyzed: 02/21/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	59	UJ
74-83-9	Bromomethane	59	UJ
75-01-4	Vinyl Chloride	59	UJ
75-00-3	Chloroethane	59	UJ
75-09-2	Methylene Chloride	84	J
67-64-1	Acetone	59	UJ
75-15-0	Carbon Disulfide	29	UJ
75-35-4	1,1-Dichloroethene	29	UJ
75-34-3	1,1-Dichloroethane	29	UJ
540-59-0	1,2-Dichloroethene (total)	29	UJ
67-66-3	Chloroform	29	UJ
107-06-2	1,2-Dichloroethane	29	UJ
78-93-3	2-Butanone	59	UJ
71-55-6	1,1,1-Trichloroethane	140	J
56-23-5	Carbon Tetrachloride	29	UJ
108-05-4	Vinyl Acetate	59	UJ
75-27-4	Bromodichloromethane	29	UJ
78-87-5	1,2-Dichloropropane	29	UJ
10061-01-5	cis-1,3-Dichloropropene	29	UJ
79-01-6	Trichloroethene	720	J
124-48-1	Dibromochloromethane	29	UJ
79-00-5	1,1,2-Trichloroethane	29	UJ
71-43-2	Benzene	29	UJ
10061-02-6	Trans-1,3-Dichloropropene	29	UJ
75-25-2	Bromoform	29	UJ
108-10-1	4-Methyl-2-Pentanone	59	UJ
591-78-6	2-Hexanone	59	UJ
127-18-4	Tetrachloroethene	1100	J
79-34-5	1,1,2,2-Tetrachloroethane	29	UJ
108-88-3	Toluene	29	UJ
108-90-7	Chlorobenzene	29	UJ
100-41-4	Ethylbenzene	29	UJ
100-42-5	Styrene	29	UJ
1330-20-7	Xylene (total)	29	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FC RSBSB68001

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWENG SAS No.: _____ SDG No.: S776

Matrix: (soil/water) SOIL Lab Sample ID: S77601

Sample wt/vol: 5.0 (g/mL) G Lab File ID: ID568

Level: (low/med) LOW Date Received: 02/14/92

% Moisture: not dec. 6 Date Analyzed: 02/21/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	11	UJ
74-83-9	Bromomethane	11	UJ
75-01-4	Vinyl Chloride	11	UJ
75-00-3	Chloroethane	11	UJ
75-09-2	Methylene Chloride	16	J
67-64-1	Acetone	12	J
75-15-0	Carbon Disulfide	5	UJ
75-35-4	1,1-Dichloroethene	5	UJ
75-34-3	1,1-Dichloroethane	5	UJ
540-59-0	1,2-Dichloroethene (total)	5	UJ
67-66-3	Chloroform	5	UJ
107-06-2	1,2-Dichloroethane	5	UJ
78-93-3	2-Butanone	11	UJ
71-55-6	1,1,1-Trichloroethane	5	UJ
56-23-5	Carbon Tetrachloride	5	UJ
108-05-4	Vinyl Acetate	11	UJ
75-27-4	Bromodichloromethane	5	UJ
78-87-5	1,2-Dichloropropane	5	UJ
10061-01-5	cis-1,3-Dichloropropene	5	UJ
79-01-6	Trichloroethene	7	J
124-48-1	Dibromochloromethane	5	UJ
79-00-5	1,1,2-Trichloroethane	5	UJ
71-43-2	Benzene	5	UJ
10061-02-6	Trans-1,3-Dichloropropene	5	UJ
75-25-2	Bromoform	5	UJ
108-10-1	4-Methyl-2-Pentanone	11	UJ
591-78-6	2-Hexanone	11	UJ
127-18-4	Tetrachloroethene	23	J
79-34-5	1,1,2,2-Tetrachloroethane	5	UJ
108-88-3	Toluene	5	UJ
108-90-7	Chlorobenzene	5	UJ
100-41-4	Ethylbenzene	5	UJ
100-42-5	Styrene	5	UJ
1330-20-7	Xylene (total)	5	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FC RSBSB68001D

Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN3 SAS No.: _____ SDG No.: 8736

Matrix: (soil/water) SOIL Lab Sample ID: 873602

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC490

Level: (low/med) LOW Date Received: 12/14/92

% Moisture: not dec. 3 Date Analyzed: 02/18/93

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	17	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	37	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

DATA VALIDATION
FRANKLIN CURTIS SITE

Organic Analysis

a. **Sample Numbers:**
FCRSBMW251001

b. **Holding Times:**
Sample was analyzed within holding times.

c. **GC/MS Tuning:**
GC/MS tuning met QAPP criteria.

d. **Calibration Verification:**
Calibration met QAPP criteria.

e. **Laboratory Blanks:**
Lab blanks were not contaminated.

f. **Surrogate/Internal Standard Recoveries:**
Surrogate/Internal standards did not meet QAPP criteria. Data estimated (J).

g. **Laboratory Duplicates:**
Lab duplicate RPD exceeded QAPP criteria. Data estimated (J).

h. **Field Duplicates:**
No field duplicate submitted.

i. **Matrix Spike Recoveries:**
Matrix spike not analyzed. All data estimated (J).

j. **Trip Blanks:**
Trip blank not submitted. All positive data estimated (J).

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FCRSBMW25100 doc

Lab Name: SWL-TULSA Contract: WWENG-MI

Lab Code: SWOK Case No.: WWEN4 SAS No.: _____ SDG No.: 8783

Matrix: (soil/water) SOIL Lab Sample ID: 878301

Sample wt/vol: 5.0 (g/mL) G Lab File ID: IC638

Level: (low/med) LOW Date Received: 02/20/92

% Moisture: not dec. 4 Date Analyzed: 02/25/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U J
74-83-9	Bromomethane	10	U J
75-01-4	Vinyl Chloride	10	U J
75-00-3	Chloroethane	10	U J
75-09-2	Methylene Chloride	5	U J
67-64-1	Acetone	10	U J
75-15-0	Carbon Disulfide	5	U J
75-35-4	1,1-Dichloroethene	5	U J
75-34-3	1,1-Dichloroethane	5	U J
[illegible]-59-0	1,2-Dichloroethene (total)	5	U J
[illegible]66-3	Chloroform	5	U J
[illegible]-06-2	1,2-Dichloroethane	5	U J
78-93-3	2-Butanone	10	U J
71-55-6	1,1,1-Trichloroethane	5	U J
56-23-5	Carbon Tetrachloride	5	U J
108-05-4	Vinyl Acetate	10	U J
75-27-4	Bromodichloromethane	5	U J
78-87-5	1,2-Dichloropropane	5	U J
10061-01-5	cis-1,3-Dichloropropene	5	U J
79-01-6	Trichloroethene	46	J
124-48-1	Dibromochloromethane	5	U J
79-00-5	1,1,2-Trichloroethane	5	U J
71-43-2	Benzene	5	U J
10061-02-6	Trans-1,3-Dichloropropene	5	U J
75-25-2	Bromoform	5	U J
108-10-1	4-Methyl-2-Pentanone	10	U J
591-78-6	2-Hexanone	10	U J
127-18-4	Tetrachloroethene	44	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U J
108-88-3	Toluene	5	U J
108-90-7	Chlorobenzene	5	U J
100-41-4	Ethylbenzene	5	U J
100-42-5	Styrene	5	U J
1330-20-7	Xylene (total)	5	U J

APPENDIX IX DATA

Sample Numbers FCRGWMW1201, FCRGWMW2201, FCRGWMW2401, FCBGW10201EB, FCRGWMW301 TB-2

Comment: Validation data was not submitted for this group of samples. QC data indicates that duplicates and matrix spikes were not performed for volatiles, semivolatiles, metals, and pesticides. All data is estimated (J) based on the lack of the above information.

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-103-01eb **Project ID:** AMPHENOL FACILITY

SWLO ID: 8929.01 **Report:** 8929.01 -P

Collected: 03/02/1992 **Report Date:** 03-31-1992 **Page:** 1
Received: 03/04/1992 **Last Modified:** **Matrix:** Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
TOTAL SULFIDE		1.0	mg/l	ND J	03/06/92	SM 427D

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
1 = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.01H9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.01
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-24-92
METHOD REFERENCE: SW846-8150, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-103-Oleb

APPENDIX IX HERBICIDES

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

HERBICIDES	DETECTION LIMIT	RESULTS
2,4-D	1.8	ND J
2,4,5-T	0.3	ND J
2,4,5-TP (SILVEX)	0.3	ND J
DINOSEB	0.3	ND J

QA/QC SURROGATE RECOVERY

DCAA 72%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
I = NOT QUANTITATIBLE DUE TO MATRIX INTERFERENCE

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.01P

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO #: 8929.01
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-31-92
METHOD REFERENCE: SW846-8080, EPA METHODOLOGY
SAMPLE ID: FCR-GW-103-01eb

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

PCB'S	DETECTION LIMIT	RESULTS
AROCHLOR-1016	1.0	ND J
AROCHLOR-1221	1.0	ND J
AROCHLOR-1232	1.0	ND J
AROCHLOR-1242	1.0	ND J
AROCHLOR-1248	1.0	ND J
AROCHLOR-1254	2.0	ND J
AROCHLOR-1260	2.0	ND J

QA/QC SURROGATE RECOVERIES

DIBUTYLCHLORENDATE (24-154) 75%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.01P9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.01
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-10-92
DATE ANALYZED: 03-11-92
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-103-01eb

RESULTS REPORTED IN (ug/L) or Parts Per Billion (PPB)

ORGANOPHOSPHOROUS PESTICIDES	DETECTION LIMIT	RESULTS
AZINPHOS METHYL (GUTHION)	1.50	ND J
BOLSTAR	0.15	ND J
CHLORPYRIFOS (DURSBAN)	0.30	ND J
COUMAPHOS (CO-RAL)	1.50	ND J
DEMETON-S (MERCAPTOPHOS)	0.25	ND J
DIAZINON	0.60	ND J
DICHLORVOS (DDVP)	0.10	ND J
DISULFOTON (DI-SYSTON)	0.20	ND J
ETHOPROP (MOCAP)	0.25	ND J
FENSULFOTHION (DASANIT)	1.50	ND J
FENTHION (BAYCID)	0.10	ND J
MERPHOS	0.25	ND J
MEVINPHOS (PHOSDRIN)	0.30	ND J
NALED	0.10	ND J
METHYL PARATHION	0.03	ND J
MALATHION	0.5(1)	ND J
PHORATE	0.15	ND J
RONNEL (FENCHLORPHOS)	0.30	ND J
STIROPHOS (TETRACHLORVINPHOS)	5.0	ND J

QA/QC SURROGATE RECOVERIES

ETION 96%

NO DETECTION LIMIT ESTABLISHED, VALUE GIVEN IS AT THE QUANTITATION LIMIT
ND NOT DETECTED ABOVE QUANTITATION LIMIT
J ESTIMATED VALUE (BELOW QUANTITATION LIMIT)
B COMPOUND FOUND IN BLANK
* SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.

REPORT: 8929.01B9

SAMPLE MATRIX: WATER
SWLO # 8929.01
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-103-01eb

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PHENOL	20	ND J	ACENAPHTHENE	20	ND J
BIS(2-CHLOROETHYL)ETHER	20	ND J	2,4-DINITROPHENOL	100	ND J
2-CHLOROPHENOL	20	ND J	4-NITROPHENOL	100	ND J
1,3-DICHLOROBENZENE	20	ND J	DIBENZOFURAN	20	ND J
1,4-DICHLOROBENZENE	20	ND J	2,4-DINITROTOLUENE	20	ND J
BENZYL ALCOHOL	20	ND J	2,6-DINITROTOLUENE	20	ND J
1,2-DICHLOROBENZENE	20	ND J	DIETHYLPHTHALATE	20	ND J
2-METHYLPHENOL	20	ND J	4-CHLOROPHENYL-PHENYLETHER	20	ND J
BIS(2-CHLOROISOPROPYL)ETHER	20	ND J	FLUORENE	20	ND J
4-/3-METBYLPHENOL (2)	20	ND J	4-NITROANILINE	100	ND J
N-NITROSO-DI-n-PROPYLAMINE	20	ND J	4,6-DINITRO 2-METHYLPHENOL	100	ND J
HEXACHLOROETHANE	20	ND J	N-NITROSODIPHENYLAMINE(1)	20	ND J
N[illegible]OBENZENE	20	ND J	4-BROMOPHENYL-PHENYLETHER	20	ND J
I[illegible]ORONE	20	ND J	HEXACHLOROBENZENE	20	ND J
2-NITROPHENOL	20	ND J	PENTACHLOROPHENOL	20	ND J
2,4-DIMETHYLPHENOL	20	ND J	PHENANTHRENE	20	ND J
BENZOIC ACID	100	ND J	ANTHRACENE	20	ND J
BIS(2-CHLOROETHOXY)METHANE	20	ND J	DI-N-BUTYLPHTHALATE	20	ND J
2,4-DICHLOROPHENOL	20	ND J	FLUORANTHENE	20	ND J
1,2,4-TRICHLOROBENZENE	20	ND J	PYRENE	20	ND J
NAPHTHALENE	20	ND J	BUTYLBENZYLPHTHALATE	20	ND J
4-CHLOROANILINE	20	ND J	3,3-DICHLOROBENZIDINE	40	ND J
HEXACHLOROBUTADIENE	20	ND J	BENZO(A)ANTHRACENE	20	ND J
4-CHLORO-3-METHYLPHENOL	20	ND J	BIS(2-ETHYLHEXYL)PHTHALATE	20	ND J
2-METHYLNAPHTHALENE	20	ND J	CHRYSENE	20	ND J
HEXACHLOROCYCLOPENTADIENE	20	ND J	DI-N-OCTYL PHTHALATE	20	ND J
2,4,6-TRICHLOROPHENOL	20	ND J	BENZO(B)FLUORANTHENE	20	ND J
2,4,5-TRICHLOROPHENOL	100	ND J	BENZO(K)FLUORANTHENE	20	ND J
2-CHLORONAPHTHALENE	20	ND J	BENZO(A)PYRENE	20	ND J
2-NITROANILINE	100	ND J	INDENO(1,2,3-CD)PYRENE	20	ND J
DIMETHYLPHTHALATE	20	ND J	DIBENZ(A,H)ANTHRACENE	20	ND J
ACENAPHTHYLENE	20	ND J	BENZO(G,H,I)PERYLENE	20	ND J
3-NITROANILINE	100	ND J	Continued. . .		

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5	(35-114)	42%	2-FLUOROBIPHENYL	(43-116)	39%	*TERPHENYL-d14	(33-141)	147%*
PHENOL-d5	(20-94)	40%	2-FLUOROPHENOL	(21-100)	38%	2,4,6-TRIBROMOPHENOL	(20-123)	24%

(1) = DETECTED AS DIPHENYLAMINE
([illegible] = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE,INC.

REPORT: 8929.01B9

SAMPLE MATRIX: WATER
SWLO # 8929.01
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-103-01eb

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES (CONT.)

SEMIVOLATILES	DET. LIMIT	RESULTS (µg/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (µg/L)
PARATHION	40	ND J	N-NITROSODIMETHYLAMINE	20	ND J
ETHYL METHANESULFONATE	20	ND J	2,3,4,6-TETRACHLOROPHENOL	20	ND J
P-PHENYLENEDIAMINE	20	ND J	CHLOROBENZILATE	20	ND J
N-NITROSODIETHYLAMINE	20	ND J	THIONAZIN	40	ND J
N-NITROSOMETHYLETHYLAMINE	20	ND J	DISULFOTON	20	ND J
N-NITROSODIBUTYLAMINE	20	ND J	ISODRIN	200	ND J
N-NITROSOPIPERIDINE	20	ND J	N-NITROSOMORPHOLINE	20	ND J
5-NITRO-O-TOLUIDINE	20	ND J	PENTACHLOROBENZENE	20	ND J
METHYL YELLOW	20	ND J	4-AMINOBIPHENYL	20	ND J
METHYL PARATHION	20	ND J	HEXACHLOROPROPENE	20	ND J
SAFROLE	40	ND J	2,6-DICHLOROPHENOL	20	ND J
ISOSAFROLE	40	ND J	SULFOTEPP	20	ND J
[illegible]COLINE	20	ND J	METHYL METHANESULFONATE	20	ND J
P[illegible]ACETIN	20	ND J	1,4-NAPHTHAQUINONE	20	ND J
O-TOLUIDINE	20	ND J	N-NITROSOPYROLLIDINE	20	ND J
3,3-DIMETHYLBENZIDINE	100	ND J	ACETOPHENONE	20	ND J
1,3-DINITROBENZENE	20	ND J	DIMETHOATE	20	ND J
A,A-DIMETHYLPHENETHYLAMINE	20	ND J	3-METHYL CHOLANTHRENE	20	ND J
O,O,O-TRIETHYLPHOSPHOROTHIOATE	20	ND J	2-ACETYLAMINOFLUORENE	20	ND J
METHAPYRILENE HYDROCHLORIDE	40	ND J	ANILINE	100	ND J
DIALLATE	40	ND J	1,2-DIBROMO-3-CHLOROPROPANE	20	ND J
1,3,5-TRINITROBENZENE	200	ND J	HEXACHLOROPHENE	20	ND J
FAMPHUR	20	ND J	KEPONE	100	ND J
4-NITROQUINOLINE-N-OXIDE	200	ND J	1-NAPHTHYLAMINE	20	ND J
1,2,4,5-TETRACHLOROBENZENE	20	ND J	2-NAPHTHYLAMINE	20	ND J
PENTACHLORONITROBENZENE	20	ND J	PRONAMIDE	100	ND J
PHORATE	20	ND J	ARAMITE	200	ND J
7,12-DIMETHYL BENZ(A)ANTHRACENE	20	ND J			

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.01DF

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO # 8929.01
METHOD REFERENCE: SW846-8280
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-05-92
DATE ANALYZED: 03-11-92
SAMPLE ID: FCR-GW-103-01eb

RESULTS REPORTED IN Parts Per Trillion (ng/L)

ANALYTE	EST. DETECTION LIMIT	CONCENTRATION
DIOXINS		
TOTAL TETRA CDD	3.1	ND J
TOTAL PENTA CDD	4.5	ND J
TOTAL HEXA CDD	1.3	ND J
TOTAL HEPTA CDD	5.8	ND J
TOTAL OCTA CDD	6.3	ND J
FURANS		
TOTAL TETRA CDF	0.6	ND J
TOTAL PENTA CDF	1.8	ND J
TOTAL HEXA CDF	1.8	ND J
TOTAL HEPTA CDF	2.1	ND J
TOTAL OCTA CDF	5.9	ND J

QA/QC SURROGATE RECOVERIES

13C-TCDD (25-150) 74% 13C-HxCDD (25-150) 74% 13C-OCDD (25-150) 47%
13C-TCDF (25-150) 84% 13C-HpCDF (25-150) 46%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
NA = NOT APPLICABLE
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-MW12-01 **Project ID:** AMPHENOL FACILITY

SWLO ID: 8929.02 **Report:** 8929.02 -P

Collected: 03/02/1992 **Report Date:** 03-31-1992 **Page:** 1
Received: 03/04/1992 **Last Modified:** **Matrix:** Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
*** INORGANICS ***						
AMENABLE CN		10	ug/l	ND J	03/10/92	SM 412F
TOTAL SULFIDE		1.0	mg/l	ND J	03/06/92	SM 427D
*** METALS ***						
METALS-APP9-ICP						ICP
ANTIMONY		60.0	ug/l	ND J	03/13/92	
BARIUM		20.0	ug/l	559 J	03/13/92	
BERYLLIUM		5.0	ug/l	ND J	03/13/92	
CADMIUM		5.0	ug/l	ND J	03/13/92	
CHROMIUM		5.0	ug/l	24.7 J	03/13/92	
COBALT		10.0	ug/l	80.4 J	03/13/92	
COPPER		10.0	ug/l	160 J	03/13/92	
NICKEL		10.0	ug/l	118 J	03/13/92	
SILVER		10.0	ug/l	ND J	03/13/92	
TIN		50.0	ug/l	ND J	03/13/92	
VANADIUM		10.0	ug/l	28.9 J	03/13/92	
ZINC		10.0	ug/l	345 J	03/13/92	
ARSENIC		10.0	ug/l	ND J	03/10/92	SW 7060
LEAD		3.0	ug/l	623.4 J	03/12/92	SW 7421
MERCURY		0.20	ug/l	0.49 J	03/18/92	SW 7470
SELENIUM		5.0	ug/l	7.75 J	03/15/92	SW 7740
THALLIUM		10.0	ug/l	ND J	03/10/92	SW 7841

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
[illegible] ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
[illegible] = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.02H9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.02
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92
METHOD REFERENCE: SW846-8150, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW12-01

APPENDIX IX HERBICIDES

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

HERBICIDES	DETECTION LIMIT	RESULTS
2,4-D	1.8 J	ND
2,4,5-T	0.3 J	ND
2,4,5-TP (SILVEX)	0.3 J	ND
DINOSEB	0.3 J	ND

QA/QC SURROGATE RECOVERY

DCAA 73%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
I = NOT QUANTITATIBLE DUE TO MATRIX INTERFERENCE

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.02P

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO #: 8929.02
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-31-92
METHOD REFERENCE: SW846-8080, EPA METHODOLOGY
SAMPLE ID: FCR-GW-MW12-01

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

PCB'S	DETECTION LIMIT	RESULTS
AROCHLOR-1016	1.0	ND J
AROCHLOR-1221	1.0	ND J
AROCHLOR-1232	1.0	ND J
AROCHLOR-1242	1.0	ND J
AROCHLOR-1248	1.0	ND J
AROCHLOR-1254	2.0	ND J
AROCHLOR-1260	2.0	ND J

QA/QC SURROGATE RECOVERIES

DIBUTYLCHLORENDATE (24-154) 26%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.02P9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.02
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-10-92
DATE ANALYZED: 03-11-92
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW12-01

RESULTS REPORTED IN (ug/L) or Parts Per Billion (PPB)

ORGANOPHOSPHOROUS PESTICIDES	DETECTION LIMIT	RESULTS
AZINPHOS METHYL (GUTHION)	1.60	ND J
BOLSTAR	0.16	ND J
CHLORPYRIFOS (DURSBAN)	0.33	ND J
COUMAPHOS (CO-RAL)	1.60	ND J
DEMETON-S (MERCAPTOPHOS)	0.27	ND J
DIAZINON	0.66	ND J
DICHLORVOS (DDVP)	0.11	ND J
DISULFOTON (DI-SYSTON)	0.22	ND J
ETHOPROP (MOCAP)	0.27	ND J
FENSULFOTHION (DASANIT)	1.60	ND J
FENTHION (BAYCID)	0.11	ND J
MERPHOS	0.27	ND J
MEVINPHOS (PHOSDRIN)	0.33	ND J
NALED	0.11	ND J
METHYL PARATHION	0.033	ND J
MALATHION	0.55(1)	ND J
PHORATE	0.16	ND J
RONNEL (FENCHLORPHOS)	0.33	ND J
STIROPHOS (TETRACHLORVINPHOS)	5.50	ND J

QA/QC SURROGATE RECOVERIES

ETION 82%

NO DETECTION LIMIT ESTABLISHED, VALUE GIVEN IS AT THE QUANTITATION LIMIT
NOT DETECTED ABOVE QUANTITATION LIMIT
J ESTIMATED VALUE (BELOW QUANTITATION LIMIT)
B COMPOUND FOUND IN BLANK
* SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.02V9

DATE: 03-31-92

SAMPLE MATRIX: WATER
SWLO # 8929.02
DATE SUBMITTED: 03-04-92
DATE ANALYZED : 03-13-92
METHOD REFERENCE: SW846-8240, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW12-01

APPENDIX IX VOLATILES

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

VOLATILES	DET. LIMIT	RESULTS	VOLATILES	DET. LIMIT	RESULTS
CHLOROMETHANE	500	ND J	1,1,2,2-TETRACHLOROETHANE	250	ND J
BROMOMETHANE	500	ND J	1,2-DICHLOROPROPANE	250	ND J
VINYL CHLORIDE	500	ND J	TRANS-1,3-DICHLOROPROPENE	250	ND J
CHLOROETHANE	500	ND J	TRICHLOROETHENE	250	2641 J
METHYLENE CHLORIDE	250	ND J	DIBROMOCHLOROMETHANE	250	ND J
ACETONE	500	ND J	1,1,2-TRICHLOROETHANE	250	ND J
CARBON DISULFIDE	250	ND J	BENZENE	250	ND J
1,1-DICHLOROETHENE	250	ND J	CIS-1,3-DICHLOROPROPENE	250	ND J
1,1-DICHLOROETHANE	250	103 J	2-CHLOROETHYLVINYLETHER	500	ND J
TRANS-1,2-DICHLOROETHENE	250	ND J	BROMOFORM	250	ND J
CHLOROFORM	250	ND J	2-HEXANONE	500	ND J
1,2-DICHLOROETHANE	250	ND J	4-METHYL-2-PENTANONE	500	ND J
2-BUTANONE	500	ND J	TETRACHLOROETHENE	250	3471 J
1,1,1-TRICHLOROETHANE	250	2041 J	TOLUENE	250	ND J
CARBON TETRACHLORIDE	250	ND J	CHLOROBENZENE	250	ND J
VINYL ACETATE	500	ND J	ETHYLBENZENE	250	ND J
BROMODICHLOROMETHANE	250	ND J	STYRENE	250	ND J
			TOTAL XYLENES	250	ND J

Continued. . .

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 94% BROMOFLUOROBENZENE(86-115) 95% 1,2-DICHLOROETHANE-d4(76-114) 104%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.02V9-2

DATE: 03-31-92

SAMPLE MATRIX: WATER
SWLO # 8929.02
DATE SUBMITTED: 03-04-92
DATE ANALYZED : 03-13-92
METHOD REFERENCE: SW846-8240, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW12-01

APPENDIX IX VOLATILES (CONT.)

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

VOLATILES	DET. LIMIT	RESULTS
ACROLEIN	2500	ND J
METHYL IODIDE	250	ND J
ALKYL CHLORIDE	250	ND J
CHLOROPRENE	250	ND J
TRANS-1,4-DICHLORO-2-BUTENE	250	ND J
PENTACHLOROETHANE	250	ND J
ACETONITRILE	5000	ND J
ACRYLONITRILE	2500	ND J
PROPRONITRILE	500	ND J
METHACRYLONITRILE	2500	ND J
ISOBUTYL ALCOHOL	5000	ND J
1,4-DIOXANE	25000	ND J
METHYL METHACRYLATE	250	ND J
PYRIDINE	5000	ND J
ETHYL METHACRYLATE	250	ND J
1,2-DIBROMOETHANE	250	ND J
1,1,1,2-TETRACHLOROETHANE	250	ND J
1,2,3-TRICHLOROPROPANE	250	ND J
DICHLORODIFLUOROMETHANE	250	ND J
TRICHLOROFLUOROMETHANE	250	ND J
DIBROMOMETHANE	500	ND J

= NOT DETECTED ABOVE QUANTITATION LIMIT
= ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

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CLIENT: WW ENGINEERING & SCIENCE,INC.

REPORT: 8929.02B9

SAMPLE MATRIX: WATER
SWLO # 8929.02
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW12-01

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PHENOL	20	ND J	ACENAPHTHENE	20	ND J
BIS(2-CHLOROETHYL)ETHER	20	ND J	2,4-DINITROPHENOL	100	ND J
2-CHLOROPHENOL	20	ND J	4-NITROPHENOL	100	ND J
1,3-DICHLOROBENZENE	20	ND J	DIBENZOFURAN	20	ND J
1,4-DICHLOROBENZENE	20	ND J	2,4-DINITROTOLUENE	20	ND J
BENZYL ALCOHOL	20	ND J	2,6-DINITROTOLUENE	20	ND J
1,2-DICHLOROBENZENE	20	ND J	DIETHYLPHTHALATE	20	ND J
2-METHYLPHENOL	20	ND J	4-CHLOROPHENYL-PHENYLETHER	20	ND J
BIS(2-CHLOROISOPROPYL)ETHER	20	ND J	FLUORENE	20	ND J
4-/3-METHYLPHENOL (2)	20	ND J	4-NITROANILINE	100	ND J
N-NITROSO-DI-n-PROPYLAMINE	20	ND J	4,6-DINITRO 2-METHYLPHENOL	100	ND J
HEXACHLOROETHANE	20	ND J	N-NITROSODIPHENYLAMINE(1)	20	ND J
NI[illegible]OBENZENE	20	ND J	4-BROMOPHENYL-PHENYLETHER	20	ND J
I[illegible]ORONE	20	ND J	HEXACHLOROBENZENE	20	ND J
2-NITROPHENOL	20	ND J	PENTACHLOROPHENOL	20	ND J
2,4-DIMETHYLPHENOL	20	ND J	PHENANTHRENE	20	ND J
BENZOIC ACID	100	ND J	ANTHRACENE	20	ND J
BIS(2-CHLOROETHOXY)METHANE	20	ND J	DI-N-BUTYLPHTHALATE	20	ND J
2,4-DICHLOROPHENOL	20	ND J	FLUORANTHENE	20	ND J
1,2,4-TRICHLOROBENZENE	20	ND J	PYRENE	20	ND J
NAPHTHALENE	20	ND J	BUTYLBENZYLPHTHALATE	20	ND J
4-CHLOROANILINE	20	ND J	3,3-DICHLOROBENZIDINE	40	ND J
HEXACHLOROBUTADIENE	20	ND J	BENZO(A)ANTHRACENE	20	ND J
4-CHLORO-3-METHYLPHENOL	20	ND J	BIS(2-ETHYLHEXYL)PHTHALATE	20	ND J
2-METHYLNAPHTHALENE	20	ND J	CHRYSENE	20	ND J
HEXACHLOROCYCLOPENTADIENE	20	ND J	DI-N-OCTYL PHTHALATE	20	ND J
2,4,6-TRICHLOROPHENOL	20	ND J	BENZO(B)FLUORANTHENE	20	ND J
2,4,5-TRICHLOROPHENOL	100	ND J	BENZO(K)FLUORANTHENE	20	ND J
2-CHLORONAPHTHALENE	20	ND J	BENZO(A)PYRENE	20	ND J
2-NITROANILINE	100	ND J	INDENO(1,2,3-CD)PYRENE	20	ND J
DIMETHYLPHTHALATE	20	ND J	DIBENZ(A,H)ANTHRACENE	20	ND J
ACENAPHTHYLENE	20	ND J	BENZO(G,H,I)PERYLENE	20	ND J
3-NITROANILINE	100	ND J	Continued. . .		

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5	(35-114)	67%	2-FLUOROBIPHENYL	(43-116)	65%	TERPHENYL-d14	(33-141)	96%
PHENOL-d5	(20-94)	63%	2-FLUOROPHENOL	(21-100)	64%	2,4,6-TRIBROMOPHENOL	(20-123)	39%

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

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CLIENT: WW ENGINEERING & SCIENCE,INC.

SAMPLE MATRIX: WATER
SWLO # 8929.02
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW12-01

REPORT: 8929.02B9

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES (CONT.)

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PARATHION	40	ND J	N-NITROSODIMETHYLAMINE	20	ND J
ETHYL METHANESULFONATE	20	ND J	2,3,4,6-TETRACHLOROPHENOL	20	ND J
P-PHENYLENEDIAMINE	20	ND J	CHLOROBENZILATE	20	ND J
N-NITROSODIETHYLAMINE	20	ND J	THIONAZIN	40	ND J
N-NITROSOMETHYLETHYLAMINE	20	ND J	DISULFOTON	20	ND J
N-NITROSODIBUTYLAMINE	20	ND J	ISODRIN	200	ND J
N-NITROSOPIPERIDINE	20	ND J	N-NITROSOMORPHOLINE	20	ND J
5-NITRO-O-TOLUIDINE	20	ND J	PENTACHLOROBENZENE	20	ND J
METHYL YELLOW	20	ND J	4-AMINOBIPHENYL	20	ND J
METHYL PARATHION	20	ND J	HEXACHLOROPROPENE	20	ND J
SAFROLE	40	ND J	2,6-DICHLOROPHENOL	20	ND J
ISOSAFROLE	40	ND J	SULFOTEPP	20	ND J
2-[illegible]OLINE	20	ND J	METHYL METHANESULFONATE	20	ND J
PHENACETIN	20	ND J	1,4-NAPHTHAQUINONE	20	ND J
O-TOLUIDINE	20	ND J	N-NITROSOPYROLLIDINE	20	ND J
3,3-DIMETHYLBENZIDINE	100	ND J	ACETOPHENONE	20	ND J
1,3-DINITROBENZENE	20	ND J	DIMETHOATE	20	ND J
A,A-DIMETHYLPHENETHYLAMINE	20	ND J	3-METHYL CHOLANTHRENE	20	ND J
O,O,O-TRIETHYLPHOSPHOROTHIOATE	20	ND J	2-ACETYLAMINOFLUORENE	20	ND J
METHAPYRILENE HYDROCHLORIDE	40	ND J	ANILINE	100	ND J
DIALLATE	40	ND J	1,2-DIBROMO-3-CHLOROPROPANE	20	ND J
1,3,5-TRINITROBENZENE	200	ND J	HEXACHLOROPHENE	20	ND J
TAMPHUR	20	ND J	KEPONE	100	ND J
4-NITROQUINOLINE-N-OXIDE	200	ND J	1-NAPHTHYLAMINE	20	ND J
1,2,4,5-TETRACHLOROBENZENE	20	ND J	2-NAPHTHYLAMINE	20	ND J
PENTACHLORONITROBENZENE	20	ND J	PRONAMIDE	100	ND J
PHORATE	20	ND J	ARAMITE	200	ND J
7,12-DIMETHYL BENZ(A)ANTHRACENE	20	ND J			

1) = DETECTED AS DIPHENYLAMINE
2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.02DF

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO # 8929.02
METHOD REFERENCE: SW846-8280
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-12-92
DATE ANALYZED: 03-17-92
SAMPLE ID: FCR-GW-MW12-01

RESULTS REPORTED IN Parts Per Trillion (ng/L)

ANALYTE	EST. DETECTION LIMIT	CONCENTRATION
DIOXINS		
TOTAL TETRA CDD	0.6	ND J
TOTAL PENTA CDD	0.7	ND J
TOTAL HEXA CDD	2.8	ND J
TOTAL HEPTA CDD	3.0	ND J
TOTAL OCTA CDD	7.9	ND J
FURANS		
TOTAL TETRA CDF	0.2	ND J
TOTAL PENTA CDF	1.3	ND J
TOTAL HEXA CDF	0.6	ND J
TOTAL HEPTA CDF	0.8	ND J
TOTAL OCTA CDF	5.6	ND J

QA/QC SURROGATE RECOVERIES

13C-TCDD (25-150) 64% 13C-HxCDD (25-150) 104% 13C-OCDD (25-150) 88%
13C-TCDF (25-150) 74% 13C-HpCDF (25-150) 68%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
NA = NOT APPLICABLE
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-MW12-01 DISS. **Project ID:** AMPHENOL FACILITY

SWLO ID: 8929.03 **Report:** 8929.03

Collected: 03/02/1992 **Report Date:** 03-31-1992 **Page:** 1
Received: 03/04/1992 **Last Modified:** **Matrix:** Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN		10	ug/l	ND J	03/10/92	SM 412F
		*** METALS ***				
APPENDIX IX						
METALS-APP9-ICP						ICP
ANTIMONY		60.0	ug/l	ND J	03/13/92	
BARIUM		20.0	ug/l	101 J	03/13/92	
BERYLLIUM		5.0	ug/l	ND J	03/13/92	
CADMIUM		5.0	ug/l	ND J	03/13/92	
CHROMIUM		5.0	ug/l	ND J	03/13/92	
COBALT		10.0	ug/l	ND J	03/13/92	
COPPER		10.0	ug/l	ND J	03/13/92	
NICKEL		10.0	ug/l	ND J	03/13/92	
SILVER		10.0	ug/l	ND J	03/13/92	
TIN		50.0	ug/l	511 J	03/13/92	
VANADIUM		10.0	ug/l	ND J	03/13/92	
ZINC		10.0	ug/l	11.9 J	03/13/92	
ARSENIC		10.0	ug/l	ND J	03/10/92	SW 7060
LEAD		3.0	ug/l	9.08 J	03/12/92	SW 7421
MERCURY		0.20	ug/l	ND J	03/18/92	SW 7470
SELENIUM		5.0	ug/l	ND J	03/10/92	SW 7740
THALLIUM		10.0	ug/l	ND J	03/10/92	SW 7841

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-MW22-01 **Project ID:** AMPHENOL FACILITY

SWLO ID: 8929.04 **Report:** 8929.04 -P

Collected: 03/02/1992 **Report Date:** 03-31-1992 **Page:** 1
Received: 03/04/1992 **Last Modified:** **Matrix:** Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN		10	ug/l	ND J	03/10/92	SM 412F
TOTAL SULFIDE		1.0	mg/l	ND J	03/06/92	SM 427D
		*** METALS ***				
METALS-APP9-ICP						ICP
ANTIMONY		60.0	ug/l	ND J	03/13/92	
BARIUM		20.0	ug/l	307 J	03/13/92	
BERYLLIUM		5.0	ug/l	ND J	03/13/92	
CADMIUM		5.0	ug/l	ND J	03/13/92	
CHROMIUM		5.0	ug/l	36.5 J	03/13/92	
COBALT		10.0	ug/l	34.3 J	03/13/92	
COPPER		10.0	ug/l	234 J	03/13/92	
NICKEL		10.0	ug/l	92.9 J	03/13/92	
SILVER		10.0	ug/l	62.2 J	03/13/92	
TIN		50.0	ug/l	ND J	03/13/92	
VANADIUM		10.0	ug/l	70.5 J	03/13/92	
ZINC		10.0	ug/l	236 J	03/13/92	
ARSENIC		10.0	ug/l	ND J	03/10/92	SW 7060
LEAD		3.0	ug/l	68.42 J	03/12/92	SW 7421
MERCURY		0.20	ug/l	0.26 J	03/18/92	SW 7470
SELENIUM		5.0	ug/l	ND J	03/10/92	SW 7740
THALLIUM		10.0	ug/l	ND J	03/10/92	SW 7841

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

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CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.04H9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.04
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92
METHOD REFERENCE: SW846-8150, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01

APPENDIX IX HERBICIDES

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

HERBICIDES	DETECTION LIMIT	RESULTS
2,4-D	1.8	ND J
2,4,5-T	0.3	ND J
2,4,5-TP (SILVEX)	0.3	ND J
DINOSEB	0.3	ND J

QA/QC SURROGATE RECOVERY

DCAA	88%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
I = NOT QUANTITATIBLE DUE TO MATRIX INTERFERENCE

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

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CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.04P

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO #: 8929.04
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-31-92
METHOD REFERENCE: SW846-8080, EPA METHODOLOGY
SAMPLE ID: FCR-GW-MW22-01

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

PCB'S	DETECTION LIMIT	RESULTS
AROCHLOR-1016	1.0 J	ND
AROCHLOR-1221	1.0 J	ND
AROCHLOR-1232	1.0 J	ND
AROCHLOR-1242	1.0 J	ND
AROCHLOR-1248	1.0 J	ND
AROCHLOR-1254	2.0 J	ND
AROCHLOR-1260	2.0 J	ND

QA/QC SURROGATE RECOVERIES

DIBUTYLCHLORENDATE (24-154) 48%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.04P9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.04
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-10-92
DATE ANALYZED: 03-11-92
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01

RESULTS REPORTED IN (ug/L) or Parts Per Billion (PPB)

ORGANOPHOSPHOROUS PESTICIDES

	DETECTION LIMIT	RESULTS
AZINPHOS METHYL (GUTHION)	1.50	ND J
BOLSTAR	0.15	ND J
CHLORPYRIFOS (DURSBAN)	0.30	ND J
COUMAPHOS (CO-RAL)	1.50	ND J
DEMETON-S (MERCAPTOPHOS)	0.25	ND J
DIAZINON	0.60	ND J
DICHLORVOS (DDVP)	0.10	ND J
DISULFOTON (DI-SYSTON)	0.20	ND J
ETHOPROP (MOCAP)	0.25	ND J
FENSULFOTHION (DASANIT)	1.50	ND J
FENTHION (BAYCID)	0.10	ND J
MERPHOS	0.25	ND J
MEVINPHOS (PHOSDRIN)	0.30	ND J
NALED	0.10	ND J
METHYL PARATHION	0.03	ND J
MALATHION	0.5(1)	ND J
PHORATE	0.15	ND J
RONNEL (FENCHLORPHOS)	0.30	ND J
STIROPHOS (TETRACHLORVINPHOS)	5.00	ND J

QA/QC SURROGATE RECOVERIES

ETION 79%

(1) NO DETECTION LIMIT ESTABLISHED, VALUE GIVEN IS AT THE QUANTITATION LIMIT
ND NOT DETECTED ABOVE QUANTITATION LIMIT
J ESTIMATED VALUE (BELOW QUANTITATION LIMIT)
B COMPOUND FOUND IN BLANK
* SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.04V9

DATE: 03-31-92

SAMPLE MATRIX: WATER
SWLO # 8929.04
DATE SUBMITTED: 03-04-92
DATE ANALYZED : 03-13-92
METHOD REFERENCE: SW846-8240, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01

APPENDIX IX VOLATILES

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

VOLATILES	DET. LIMIT	RESULTS	VOLATILES	DET. LIMIT	RESULTS
CHLOROMETHANE	1000	ND J	1,1,2,2-TETRACHLOROETHANE	500	ND J
BROMOMETHANE	1000	ND J	1,2-DICHLOROPROPANE	500	ND J
VINYL CHLORIDE	1000	ND J	TRANS-1,3-DICHLOROPROPENE	500	ND J
CHLOROETHANE	1000	ND J	TRICHLOROETHENE	500	3167 J
METHYLENE CHLORIDE	500	ND J	DIBROMOCHLOROMETHANE	500	ND J
ACETONE	1000	ND J	1,1,2-TRICHLOROETHANE	500	ND J
CARBON DISULFIDE	500	ND J	BENZENE	500	ND J
1,1-DICHLOROETHENE	500	ND J	CIS-1,3-DICHLOROPROPENE	500	ND J
1,1-DICHLOROETHANE	500	ND J	2-CHLOROETHYLVINYLETHER	1000	ND J
TRANS-1,2-DICHLOROETHENE	500	ND J	BROMOFORM	500	ND J
CHLOROFORM	500	ND J	2-HEXANONE	1000	ND J
1,2-DICHLOROETHANE	500	ND J	4-METHYL-2-PENTANONE	1000	ND J
2-BUTANONE	1000	ND J	TETRACHLOROETHENE	500	16774 J
1,1,1-TRICHLOROETHANE	500	ND J	TOLUENE	500	ND J
CARBON TETRACHLORIDE	500	ND J	CHLOROBENZENE	500	ND J
VINYL ACETATE	1000	ND J	ETHYLBENZENE	500	ND J
BROMODICHLOROMETHANE	500	ND J	STYRENE	500	ND J
			TOTAL XYLENES	500	ND J

Continued. . .

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 104% BROMOFLUOROBENZENE(86-115) 101% 1,2-DICHLOROETHANE-d4(76-114) 112%

= NOT DETECTED ABOVE QUANTITATION LIMIT
= ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.04V9-2

DATE: 03-31-92

SAMPLE MATRIX: WATER
SWLO # 8929.04
DATE SUBMITTED: 03-04-92
DATE ANALYZED : 03-13-92
METHOD REFERENCE: SW846-8240, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01

APPENDIX IX VOLATILES (CONT.)

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

VOLATILES	DET. LIMIT	RESULTS
ACROLEIN	5000	ND J
METHYL IODIDE	500	ND J
ALKYL CHLORIDE	500	ND J
CHLOROPRENE	500	ND J
TRANS-1,4-DICHLORO-2-BUTENE	500	ND J
PENTACHLOROETHANE	500	ND J
ACETONITRILE	10000	ND J
ACRYLONITRILE	5000	ND J
PROPRONITRILE	1000	ND J
METHACRYLONITRILE	5000	ND J
ISOBUTYL ALCOHOL	10000	ND J
1,4-DIOXANE	50000	ND J
METHYL METHACRYLATE	500	ND J
PYRIDINE	10000	ND J
ETHYL METHACRYLATE	500	ND J
1,2-DIBROMOETHANE	500	ND J
1,1,1,2-TETRACHLOROETHANE	500	ND J
1,2,3-TRICHLOROPROPANE	500	ND J
DICHLORODIFLUOROMETHANE	500	ND J
TRICHLOROFLUOROMETHANE	500	ND J
DIBROMOMETHANE	1000	ND J

= NOT DETECTED ABOVE QUANTITATION LIMIT
= ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.

REPORT: 8929.04B9

SAMPLE MATRIX: WATER
SWLO # 8929.04
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PHENOL	20	ND J	ACENAPHTHENE	20	ND J
BIS(2-CHLOROETHYL)ETHER	20	ND J	2,4-DINITROPHENOL	100	ND J
2-CHLOROPHENOL	20	ND J	4-NITROPHENOL	100	ND J
1,3-DICHLOROBENZENE	20	ND J	DIBENZOFURAN	20	ND J
1,4-DICHLOROBENZENE	20	ND J	2,4-DINITROTOLUENE	20	ND J
BENZYL ALCOHOL	20	ND J	2,6-DINITROTOLUENE	20	ND J
1,2-DICHLOROBENZENE	20	ND J	DIETHYLPHTHALATE	20	ND J
2-METHYLPHENOL	20	ND J	4-CHLOROPHENYL-PHENYLETHER	20	ND J
BIS(2-CHLOROISOPROPYL)ETHER	20	ND J	FLUORENE	20	ND J
4-/3-METHYLPHENOL (2)	20	ND J	4-NITROANILINE	100	ND J
N-NITROSO-DI-n-PROPYLAMINE	20	ND J	4,6-DINITRO 2-METHYLPHENOL	100	ND J
HEXACHLOROETHANE	20	ND J	N-NITROSODIPHENYLAMINE(1)	20	ND J
NITROBENZENE	20	ND J	4-BROMOPHENYL-PHENYLETHER	20	ND J
ISOPHORONE	20	ND J	HEXACHLOROBENZENE	20	ND J
2-NITROPHENOL	20	ND J	PENTACHLOROPHENOL	20	ND J
2,4-DIMETHYLPHENOL	20	ND J	PHENANTHRENE	20	ND J
BENZOIC ACID	100	ND J	ANTHRACENE	20	ND J
BIS(2-CHLOROETHOXY)METHANE	20	ND J	DI-N-BUTYLPHTHALATE	20	ND J
2,4-DICHLOROPHENOL	20	ND J	FLUORANTHENE	20	ND J
1,2,4-TRICHLOROBENZENE	20	ND J	PYRENE	20	ND J
NAPHTHALENE	20	ND J	BUTYLBENZYLPHTHALATE	20	ND J
4-CHLOROANILINE	20	ND J	3,3-DICHLOROBENZIDINE	40	ND J
HEXACHLOROBUTADIENE	20	ND J	BENZO(A)ANTHRACENE	20	ND J
4-CHLORO-3-METHYLPHENOL	20	ND J	BIS(2-ETHYLHEXYL)PHTHALATE	20	ND J
2-METHYLNAPHTHALENE	20	ND J	CHRYSENE	20	ND J
HEXACHLOROCYCLOPENTADIENE	20	ND J	DI-N-OCTYL PHTHALATE	20	ND J
2,4,6-TRICHLOROPHENOL	20	ND J	BENZO(B)FLUORANTHENE	20	ND J
2,4,5-TRICHLOROPHENOL	100	ND J	BENZO(K)FLUORANTHENE	20	ND J
2-CHLORONAPHTHALENE	20	ND J	BENZO(A)PYRENE	20	ND J
2-NITROANILINE	100	ND J	INDENO(1,2,3-CD)PYRENE	20	ND J
DIMETHYLPHTHALATE	20	ND J	DIBENZ(A,H)ANTHRACENE	20	ND J
ACENAPHTHYLENE	20	ND J	BENZO(G,H,I)PERYLENE	20	ND J
3-NITROANILINE	100	ND J	Continued. . .		

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5	(35-114)	71%	2-FLUOROBIPHENYL	(43-116)	58%	TERPHENYL-d14	(33-141)	103%
PHENOL-d5	(20-94)	64%	2-FLUOROPHENOL	(21-100)	69%	2,4,6-TRIBROMOPHENOL	(20-123)	40%

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

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CLIENT: WW ENGINEERING & SCIENCE, INC.

REPORT: 8929.04B9

SAMPLE MATRIX: WATER
SWLO # 8929.04
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES (CONT.)

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PARATHION	40	ND J	N-NITROSODIMETHYLAMINE	20	ND J
ETHYL METHANESULFONATE	20	ND J	2,3,4,6-TETRACHLOROPHENOL	20	ND J
P-PHENYLENEDIAMINE	20	ND J	CHLOROBENZILATE	20	ND J
N-NITROSODIETHYLAMINE	20	ND J	THIONAZIN	40	ND J
N-NITROSOMETHYLETHYLAMINE	20	ND J	DISULFOTON	20	ND J
N-NITROSODIBUTYLAMINE	20	ND J	ISODRIN	200	ND J
N-NITROSOPIPERIDINE	20	ND J	N-NITROSOMORPHOLINE	20	ND J
5-NITRO-O-TOLUIDINE	20	ND J	PENTACHLOROBENZENE	20	ND J
METHYL YELLOW	20	ND J	4-AMINOBIPHENYL	20	ND J
METHYL PARATHION	20	ND J	HEXACHLOROPROPENE	20	ND J
SAFROLE	40	ND J	2,6-DICHLOROPHENOL	20	ND J
IS[illegible]AFROLE	40	ND J	SULFOTEPP	20	ND J
2[illegible]OLINE	20	ND J	METHYL METHANESULFONATE	20	ND J
PHENACETIN	20	ND J	1,4-NAPHTHAQUINONE	20	ND J
O-TOLUIDINE	20	ND J	N-NITROSOPYROLLIDINE	20	ND J
3,3-DIMETHYLBENZIDINE	100	ND J	ACETOPHENONE	20	ND J
1,3-DINITROBENZENE	20	ND J	DIMETHOATE	20	ND J
A,A-DIMETHYLPHENETHYLAMINE	20	ND J	3-METHYL CHOLANTHRENE	20	ND J
O,O,O-TRIETHYLPHOSPHOROTHIOATE	20	ND J	2-ACETYLAMINOFLUORENE	20	ND J
METHAPYRILENE HYDROCHLORIDE	40	ND J	ANILINE	100	ND J
DIALLATE	40	ND J	1,2-DIBROMO-3-CHLOROPROPANE	20	ND J
1,3,5-TRINITROBENZENE	200	ND J	HEXACHLOROPHENE	20	ND J
FAMPHUR	20	ND J	KEPONE	100	ND J
4-NITROQUINOLINE-N-OXIDE	200	ND J	1-NAPHTHYLAMINE	20	ND J
1,2,4,5-TETRACHLOROBENZENE	20	ND J	2-NAPHTHYLAMINE	20	ND J
PENTACHLORONITROBENZENE	20	ND J	PRONAMIDE	100	ND J
PHORATE	20	ND J	ARAMITE	200	ND J
7,12-DIMETHYL BENZ(A)ANTHRACENE	20	ND J			

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.04DF

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO # 8929.04
METHOD REFERENCE: SW846-8280
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-05-92
DATE ANALYZED: 03-11-92
SAMPLE ID: FCR-GW-MW22-01

RESULTS REPORTED IN Parts Per Trillion (ng/L)

ANALYTE	EST. DETECTION LIMIT	CONCENTRATION
DIOXINS		
TOTAL TETRA CDD	1.8	ND J
TOTAL PENTA CDD	2.2	ND J
TOTAL HEXA CDD	1.7	ND J
TOTAL HEPTA CDD	2.5	ND J
TOTAL OCTA CDD	5.5	ND J
FURANS		
TOTAL TETRA CDF	1.4	ND J
TOTAL PENTA CDF	1.4	ND J
TOTAL HEXA CDF	1.2	ND J
TOTAL HEPTA CDF	1.4	ND J
TOTAL OCTA CDF	3.2	ND J

QA/QC SURROGATE RECOVERIES

13C-TCDD (25-150) 88% 13C-HxCDD (25-150) 76% 13C-OCDD (25-150) 61%
13C-TCDF (25-150) 98% 13C-HpCDF (25-150) 58%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
NA = NOT APPLICABLE
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-MW22-01 DISS. **Project ID:** AMPHENOL FACILITY

SWLO ID: 8929.05 **Report:** 8929.05

Collected: 03/02/1992 **Report Date:** 03-31-1992 **Page:** 1
Received: 03/04/1992 **Last Modified:** **Matrix:** Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN		10	ug/l	ND J	03/10/92	SM 412F
		*** METALS ***				
APPENDIX IX						
METALS-APP9-ICP						ICP
ANTIMONY		60.0	ug/l	ND J	03/13/92	
BARIUM		20.0	ug/l	82.4 J	03/13/92	
BERYLLIUM		5.0	ug/l	ND J	03/13/92	
CADMIUM		5.0	ug/l	ND J	03/13/92	
CHROMIUM		5.0	ug/l	ND J	03/13/92	
COBALT		10.0	ug/l	ND J	03/13/92	
COPPER		10.0	ug/l	ND J	03/13/92	
NICKEL		10.0	ug/l	ND J	03/13/92	
SILVER		10.0	ug/l	ND J	03/13/92	
TIN		50.0	ug/l	ND J	03/13/92	
VANADIUM		10.0	ug/l	ND J	03/13/92	
ZINC		10.0	ug/l	ND J	03/13/92	
ARSENIC		10.0	ug/l	ND J	03/10/92	SW 7060
LEAD		3.0	ug/l	ND J	03/12/92	SW 7421
MERCURY		0.20	ug/l	ND J	03/18/92	SW 7470
SELENIUM		5.0	ug/l	ND J	03/10/92	SW 7740
THALLIUM		10.0	ug/l	ND J	03/10/92	SW 7841

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-MW22-01d **Project ID:** AMPHENOL FACILITY

SWLO ID: 8929.06 **Report:** 8929.06

Collected: 03/02/1992 **Report Date:** 03-30-1992 **Page:** 1
Received: 03/04/1992 **Last Modified:** **Matrix:** Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
TOTAL SULFIDE		1.0	mg/l	ND J	03/06/92	SM 427D

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B [illegible]ALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I [illegible]ABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

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CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.06H9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.06
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92
METHOD REFERENCE: SW846-8150, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01d

APPENDIX IX HERBICIDES

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

HERBICIDES	DETECTION LIMIT	RESULTS
2,4-D	1.8	ND J
2,4,5-T	0.3	ND J
2,4,5-TP (SILVEX)	0.3	ND J
DINOSEB	0.3	ND J

QA/QC SURROGATE RECOVERY

DCAA 83%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
I = NOT QUANTITATIBLE DUE TO MATRIX INTERFERENCE

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

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CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.06P

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO #: 8929.06
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-31-92
METHOD REFERENCE: SW846-8080, EPA METHODOLOGY
SAMPLE ID: FCR-GW-MW22-01d

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

PCB'S	DETECTION LIMIT		RESULTS
AROCHLOR-1016	1.0	J	ND
AROCHLOR-1221	1.0	J	ND
AROCHLOR-1232	1.0	J	ND
AROCHLOR-1242	1.0	J	ND
AROCHLOR-1248	1.0	J	ND
AROCHLOR-1254	2.0	J	ND
AROCHLOR-1260	2.0	J	ND

QA/QC SURROGATE RECOVERIES

DIBUTYLCHLORENDATE (24-154) 38%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

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5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.06P9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.06
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-10-92
DATE ANALYZED: 03-11-92
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01d

RESULTS REPORTED IN (ug/L) or Parts Per Billion (PPB)

ORGANOPHOSPHOROUS PESTICIDES	DETECTION LIMIT	RESULTS
AZINPHOS METHYL (GUTHION)	1.50	ND
BOLSTAR	0.15	ND
CHLORPYRIFOS (DURSBAN)	0.30	ND
COUMAPHOS (CO-RAL)	1.50	ND
DEMETON-S (MERCAPTOPHOS)	0.25	ND
DIAZINON	0.60	ND
DICHLORVOS (DDVP)	0.10	ND
DISULFOTON (DI-SYSTON)	0.20	ND
ETHOPROP (MOCAP)	0.25	ND
FENSULFOTHION (DASANIT)	1.50	ND
FENTHION (BAYCID)	0.10	ND
MERPHOS	0.25	ND
MEVINPHOS (PHOSDRIN)	0.30	ND
NALED	0.10	ND
METHYL PARATHION	0.03	ND
MALATHION	0.5(1)	ND
PHORATE	0.15	ND
RONNEL (FENCHLORPHOS)	0.30	ND
STIROPHOS (TETRACHLORVINPHOS)	5.00	ND

QA/QC SURROGATE RECOVERIES

ETION 85%

(1) NO DETECTION LIMIT ESTABLISHED, VALUE GIVEN IS AT THE QUANTITATION LIMIT
ND NOT DETECTED ABOVE QUANTITATION LIMIT
J ESTIMATED VALUE (BELOW QUANTITATION LIMIT)
B COMPOUND FOUND IN BLANK
* SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE,INC.

REPORT: 8929.06B9

SAMPLE MATRIX: WATER
SWLO # 8929.06
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01d

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PHENOL	20	ND	ACENAPHTHENE	20	ND
BIS(2-CHLOROETHYL)ETHER	20	ND	2,4-DINITROPHENOL	100	ND
2-CHLOROPHENOL	20	ND	4-NITROPHENOL	100	ND
1,3-DICHLOROBENZENE	20	ND	DIBENZOFURAN	20	ND
1,4-DICHLOROBENZENE	20	ND	2,4-DINITROTOLUENE	20	ND
BENZYL ALCOHOL	20	ND	2,6-DINITROTOLUENE	20	ND
1,2-DICHLOROBENZENE	20	ND	DIETHYLPHTHALATE	20	ND
2-METHYLPHENOL	20	ND	4-CHLOROPHENYL-PHENYLETHER	20	ND
BIS(2-CHLOROISOPROPYL)ETHER	20	ND	FLUORENE	20	ND
4-/3-METHYLPHENOL (2)	20	ND	4-NITROANILINE	100	ND
N-NITROSO-DI-n-PROPYLAMINE	20	ND	4,6-DINITRO 2-METHYLPHENOL	100	ND
HEXACHLOROETHANE	20	ND	N-NITROSODIPHENYLAMINE(1)	20	ND
NITROBENZENE	20	ND	4-BROMOPHENYL-PHENYLETHER	20	ND
ISOPHORONE	20	ND	HEXACHLOROBENZENE	20	ND
2-NITROPHENOL	20	ND	PENTACHLOROPHENOL	20	ND
2,4-DIMETHYLPHENOL	20	ND	PHENANTHRENE	20	ND
BENZOIC ACID	100	ND	ANTHRACENE	20	ND
BIS(2-CHLOROETHOXY)METHANE	20	ND	DI-N-BUTYLPHTHALATE	20	ND
2,4-DICHLOROPHENOL	20	ND	FLUORANTHENE	20	ND
1,2,4-TRICHLOROBENZENE	20	ND	PYRENE	20	ND
NAPHTHALENE	20	ND	BUTYLBENZYLPHTHALATE	20	ND
4-CHLOROANILINE	20	ND	3,3-DICHLOROBENZIDINE	40	ND
HEXACHLOROBUTADIENE	20	ND	BENZO(A)ANTHRACENE	20	ND
4-CHLORO-3-METHYLPHENOL	20	ND	BIS(2-ETHYLHEXYL)PHTHALATE	20	ND
2-METHYLNAPHTHALENE	20	ND	CHRYSENE	20	ND
HEXACHLOROCYCLOPENTADIENE	20	ND	DI-N-OCTYL PHTHALATE	20	ND
2,4,6-TRICHLOROPHENOL	20	ND	BENZO(B)FLUORANTHENE	20	ND
2,4,5-TRICHLOROPHENOL	100	ND	BENZO(K)FLUORANTHENE	20	ND
2-CHLORONAPHTHALENE	20	ND	BENZO(A)PYRENE	20	ND
2-NITROANILINE	100	ND	INDENO(1,2,3-CD)PYRENE	20	ND
DIMETHYLPHTHALATE	20	ND	DIBENZ(A,H)ANTHRACENE	20	ND
ACENAPHTHYLENE	20	ND	BENZO(G,H,I)PERYLENE	20	ND
3-NITROANILINE	100	ND	Continued. . .		

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5	(35-114)	78%	2-FLUOROBIPHENYL	(43-116)	68%	TERPHENYL-d14	(33-141)	115%
PHENOL-d5	(20-94)	73%	2-FLUOROPHENOL	(21-100)	75%	2,4,6-TRIBROMOPHENOL	(20-123)	42%

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE,INC.

REPORT: 8929.06B9

SAMPLE MATRIX: WATER
SWLO # 8929.06
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01d

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES (CONT.)

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PARATHION	40	ND J	N-NITROSODIMETHYLAMINE	20	ND J
ETHYL METHANESULFONATE	20	ND J	2,3,4,6-TETRACHLOROPHENOL	20	ND J
P-PHENYLENEDIAMINE	20	ND J	CHLOROBENZILATE	20	ND J
N-NITROSODIETHYLAMINE	20	ND J	THIONAZIN	40	ND J
N-NITROSOMETHYLETHYLAMINE	20	ND J	DISULFOTON	20	ND J
N-NITROSODIBUTYLAMINE	20	ND J	ISODRIN	200	ND J
N-NITROSOPIPERIDINE	20	ND J	N-NITROSOMORPHOLINE	20	ND J
5-NITRO-O-TOLUIDINE	20	ND J	PENTACHLOROBENZENE	20	ND J
METHYL YELLOW	20	ND J	4-AMINOBIPHENYL	20	ND J
METHYL PARATHION	20	ND J	HEXACHLOROPROPENE	20	ND J
SAFROLE	40	ND J	2,6-DICHLOROPHENOL	20	ND J
ISOSAFROLE	40	ND J	SULFOTEPP	20	ND J
2 [illegible]OLINE	20	ND J	METHYL METHANESULFONATE	20	ND J
PHENACETIN	20	ND J	1,4-NAPHTHAQUINONE	20	ND J
O-TOLUIDINE	20	ND J	N-NITROSOPYROLLIDINE	20	ND J
3,3-DIMETHYLBENZIDINE	100	ND J	ACETOPHENONE	20	ND J
1,3-DINITROBENZENE	20	ND J	DIMETHOATE	20	ND J
A,A-DIMETHYLPHENETHYLAMINE	20	ND J	3-METHYL CHOLANTHRENE	20	ND J
O,O,O-TRIETHYLPHOSPHOROTHIOATE	20	ND J	2-ACETYLAMINOFLUORENE	20	ND J
METBAPYRILENE HYDROCHLORIDE	40	ND J	ANILINE	100	ND J
DIALLATE	40	ND J	1,2-DIBROMO-3-CHLOROPROPANE	20	ND J
1,3,5-TRINITROBENZENE	200	ND J	HEXACHLOROPHENE	20	ND J
FAMPHUR	20	ND J	KEPONE	100	ND J
4-NITROQUINOLINE-N-OXIDE	200	ND J	1-NAPHTHYLAMINE	20	ND J
1,2,4,5-TETRACHLOROBENZENE	20	ND J	2-NAPHTHYLAMINE	20	ND J
PENTACHLORONITROBENZENE	20	ND J	PRONAMIDE	100	ND J
PHORATE	20	ND J	ARAMITE	200	ND J
7,12-DIMETHYL BENZ(A)ANTHRACENE	20	ND J			

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.06DF

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO # 8929.06
METHOD REFERENCE: SW846-8280
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-05-92
DATE ANALYZED: 03-17-92
SAMPLE ID: FCR-GW-MW22-01d

RESULTS REPORTED IN Parts Per Trillion (ng/L)

ANALYTE	EST. DETECTION LIMIT	CONCENTRATION
DIOXINS		
TOTAL TETRA CDD	1.4	ND J
TOTAL PENTA CDD	0.8	ND J
TOTAL HEXA CDD	1.5	ND J
TOTAL HEPTA CDD	2.9	ND J
TOTAL OCTA CDD	4.8	ND J
FURANS		
TOTAL TETRA CDF	1.5	ND J
TOTAL PENTA CDF	0.4	ND J
TOTAL HEXA CDF	1.7	ND J
TOTAL HEPTA CDF	1.5	ND J
TOTAL OCTA CDF	2.5	ND J

QA/QC SURROGATE RECOVERIES

13C-TCDD (25-150) 88% 13C-HxCDD (25-150) 150% 13C-OCDD (25-150) 123%
13C-TCDF (25-150) 100% 13C-HpCDF (25-150) 98%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
NA = NOT APPLICABLE
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.07H9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.07
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92
METHOD REFERENCE: SW846-8150, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01m (MS)

APPENDIX IX HERBICIDES

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

HERBICIDES	DETECTION LIMIT	RESULTS
2,4-D	1.8	ND J
2,4,5-T	0.3	ND J
2,4,5-TP (SILVEX)	0.3	ND J
DINOSEB	0.3	ND J

QA/QC SURROGATE RECOVERY

DCAA 85%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
I = NOT QUANTITATIBLE DUE TO MATRIX INTERFERENCE

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.07PC

DATE: 04-03-92

SAMPLE MATRIX: WATER
SWLO #: 8929.07
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-23-92
DATE ANALYZED : 03-31-92
METHOD REFERENCE: SW846-8080, EPA METHODOLOGY
SAMPLE ID: FCR-GW-MW22-01m (MS)

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

PCB'S	DETECTION LIMIT	RESULTS
AROCHLOR-1016	1.0	ND J
AROCHLOR-1221	1.0	ND J
AROCHLOR-1232	1.0	ND J
AROCHLOR-1242	1.0	ND J
AROCHLOR-1248	1.0	ND J
AROCHLOR-1254	2.0	ND J
AROCHLOR-1260	2.0	ND J

QA/QC SURROGATE RECOVERIES

DIBUTYLCHLORENDATE (24-154) 67%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.07P9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.07
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-10-92
DATE ANALYZED: 03-11-92
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01m (MS)

RESULTS REPORTED IN (ug/L) or Parts Per Billion (PPB)

ORGANOPHOSPHOROUS PESTICIDES	DETECTION LIMIT	RESULTS	
AZINPHOS METHYL (GUTHION)	1.50	ND	J
BOLSTAR	0.15	ND	J
CHLORPYRIFOS (DURSBAN)	0.30	ND	J
COUMAPHOS (CO-RAL)	1.50	ND	J
DEMETON-S (MERCAPTOPHOS)	0.25	ND	J
DIAZINON	0.60	ND	J
DICHLORVOS (DDVP)	0.10	ND	J
DISULFOTON (DI-SYSTON)	0.20	ND	J
ETHOPROP (MOCAP)	0.25	ND	J
FENSULFOTHION (DASANIT)	1.50	ND	J
FENTHION (BAYCID)	0.10	ND	J
MERPHOS	0.25	ND	J
MEVINPHOS (PHOSDRIN)	0.30	ND	J
NALED	0.10	ND	J
METHYL PARATHION	0.03	ND	J
MALATHION	0.5(1)	ND	J
PHORATE	0.15	ND	J
RONNEL (FENCHLORPHOS)	0.30	ND	J
STIROPHOS (TETRACHLORVINPHOS)	5.00	ND	J

QA/QC SURROGATE RECOVERIES

ETION 90%

(1) NO DETECTION LIMIT ESTABLISHED, VALUE GIVEN IS AT THE QUANTITATION LIMIT
ND NOT DETECTED ABOVE QUANTITATION LIMIT
J ESTIMATED VALUE (BELOW QUANTITATION LIMIT)
B COMPOUND FOUND IN BLANK
* SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
SAMPLE MATRIX: WATER
SWLO # 8929.07
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01m (MS)

REPORT: 8929.07B9
DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)		SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	
PHENOL	20	ND	J	ACENAPHTHENE	20	ND	J
BIS(2-CHLOROETHYL)ETHER	20	ND	J	2,4-DINITROPHENOL	100	ND	J
2-CHLOROPHENOL	20	ND	J	4-NITROPHENOL	100	ND	J
1,3-DICHLOROBENZENE	20	ND	J	DIBENZOFURAN	20	ND	J
1,4-DICHLOROBENZENE	20	ND	J	2,4-DINITROTOLUENE	20	ND	J
BENZYL ALCOHOL	20	ND	J	2,6-DINITROTOLUENE	20	ND	J
1,2-DICHLOROBENZENE	20	ND	J	DIETHYLPHTHALATE	20	ND	J
2-METHYLPHENOL	20	ND	J	4-CHLOROPHENYL-PHENYLETHER	20	ND	J
BIS(2-CHLOROISOPROPYL)ETHER	20	ND	J	FLUORENE	20	ND	J
4-/3-METHYLPHENOL (2)	20	ND	J	4-NITROANILINE	100	ND	J
N-NITROSO-DI-n-PROPYLAMINE	20	ND	J	4,6-DINITRO 2-METHYLPHENOL	100	ND	J
HEXACHLOROETHANE	20	ND	J	N-NITROSODIPHENYLAMINE(1)	20	ND	J
NITROBENZENE	20	ND	J	4-BROMOPHENYL-PHENYLETHER	20	ND	J
IS[illegible]RONE	20	ND	J	HEXACHLOROBENZENE	20	ND	J
2-NITROPHENOL	20	ND	J	PENTACHLOROPHENOL	20	ND	J
2,4-DIMETHYLPHENOL	20	ND	J	PHENANTHRENE	20	ND	J
BENZOIC ACID	100	ND	J	ANTHRACENE	20	ND	J
BIS(2-CHLOROETHOXY)METHANE	20	ND	J	DI-N-BUTYLPHTHALATE	20	ND	J
2,4-DICHLOROPHENOL	20	ND	J	FLUORANTHENE	20	ND	J
1,2,4-TRICHLOROBENZENE	20	ND	J	PYRENE	20	ND	J
NAPHTHALENE	20	ND	J	BUTYLBENZYLPHTHALATE	20	ND	J
4-CHLOROANILINE	20	ND	J	3,3-DICHLOROBENZIDINE	40	ND	J
HEXACHLOROBUTADIENE	20	ND	J	BENZO(A)ANTHRACENE	20	ND	J
4-CHLORO-3-METHYLPHENOL	20	ND	J	BIS(2-ETHYLHEXYL)PHTHALATE	20	ND	J
2-METHYLNAPHTHALENE	20	ND	J	CHRYSENE	20	ND	J
HEXACHLOROCYCLOPENTADIENE	20	ND	J	DI-N-OCTYL PHTHALATE	20	3	J
2,4,6-TRICHLOROPHENOL	20	ND	J	BENZO(B)FLUORANTHENE	20	ND	J
2,4,5-TRICHLOROPHENOL	100	ND	J	BENZO(K)FLUORANTHENE	20	ND	J
2-CHLORONAPHTHALENE	20	ND	J	BENZO(A)PYRENE	20	ND	J
2-NITROANILINE	100	ND	J	INDENO(1,2,3-CD)PYRENE	20	ND	J
DIMETHYLPHTHALATE	20	ND	J	DIBENZ(A,H)ANTHRACENE	20	ND	J
ACENAPHTHYLENE	20	ND	J	BENZO(G,H,I)PERYLENE	20	ND	J
3-NITROANILINE	100	ND	J	Continued. . .			

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5	(35-114)	86%	2-FLUOROBIPHENYL	(43-116)	52%	TERPHENYL-d14	(33-141)	97%
PHENOL-d5	(20-94)	84%	2-FLUOROPHENOL	(21-100)	84%	2,4,6-TRIBROMOPHENOL	(20-123)	55%

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.

REPORT: 8929.07B9

SAMPLE MATRIX: WATER
SWLO # 8929.07
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01m (MS)

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES (CONT.)

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PARATHION	40	ND J	N-NITROSODIMETHYLAMINE	20	ND J
ETHYL METHANESULFONATE	20	ND J	2,3,4,6-TETRACHLOROPHENOL	20	ND J
P-PHENYLENEDIAMINE	20	ND J	CHLOROBENZILATE	20	ND J
N-NITROSODIETHYLAMINE	20	ND J	THIONAZIN	40	ND J
N-NITROSOMETHYLETHYLAMINE	20	ND J	DISULFOTON	20	ND J
N-NITROSODIBUTYLAMINE	20	ND J	ISODRIN	200	ND J
N-NITROSOPIPERIDINE	20	ND J	N-NITROSOMORPHOLINE	20	ND J
5-NITRO-O-TOLUIDINE	20	ND J	PENTACHLOROBENZENE	20	ND J
METHYL YELLOW	20	ND J	4-AMINOBIPHENYL	20	ND J
METHYL PARATHION	20	ND J	HEXACHLOROPROPENE	20	ND J
SAFROLE	40	ND J	2,6-DICHLOROPHENOL	20	ND J
ISOSAFROLE	40	ND J	SULFOTEPP	20	ND J
2-[illegible]OLINE	20	ND J	METHYL METHANESULFONATE	20	ND J
PH[illegible]ACETIN	20	ND J	1,4-NAPHTHAQUINONE	20	ND J
O-TOLUIDINE	20	ND J	N-NITROSOPYROLLIDINE	20	ND J
3,3-DIMETHYLBENZIDINE	100	ND J	ACETOPHENONE	20	ND J
1,3-DINITROBENZENE	20	ND J	DIMETHOATE	20	ND J
A,A-DIMETHYLPHENETHYLAMINE	20	ND J	3-METHYL CHOLANTHRENE	20	ND J
O,O,O-TRIETHYLPHOSPHOROTHIOATE	20	ND J	2-ACETYLAMINOFLUORENE	20	ND J
METHAPYRILENE HYDROCHLORIDE	40	ND J	ANILINE	100	ND J
DIALLATE	40	ND J	1,2-DIBROMO-3-CHLOROPROPANE	20	ND J
1,3,5-TRINITROBENZENE	200	ND J	HEXACHLOROPHENE	20	ND J
FAMPHUR	20	ND J	KEPONE	100	ND J
4-NITROQUINOLINE-N-OXIDE	200	ND J	1-NAPHTHYLAMINE	20	ND J
1,2,4,5-TETRACHLOROBENZENE	20	ND J	2-NAPHTHYLAMINE	20	ND J
PENTACHLORONITROBENZENE	20	ND J	PRONAMIDE	100	ND J
PHORATE	20	ND J	ARAMITE	200	ND J
7,12-DIMETHYL BENZ(A)ANTHRACENE	20	ND J			

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

ü

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.07DF

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO # 8929.07
METHOD REFERENCE: SW846-8280
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-05-92
DATE ANALYZED: 03-17-92
SAMPLE ID: FCR-GW-MW22-01m (MS)

RESULTS REPORTED IN Parts Per Trillion (ng/L)

ANALYTE	EST. DETECTION LIMIT	CONCENTRATION
DIOXINS		
TOTAL TETRA CDD	N/A	47.4
TOTAL PENTA CDD	N/A	150.1
TOTAL HEXA CDD	N/A	150.5
TOTAL HEPTA CDD	N/A	186.9
TOTAL OCTA CDD	N/A	287.4
FURANS		
TOTAL TETRA CDF	N/A	50.6
TOTAL PENTA CDF	N/A	132.9
TOTAL HEXA CDF	N/A	111.7
TOTAL HEPTA CDF	N/A	132.1
TOTAL OCTA CDF	N/A	276.4

QA/QC SURROGATE RECOVERIES

13C-TCDD (25-150) 72% 13C-HxCDD (25-150) 102% 13C-OCDD (25-150) 94%
13C-TCDF (25-150) 80% 13C-HpCDF (25-150) 69%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
NA = NOT APPLICABLE
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.08H9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.08
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92
METHOD REFERENCE: SW846-8150, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01md (MSD)

APPENDIX IX HERBICIDES

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

HERBICIDES	DETECTION LIMIT	RESULTS
2,4-D	1.8	ND J
2,4,5-T	0.3	ND J
2,4,5-TP (SILVEX)	0.3	ND J
DINOSEB	0.3	ND J

QA/QC SURROGATE RECOVERY

DCAA	83%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
I = NOT QUANTITATIBLE DUE TO MATRIX INTERFERENCE

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.08PC

DATE: 04-03-92

SAMPLE MATRIX: WATER
SWLO #: 8929.08
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-23-92
DATE ANALYZED : 03-31-92
METHOD REFERENCE: SW846-8080, EPA METHODOLOGY
SAMPLE ID: FCR-GW-MW22-01md (MSD)

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

PCB'S	DETECTION LIMIT	RESULTS
AROCHLOR-1016	1.0	ND J
AROCHLOR-1221	1.0	ND J
AROCHLOR-1232	1.0	ND J
AROCHLOR-1242	1.0	ND J
AROCHLOR-1248	1.0	ND J
AROCHLOR-1254	2.0	ND J
AROCHLOR-1260	2.0	ND J

QA/QC SURROGATE RECOVERIES

DIBUTYLCHLORENDATE (24-154) 63%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
D = SURROGATE OR MATRIX SPIKE DILUTED OUT
SAMPLE RUN AT SECONDARY DILUTION
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.08P9

DATE: 03-30-92

SAMPLE MATRIX: WATER
SWLO # 8929.08
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-10-92
DATE ANALYZED: 03-11-92
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01md (MSD)

RESULTS REPORTED IN (ug/L) or Parts Per Billion (PPB)

ORGANOPHOSPHOROUS PESTICIDES	DETECTION LIMIT	RESULTS	
AZINPHOS METHYL (GUTHION)	1.50	ND	J
BOLSTAR	0.15	ND	J
CHLORPYRIFOS (DURSBAN)	0.30	ND	J
COUMAPHOS (CO-RAL)	1.50	ND	J
DEMETON-S (MERCAPTOPHOS)	0.25	ND	J
DIAZINON	0.60	ND	J
DICHLORVOS (DDVP)	0.10	ND	J
DISULFOTON (DI-SYSTON)	0.20	ND	J
ETHOPROP (MOCAP)	0.25	ND	J
FENSULFOTHION (DASANIT)	1.50	ND	J
FENTHION (BAYCID)	0.10	ND	J
MERPHOS	0.25	ND	J
MEVINPHOS (PHOSDRIN)	0.30	ND	J
NALED	0.10	ND	J
METHYL PARATHION	0.03	ND	J
MALATHION	0.5(1)	ND	J
PHORATE	0.15	ND	J
RONNEL (FENCHLORPHOS)	0.30	ND	J
STIROPHOS (TETRACHLORVINPHOS)	5.00	ND	J

QA/QC SURROGATE RECOVERIES

ETION 90%

) NO DETECTION LIMIT ESTABLISHED, VALUE GIVEN IS AT THE QUANTITATION LIMIT
NOT DETECTED ABOVE QUANTITATION LIMIT
J ESTIMATED VALUE (BELOW QUANTITATION LIMIT)
B COMPOUND FOUND IN BLANK
* SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.

REPORT: 8929.08B9

SAMPLE MATRIX: WATER
SWLO # 8929.08
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01md (MSD)

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)		SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	
PHENOL	20	ND	J	ACENAPHTHENE	20	ND	J
BIS(2-CHLOROETHYL)ETHER	20	ND	J	2,4-DINITROPHENOL	100	ND	J
2-CHLOROPHENOL	20	ND	J	4-NITROPHENOL	100	ND	J
1,3-DICHLOROBENZENE	20	ND	J	DIBENZOFURAN	20	ND	J
1,4-DICHLOROBENZENE	20	ND	J	2,4-DINITROTOLUENE	20	ND	J
BENZYL ALCOHOL	20	ND	J	2,6-DINITROTOLUENE	20	ND	J
1,2-DICHLOROBENZENE	20	14	J	DIETHYLPHTHALATE	20	ND	J
2-METHYLPHENOL	20	ND	J	4-CHLOROPHENYL-PHENYLETHER	20	ND	J
BIS(2-CHLOROISOPROPYL)ETHER	20	ND	J	FLUORENE	20	ND	J
4-/3-METHYLPHENOL (2)	20	ND	J	4-NITROANILINE	100	ND	J
N-NITROSO-DI-n-PROPYLAMINE	20	ND	J	4,6-DINITRO 2-METHYLPHENOL	100	ND	J
HEXACHLOROETHANE	20	ND	J	N-NITROSODIPHENYLAMINE(1)	20	ND	J
NITROBENZENE	20	ND	J	4-BROMOPHENYL-PHENYLETHER	20	ND	J
ISOPHORONE	20	ND	J	HEXACHLOROBENZENE	20	ND	J
2-[illegible]ROPHENOL	20	ND	J	PENTACHLOROPHENOL	20	ND	J
2,4-DIMETHYLPHENOL	20	ND	J	PHENANTHRENE	20	ND	J
BENZOIC ACID	100	8	J	ANTHRACENE	20	ND	J
BIS(2-CHLOROETHOXY)METHANE	20	ND	J	DI-N-BUTYLPHTHALATE	20	ND	J
2,4-DICHLOROPHENOL	20	ND	J	FLUORANTHENE	20	ND	J
1,2,4-TRICHLOROBENZENE	20	ND	J	PYRENE	20	ND	J
NAPHTHALENE	20	ND	J	BUTYLBENZYLPHTHALATE	20	ND	J
4-CHLOROANILINE	20	ND	J	3,3-DICHLOROBENZIDINE	40	ND	J
HEXACHLOROBUTADIENE	20	ND	J	BENZO(A)ANTHRACENE	20	ND	J
4-CHLORO-3-METHYLPHENOL	20	ND	J	BIS(2-ETHYLHEXYL)PHTHALATE	20	ND	J
2-METHYLNAPHTHALENE	20	ND	J	CHRYSENE	20	ND	J
HEXACHLOROCYCLOPENTADIENE	20	ND	J	DI-N-OCTYL PHTHALATE	20	ND	J
2,4,6-TRICHLOROPHENOL	20	ND	J	BENZO(B)FLUORANTHENE	20	ND	J
2,4,5-TRICHLOROPHENOL	100	ND	J	BENZO(K)FLUORANTHENE	20	ND	J
2-CHLORONAPHTHALENE	20	ND	J	BENZO(A)PYRENE	20	ND	J
2-NITROANILINE	100	ND	J	INDENO(1,2,3-CD)PYRENE	20	ND	J
DIMETHYLPHTHALATE	20	ND	J	DIBENZ(A,H)ANTHRACENE	20	ND	J
ACENAPHTHYLENE	20	ND	J	BENZO(G,H,I)PERYLENE	20	ND	J
-NITROANILINE	100	ND	J	Continued. . .			

QA/QC SURROGATE RECOVERIES

OBENZENE-d5	(35-114)	68%	2-FLUOROBIPHENYL	(43-116)	52%	TERPHENYL-d14	(33-141)	96%
L-d5	(20-94)	58%	2-FLUOROPHENOL	(21-100)	64%	2,4,6-TRIBROMOPHENOL	(20-123)	47%

DETECTED AS DIPHENYLAMINE
DELUTE ON GC COLUMN
T DETECTED ABOVE QUANTITATION LIMIT
IMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
YTE DETECTED IN BLANK AS WELL AS SAMPLE
GATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE,INC.

REPORT: 8929.08B9

SAMPLE MATRIX: WATER
SWLO # 8929.08
METHOD REF.: SW846-8270, EPA METHODOLOGY
PROJECT: AMPHENOL FACILITY
SAMPLE ID: FCR-GW-MW22-01md (MSD)

DATE REPORTED: 04-03-92
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-06-92
DATE ANALYZED : 03-25-92

APPENDIX IX SEMIVOLATILES (CONT.)

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)	SEMIVOLATILES	DET. LIMIT	RESULTS (ug/L)
PARATHION	40	ND J	N-NITROSODIMETHYLAMINE	20	ND J
ETHYL METHANESULFONATE	20	ND J	2,3,4,6-TETRACHLOROPHENOL	20	ND J
P-PHENYLENEDIAMINE	20	ND J	CHLOROBENZILATE	20	ND J
N-NITROSODIETHYLAMINE	20	ND J	THIONAZIN	40	ND J
N-NITROSOMETHYLETHYLAMINE	20	ND J	DISULFOTON	20	ND J
N-NITROSODIBUTYLAMINE	20	ND J	ISODRIN	200	ND J
N-NITROSOPIPERIDINE	20	ND J	N-NITROSOMORPHOLINE	20	ND J
5-NITRO-O-TOLUIDINE	20	ND J	PENTACHLOROBENZENE	20	ND J
METHYL YELLOW	20	ND J	4-AMINOBIPHENYL	20	ND J
METHYL PARATHION	20	ND J	HEXACHLOROPROPENE	20	ND J
SAFROLE	40	ND J	2,6-DICHLOROPHENOL	20	ND J
ISOSAFROLE	40	ND J	SULFOTEPP	20	ND J
2-PICOLINE	20	ND J	METHYL METHANESULFONATE	20	ND J
PHENACETIN	20	ND J	1,4-NAPHTHAQUINONE	20	ND J
O-TOLUIDINE	20	ND J	N-NITROSOPYROLLIDINE	20	ND J
3,3-DIMETHYLBENZIDINE	100	ND J	ACETOPHENONE	20	ND J
1,3-DINITROBENZENE	20	ND J	DIMETHOATE	20	ND J
A,A-DIMETHYLPHENETHYLAMINE	20	ND J	3-METHYL CHOLANTHRENE	20	ND J
O,O,O-TRIETHYLPHOSPHOROTHIOATE	20	ND J	2-ACETYLAMINOFLUORENE	20	ND J
METHAPYRILENE HYDROCHLORIDE	40	ND J	ANILINE	100	ND J
DIALLATE	40	ND J	1,2-DIBROMO-3-CHLOROPROPANE	20	ND J
1,3,5-TRINITROBENZENE	200	ND J	HEXACHLOROPHENE	20	ND J
FAMPHUR	20	ND J	KEPONE	100	ND J
4-NITROQUINOLINE-N-OXIDE	200	ND J	1-NAPHTHYLAMINE	20	ND J
1,2,4,5-TETRACHLOROBENZENE	20	ND J	2-NAPHTHYLAMINE	20	ND J
PENTACHLORONITROBENZENE	20	ND J	PRONAMIDE	100	ND J
PHORATE	20	ND J	ARAMITE	200	ND J
7,12-DIMETHYL BENZ(A)ANTHRACENE	20	ND J			

(1) = DETECTED AS DIPHENYLAMINE
(2) = COELUTE ON GC COLUMN
ND = NOT DETECTED ABOVE QUANTITATION LIMIT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408
ATTN: JIM KEITH

REPORT: 8929.08DF

DATE: 04-02-92

SAMPLE MATRIX: WATER
SWLO # 8929.08
METHOD REFERENCE: SW846-8280
DATE SUBMITTED: 03-04-92
DATE EXTRACTED: 03-05-92
DATE ANALYZED: 03-17-92
SAMPLE ID: FCR-GW-MW22-01md (MSD)

RESULTS REPORTED IN Parts Per Trillion (ng/L)

ANALYTE	EST. DETECTION LIMIT	CONCENTRATION
DIOXINS		
TOTAL TETRA CDD	N/A	51.2
TOTAL PENTA CDD	N/A	166.1
TOTAL HEXA CDD	N/A	148.8
TOTAL HEPTA CDD	N/A	178.7
TOTAL OCTA CDD	N/A	264.6
FURANS		
TOTAL TETRA CDF	N/A	49.9
TOTAL PENTA CDF	N/A	130.9
TOTAL HEXA CDF	N/A	117.1
TOTAL HEPTA CDF	N/A	135.9
TOTAL OCTA CDF	N/A	270.6

QA/QC SURROGATE RECOVERIES

13C-TCDD (25-150) 60% 13C-HxCDD (25-150) 98% 13C-OCDD (25-150) 86%
13C-TCDF (25-150) 72% 13C-HpCDF (25-150) 64%

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
NA = NOT APPLICABLE
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-MW24-01 Project ID: AMPHENOL FACILITY

SWLO ID: 8929.09 Report: 8929.09

Collected: 03/02/1992 Report Date: 03-30-1992 Page: 1
Received: 03/04/1992 Last Modified: Matrix: Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN		10	ug/l	ND J	03/10/92	SM 412F

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-MW102-01eb Project ID: AMPHENOL FACILITY

SWLO ID: 8929.10 Report: 8929.10

Collected: 03/02/1992 Report Date: 03-30-1992 Page: 1
Received: 03/04/1992 Last Modified: Matrix: Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN		10	ug/l	ND J	03/10/92	SM 412F

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012 918 251-2858

Client Name: WW ENGINEERING & SCIENCE, INC.
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: FCR-GW-MW3-01 Project ID: AMPHENOL FACILITY

SWLO ID: 8929.11 Report: 8929.11

Collected: 03/02/1992 Report Date: 03-30-1992 Page: 1
Received: 03/04/1992 Last Modified: Matrix: Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN		10	ug/l	ND J	03/10/92	SM 412F

NOT DETECTED ABOVE QUANTITATION LIMIT
ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

HMM Associates, Inc.
A Summit Company

6908/HAZ/12302I

April 16, 1993

Mr. James H. Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Inorganic Data Validation Report
Southwest Laboratory of Oklahoma
Metals: 3 low concentration samples
Cyanide: 4 low concentration samples

Dear Mr. Keith:

Data validation was performed on the inorganic analytical data from 4 low level soil samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, February 1989:

* - data completeness
  - holding times
* - calibration verification
  - field and laboratory blank results
* - ICP interference check sample results
  - matrix spike percent recovery results
  - laboratory and field duplicate results
* - laboratory control sample results
  - ICP serial dilution analysis
* - sample results

196 Baker Avenue Concord, MA 01742 508/371-4000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-4642

* All criteria was met for this parameter.

Data Completeness

The packages were complete and legible.

Holding Times

All holding times were met for metals and mercury analysis. The holding time for cyanide was 17 days, which exceeds the 14 day requirement. However, this is not considered to be a gross exceedence and, therefore, the data will not be qualified.

Calibration Verification

All calibration results were reviewed and found to be acceptable.

Field and Laboratory Blanks

The method blanks were prepared and analyzed at the required frequency. The initial and continuing calibration blanks were also reported. There were no field blanks collected.

The initial calibration blank (ICB) had a reported concentration of 15.8 mg/kg for copper and 2.1 mg/kg for zinc. The preparation blank had reported concentrations of 1.3 mg/kg for silver and 1.1 mg/kg for selenium. The action level for these analytes is five times the reported concentration. All samples had a reported concentration below the action level for copper, silver, and selenium. Only sample EB03 had a reported concentration of zinc below the action level and will be qualified U.

ICP Interference Check Sample Results

The reported results for the ICP interference check sample A were acceptable.

Matrix Spike Recovery Results

The review of the matrix spike results revealed the deficiency which is summarized in the following table.

The actions apply to all samples of the same matrix.

Sample No.	Matrix	Analyte	Percent Recovery
MW23D3	Water	Antimony	59.6%
MW23D3	Water	Arsenic	57.6%
MW23D3	Water	Sodium	0.0%

The positive results for the above analytes have been estimated (J).

The non detect results for the above analytes have been estimated (UJ).

Laboratory and Field Duplicates

Copper, lead, nickel, and zinc did not meet required criteria for laboratory duplicates and positive results for these analytes will be estimated (J).

A field duplicate, FCR-SB-MW2715.0-03D, was collected, however, results were not reported for this sample by the laboratory.

Laboratory Control Sample Results

The laboratory control sample results were reviewed and found to be acceptable.

ICP Serial Dilution Analysis

The following compounds did not meet the required criteria for serial dilution: barium, beryllium, cobalt, copper, nickel, silver, and vanadium. Positive results for barium, cobalt, sodium, and vanadium will be estimated (J) and non detects will be estimated (UJ). No action will be taken on beryllium, copper, and nickel.

Sample Results

All sample results were reported accurately by the laboratory.

Data tables have been provide that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa J. Solari

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

EPA Sample No.	EB03	1503	2303	--
Lab Sample No.	1230203	1230201	12303204	1230204
Matrix	Soil	Soil	Soil	Soil
Level	Low	Low	Low	--
Date Collected	1/3/93	1/3/93	1/3/93	1/3/93
Date Analyzed	1/26/93	1/26/93	1/26/93	2/4/93
Units	mg/kg	mg/kg	mg/kg	mg/kg
Analyte				
Aluminum	21.0 B	1960	2100	NA
Antimony	5.8 U	6.4 U	6.7 U	NA
Arsenic	0.40 U	0.65 B	0.85 B	NA
Barium	1.4 U	7.9 B	8.8 B	NA
Beryllium	0.20 U	1.1	1.6	NA
Cadmium	0.40 U	0.44 U	0.49 B	NA
Calcium	80.1 B	91200	80600	NA
Chromium	0.80 U	4.0	3.5	NA
Cobalt	1.0 U	1.8 B	1.2 U	NA
Copper	4.0 B	22.2	70.7	NA
Iron	26.9	4470	4490	NA
Lead	0.40 B	3.6	5.8	NA
Magnesium	37.8 B	22400	21900	NA
Manganese	0.22 B	149	141	NA
Mercury	0.10 U	0.11 U	0.12 U	NA
Nickel	1.2 U	7.5 B	14.6	NA
Potassium	62.1 U	435 B	411 B	NA
Selenium	0.20 U	0.22 U	0.27 B	NA
Silver	1.0 U	1.4 B	1.7 B	NA
Sodium	101 U	111 U	117 U	NA
Thallium	0.60 U	0.66 U	0.70 U	NA
Vanadium	0.80 U	6.6 B	6.4 B	NA
Zinc	0.44 B	16.0	30.9	NA
Cyanide	0.50 U	0.50 U	0.50 U	0.50 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.
U = The analyte was analyzed for, but not detected.
mg/kg = milligrams per kilogram
NA = Not analyzed

EPA Sample No.	EB03	1503	2303	--
Lab Sample No.	1230203	1230201	12303204	1230204
Matrix	Soil	Soil	Soil	Soil
Level	Low	Low	Low	--
Date Collected	1/3/93	1/3/93	1/3/93	1/3/93
Date Analyzed	1/26/93	1/26/93	1/26/93	2/4/93
Units	mg/kg	mg/kg	mg/kg	mg/kg
Analyte				
Aluminum	21.0 B	1960	2100	NA
Antimony	5.8 UJ	6.4 UJ	6.7 UJ	NA
Arsenic	0.40 UJ	0.65 J	0.85 J	NA
Barium	1.4 UJ	7.9 J	8.8 J	NA
Beryllium	0.20 U	1.1	1.6	NA
Cadmium	0.40 U	0.44 U	0.49 B	NA
Calcium	80.1 B	91200	80600	NA
Chromium	0.80 U	4.0	3.5	NA
Cobalt	1.0 UJ	1.8 J	1.2 UJ	NA
Copper	4.0 U	22.2 U	70.7 U	NA
Iron	26.9	4470	4490	NA
Lead	0.40 J	3.6 J	5.8 J	NA
Magnesium	37.8 B	22400	21900	NA
Manganese	0.22 B	149	141	NA
Mercury	0.10 U	0.11 U	0.12 U	NA
Nickel	1.2 U	7.5 J	14.6 J	NA
Potassium	62.1 U	435 B	411 B	NA
Selenium	0.20 U	0.22 U	0.27 U	NA
Silver	1.0 UJ	1.4 UJ	1.7 UJ	NA
Sodium	101 UJ	111 UJ	117 UJ	NA
Thallium	0.60 U	0.66 U	0.70 U	NA
Vanadium	0.80 UJ	6.6 J	6.4 J	NA
Zinc	0.44 J	16.0 J	30.9 J	NA
Cyanide	0.50 U	0.55 U	0.58 U	0.50 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.
J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be imprecise.
mg/kg = milligrams per kilogram
NA = Not analyzed

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number

REGION I REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No.	12302	SAS No.		Sampling Date(s)	1/3/93
SDG. No.	EB03	Matrix	SOIL	Shipping Date(s)	—
No. of Samples	5			Date Rec'd by Lab	1/15/93

Traffic Report Nos: EB03, 1503, 2303, 15035

Trip Blank No.: —
Equipment Blank No.: ~~EB09~~
Field Dup Nos: —

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -Calibrations
- -Blanks
- -ICP Interference Check Results
- -Matrix Spike Recoveries
- -Laboratory Duplicates
- -Field Duplicates
- -Lab Control Sample Results
- -Furnace AA Results
- -ICP Serial Dilution Results
- -Detection Limit Results
- -Sample Quantitation

Overall Comments:

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Analyte not detected.

Reviewer: Melissa Solari Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets

II. HOLDING TIMES

Complete table for all samples and circle the analysis date for samples not within criteria.

SAMPLE ID	DATE SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
EB03	1/3/93	1/20/93 17	1/26/93 23	1/20/93 17		NO ACTION
1503	1/3/93	1/20/93 17	1/26/93 23	1/20/93 17		NO ACTION
2303	1/3/93	1/20/93 17	1/26/93 23	1/20/93 17		NO ACTION

METALS - 180 DAYS FROM SAMPLE COLLECTION
MERCURY - 28 DAYS FROM SAMPLE COLLECTION
CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

* NO ACTION WILL BE TAKEN DUE TO HOLDING TIMES FOR CN AS 17 DAYS THIS IS NOT CONSIDERED TO BE A GROSS EXCEEDENCE.

ACTION:

1. If holding times are exceeded all positive results are estimated (J) and non-detects are estimated (UJ).

2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable (R).

REGION I
Data Review worksheets

III A. INSTRUMENT CALIBRATION (Section 1) - all ok

1. Recovery Criteria

List the analytes which did not meet the percent recovery (%R) criteria for Initial or Continuing Calibration.

DATE	ICV/CCV#	ANALYTE	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If any analyte does not meet the %R criteria follow the actions stated below:

For Positive Results:

	Accept	Estimate (J)	Reject (R)
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%R
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%R

For Non-detected Results:

	Accept	Estimate (UJ)	Reject (R)
Metals	90-125%R	75-89%R	<75%R, >125%R
Mercury	80-135%R	65-79%R	<65%R, >135%R
Cyanide	85-130%R	70-84%R	<70%R, >130%R

REGION I
Data Review Worksheets

III B. INSTRUMENT CALIBRATION (Section 2)

2. Analytical Sequence

A. Did the laboratory use the proper number of standards for calibration as described in the SOW? Yes or No

B. Were calibrations performed at the beginning of each analysis? Yes or No

C. Were calibration standards analyzed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during analysis, whichever is more frequent? Yes or No

D. Were the correlation coefficients for the calibration curves for AA, Hg, and CN $\geq$ 0.995? Yes or No

E. Was a standard at 2xCRDL analyzed for all ICP analyses? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

_____

REGION I
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks MATRIX: SOIL

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS (mg/kg)
4/20/93	CCB#2		CU	15.8
	CCB#3		CU	12.1
	CCB#3		ZN	2.1
		PB#1	Ag	1.283
	CCB#2		SC	1.1

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? Yes or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION I
Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Levels for any analyte is equal to five times the highest concentration of that element's contamination in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL). Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

MATRIX: SOIL

ELEMENT	MAX. CONC./ UNITS (mg/kg)	AL/ UNITS (mg/kg)
Cu	15.8	79
Zn	2.1	10.5
Ag	1.283	6.42
Se	1.1	5.5

MATRIX: _____

ELEMENT	MAX. CONC./ UNITS	AL/ UNITS

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{Conc. in ug/L} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1L}{1000ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the action level gives a final result in mg/kg which can then be compared to sample results.

REGION I
Data Review Worksheets

V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2) - all OK

1. Recovery Criteria

List any elements in the ICS AB solution which did not meet the criteria for %R.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If an element does not meet the %R criteria , follow the actions stated below:

	PERCENT RECOVERY		
	<50%	50-79%	>120%
Positive Sample Results	R	J	J
Non-detected Sample Results	R	UJ	A

2. Frequency Requirements

Were Interference QC samples run at the beginning and end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent? Yes or No

If no,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

REGION I
Data Review Worksheets

VI. MATRIX SPIKE

TR # 15035 MATRIX: SOIL

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spikes sample result
SR - sample result

Analyte	SSR	SR	S	%R	Action
ANTIMONY	65.4811	~~104.84~~ 6.3736	109.89	59.6	UJ, J
ARSENIC	5.7143	0.6484	8.79	57.6	UJ, J
SODIUM	0.6593U	0.6593U	10.99	0.0	UJ, J

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no action is taken.

2. If any analyte does not meet the %R criteria follow the actions stated below:

	PERCENT RECOVERY		
	<30%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No

B. Was a post digestion spike analyzed for elements that did not meet required criteria for matrix spike recovery? Yes or No

A separate worksheet should be used for each matrix spike pair.

REGION I
Data Review Worksheets

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element. <35

MATRIX: SOIL

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # 1503	Duplicate# 1503D	RPD	Action
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25		22.1618	102.6554	129.0	J
Iron	100					
Lead	5		3.5505	8.5457	82.9	J
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40		7.4835	15.2079	68.1	J
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20		16.0121	53.1015	107.3	J
Cyanide	10		.0	0.5495U	107.3	

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >20% for waters and >35% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results for elements whose absolute difference is >CRDL, (2xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX: SOIL

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # 1503	Duplicate# 1503D	RPD	Action
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

* THE LAB PERFORMED A LAB DUPLICATE FOR 1503, BUT DID NOT ANALYZE SAMPLE FCR-SB-HW2715.0-03D (a. field dup). THIS SAMPLE IS LISTED ON THE C-O-C, BUT RESULTS ARE NOT REPORTED ON A FORM I.

REGION I
Data Review Worksheets

IX. LABORATORY CONTROL SAMPLE - ALL CRITERIA WAS MET

1. Aqueous LCS

List any LCS recoveries not within the 80-120% criteria and the samples affected.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

2. Solid LCS

List any analytes that were not within the control windows set by the EPA for the solid LCS sample. The 80-120% criteria is not used to evaluate solid LCS results.

ELEMENT	LCS CONC.	CONTROL WINDOWS	ACTION	SAMPLES AFFECTED

ACTIONS:

AQUEOUS LCS	Percent Recovery <50%	51-79%	>120%
Positive Results	R	J	J
Non-detected Results	R	UJ	A

SOLID LCS	<EPA Control Windows	>EPA Control Windows
Positive Results	J	J
Non-detected Results	UJ	A

3. Frequency Criteria

A. Was an LCS analyzed for every matrix, every digestion batch, and every 20 samples? Yes or No

REGION I
Data Review Worksheets

X A. FURNACE ATOMIC ABSORPTION ANALYSIS

1. Duplicate Precision

---X--- Duplicate injections and one-point analytical spikes were performed for all samples: duplicate injections agreed within ± 20%.

-------- Duplicate injections and/or spikes were not performed for the following samples/elements: _____

_____

-------- Duplicate injections did not agree within ± 20% for samples/elements: _____

_____

2. Post Digestion Spike Recoveries

---X--- Spike recoveries met the 85-115% recovery criteria for all samples.

-------- Spike recoveries did not meet the 85-115% criteria but did not require MSA for the following samples/elements:

_____

_____

-------- MSA was used to quantitate analytical results when contractually required.

X Correlation coefficients ≥0.995, accept results.

_____ Correlation coefficients <0.995 for sample numbers/elements: _____

-------- Method of Standard Addition (MSA) was not performed as required for samples/elements: _____

ACTIONS:

1. Estimate (J) positive results if duplicate injections are outside ± 20 % RSD or CV.

2. If the sample absorbance is <50% of post digestion spike absorbance the following actions should be applied:

	PERCENT RECOVERY		
	<10%	11%-84%	>115%
Positive Sample Results	J or R	J	J
Non-detected Results	R	UJ	A

3. Estimate (J) sample results if MSA was required and not performed.

4. Estimate (J) sample results if correlation coefficient was <0.995.

REGION I
Data Review Worksheets

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

_____ Serial Dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

_____ Serial Dilutions were not performed for the following: _____

X Serial Dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 50x the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

MATRIX: WATER

ELEMENT	IDL	50xIDL	SAMPLE RESULT	SERIAL DILUTION	%D	ACTION
Aluminum						
Barium	7.0	350	36.07B	45.07B	25	J, UJ
Beryllium	1.0	50	5.06	5U	100	NO ACTION
Cadmium						
Calcium						
Chromium						
Cobalt	5.0	250	8.06B	25.0U	100	UJ, J
Copper	5.0	250	100.84	64.73	35.8	NO ACTION
Iron						
Lead						
Magnesium						
Manganese						
Nickel	6.0	300	34.05	30.0	100	NO ACTION
Potassium						
Silver	5.0	250	6.27	32.49	422	UJ, J
Sodium						
Vanadium	4.0	200	29.88	38.68	29.5	UJ, J
Zinc						

Actions apply to all samples of the same matrix.

ACTIONS:

1. Estimate (J) positive results if %D >15.

XII. DETECTION LIMIT RESULTS

1. Instrument Detection Limits

_____ Instrument Detection Limit results were present and found to be less than the Contract Required Detection Limits.

X IDLs were not included in the data package on Form XI.

_____ IDLs were present, but the criteria was not met for the following elements:_____

2. Reporting Requirements

_____ Were sample results on Form I reported down to the IDL not the CRDL for all analytes? (Yes) or No

_____ Were sample results that were analyzed by ICP for Se, Tl, As, or Pb at least 5x IDL. (Yes) or No

_____ Were sample weights, volumes, and dilutions taken into account when reporting detection limits on Form I. (Yes) or No

If No,

The reported results may be inaccurate. Make the necessary changes on the data summary tables and request that the laboratory resubmit the corrected data.

REGION I
Data Review Worksheets

XIII. SAMPLE QUANTITATION

X Sample results fall within the linear range for ICP and within the calibrated range for all other parameters.

_____ Sample results were beyond the linear range/ calibration range of the instrument for the following samples/elements:

In the space below, please show a minimum of one sample calculation per method:

Aluminum 2100 mg/kg on Form I

ICP $(4033.420\ \frac{ug}{L})(\frac{200\ ml}{g})(\frac{1}{1000\ ml})(\frac{1000\ gm}{kg})(\frac{1\ mg}{1000\ ug})(\frac{1}{.861}) = 2098 \approx 2100\ mg/kg$

As 0.85 B mg/kg on Form I

FURNACE $(3.63\ ug/L)(\frac{200\ ml}{g})(\frac{1}{1000\ ml})(\frac{1000\ gm}{kg})(\frac{1\ mg}{1000\ ug})(\frac{1}{.861}) = 0.84 \approx 0.85\ mg/kg$

MERCURY $(0.037\ ug/L)(\frac{200\ ml}{g})(\frac{1}{1000\ ml})(\frac{1000\ gm}{kg})(\frac{1\ mg}{1000\ ug})(\frac{1}{.861}) = 0.01$ ≈0.12U

CYANIDE $(0.976\ ug/L)(\frac{200\ ml}{g})(\frac{1}{1000\ ml})(\frac{1000\ gm}{kg})(\frac{1\ mg}{1000\ ug})(\frac{1}{.861}) = 0.23U$

For soil samples, the following equation may be necessary to convert raw data values (usually reported in ug/L) to actual sample concentrations (mg/kg):

The lab is required to use 1 gram sample (wet weight) to 200 ml.

Wet weight concentration =

digest conc. in $\frac{ug}{L} \times \frac{200ml}{1\ gm} \times \frac{1L}{1000\ ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \frac{mg}{kg}$

In addition the sample results are converted to dry weight using the percent solids calculations:

$\frac{\text{Wet weight conc.}}{\%\text{solids}} \times 100$ = final concentration, dry weight (mg/kg)

HMM Associates, Inc.
A Summit Company

6908/HAZ/104991

April 16, 1993

Mr. James H. Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Inorganic Data Validation Report
Southwest Laboratory of Oklahoma
Metals: 6 low concentration samples
Cyanide: 6 low concentration samples

Dear Mr. Keith:

Data validation was performed on the inorganic analytical data from 6 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, February 1989:

- data completeness
* - holding times
* - calibration verification
- field and laboratory blank results
* - ICP interference check sample results
- matrix spike percent recovery results
- laboratory and field duplicate results
* - laboratory control sample results
- ICP serial dilution analysis

196 Baker Avenue Concord, MA 01742 508/371-1000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-4642

* - sample results

* All criteria was met for this parameter.

Data Completeness

The data package received was missing a chain of custody. All laboratory report forms were complete and legible.

Holding Times

Holding times were evaluated based on the date received by the laboratory because a chain of custody was not provided. All holding times were met for all analytes.

Calibration Verification

All calibration results were reviewed and found to be acceptable.

Field and Laboratory Blanks

The method blanks were prepared and analyzed at the required frequency. The initial and continuing calibration blanks were also reported. There was one field blank, FT02EB, included in the data package.

The initial calibration blank (ICB) had reported concentrations of 7.8 ug/L for copper, 853.7 ug/L for sodium, and 1.1 ug/L for lead. The action level for these analytes is five times the reported concentration. Results for copper, sodium, and lead were all above the action level and were not qualified.

The following analytes were detected in the field blank:

Iron	24.1 ug/L
Manganese	1.4 ug/L
Mercury	0.53 ug/L

Sample results less than five times the reported result for the above analytes will be qualified U and treated as non-detects.

ICP Interference Check Sample Results

The reported results for the ICP interference check sample A were acceptable.

Matrix Spike Recovery Results

The review of the matrix spike results revealed deficiencies summarized in the following table.

The actions apply to all samples of the same matrix.

Sample No.	Matrix	Analyte	Percent Recovery
FW2202	Water	Aluminum	31.9%
FW2202	Water	Antimony	26.4%
FW2202	Water	Iron	303.7%
FW2202	Water	Lead	68.4%
FW2202	Water	Selenium	69.0%
FW2202	Water	Thallium	47.3%

The positive results for the above analytes have been estimated (J).

The non detect results for aluminum, antimony, lead, selenium, and thallium have been estimated (UJ).

The non detect results for iron are accepted as reported by the laboratory.

Laboratory and Field Duplicates

Aluminum and iron did not meet required criteria for laboratory duplicates, however, results for these analytes have already been qualified due to poor matrix spike recoveries.

Field duplicates were not collected.

Laboratory Control Sample Results

The laboratory control sample results were reviewed and found to be acceptable.

ICP Serial Dilution Analysis

The following compounds did not meet the required criteria for serial dilution: aluminum, beryllium, manganese, sodium, and zinc. Positive results for these compounds will be estimated (J) and non detects will be estimated (UJ).

Sample Results

All sample results were reported accurately by the laboratory.

SUMMARY OF INORGANIC ANALYSES - WATER

UNVALIDATED

EPA Sample No.	FT02EB	FT0202	FT0302	FW0202	FW1202	FW2202
Lab Sample No.	1049906	1049905	1049904	1049901	1049903	1049902
Matrix	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low
Date Collected	7/29/92	7/29/92	7/29/92	7/29/92	7/29/92	7/29/92
Date Analyzed	8/10/92	8/10/92	8/10/92	8/10/92	8/10/92	8/10/92
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte						
Aluminum	43.0 U	14200	16300	196 B	8350	7590
Antimony	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U
Arsenic	1.0 U	8.2 B	11.6	1.7 B	7.0 B	2.8 B
Barium	8.0 U	815	409	93.6 B	296	216
Beryllium	1.0 U	6.7	6.5	1.2 B	5.1	5.0 B
Cadmium	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Calcium	154 U	523000	480000	101000	401000	387000
Chromium	6.0 U	24.4	33.9	6.0 U	12.7	18.2
Cobalt	5.0 U	20.7 B	42.8 B	5.0 U	20.8 B	19.7 B
Copper	9.0 U	87.1	72.4	9.0 U	53.3	94.5
Iron	24.1 B	37300	43900	251	34200	17900
Lead	1.0 U	51.0	50.4	1.0 U	58.3	33.3
Magnesium	138 U	180000	151000	27700	114000	128000
Manganese	1.4 B	2250	3860	25.1	2120	2100
Mercury	0.53	0.2 U	0.53	0.2 U	0.26	0.39
Nickel	7.0 U	135	81.3	7.0 U	52.0	60.6
Potassium	271 U	4800 B	4310 B	3440 B	3740 B	3660 B
Selenium	2.0 U	2.0 U	2.0 U	2.0 U	2.9 B	2.0 U
Silver	8.0 U	8.0 U	8.0 U	8.0 U	8.0 U	23.3
Sodium	822 U	19800	7280	6560	9130	8820
Thallium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	5.0 U	37.2 B	37.9 B	5.0 U	26.7 B	28.2 B
Zinc	4.0 U	197	171	81.4	165	109
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.
U = The analyte was analyzed for, but not detected.

Data tables have been provide that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

SUMMARY OF INORGANIC ANALYSES - WATER

EPA Sample No.	FT02EB	FT0202	FT0302	FW0202	FW1202	FW2202
Lab Sample No.	1049906	1049905	1049904	1049901	1049903	1049902
Matrix	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low
Date Collected *	7/29/92	7/29/92	7/29/92	7/29/92	7/29/92	7/29/92
Date Analyzed	8/10/92	8/10/92	8/10/92	8/10/92	8/10/92	8/10/92
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte						
Aluminum	43.0 UJ	14200 J	16300 J	196 J	8350 J	7590 J
Antimony	39.0 UJ	39.0 UJ	39.0 UJ	39.0 UJ	39.0 UJ	39.0 UJ
Arsenic	1.0 U	8.2 B	11.6	1.7 B	7.0 B	2.8 B
Barium	8.0 U	815	409	93.6 B	296	216
Beryllium	1.0 U	6.7 J	6.5 J	1.2 J	5.1 J	5.0 J
Cadmium	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Calcium	154 U	523000	480000	101000	401000	387000
Chromium	6.0 U	24.4	33.9	6.0 U	12.7	18.2
Cobalt	5.0 U	20.7 B	42.8 B	5.0 U	20.8 B	19.7 B
Copper	9.0 U	87.1	72.4	9.0 U	53.3	94.5
Iron	24.1 B	37300 J	43900 J	251 J	34200 J	17900 J
Lead	1.0 U	51.0 J	50.4 J	1.0 UJ	58.3 J	33.3 J
Magnesium	138 U	180000	151000	27700	114000	128000
Manganese	1.4 B	2250 J	3860 J	25.1 J	2120 J	2100 J
Mercury	0.53	0.2 U	0.53 U	0.2 U	0.26 U	0.39 U
Nickel	7.0 U	135	81.3	7.0 U	52.0	60.6
Potassium	271 U	4800 B	4310 B	3440 B	3740 B	3660 B
Selenium	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.9 J	2.0 U
Silver	8.0 U	8.0 U	8.0 U	8.0 U	8.0 U	23.3
Sodium	822 U	19800 J	7280 J	6560 J	9130 J	8820 J
Thallium	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Vanadium	5.0 U	37.2 B	37.9 B	5.0 U	26.7 B	28.2 B
Zinc	4.0 UJ	197 J	171 J	81.4 J	165 J	109 J
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

* The chain of custody was not provided, therefore samples were evaluated using the date of sample receipt.

B = The reported value is less than the CRDL, but greater than or equal to the IDL.

J = The associated value is an estimated quantity.

U = The analyte was analyzed for, but not detected.

UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be imprecise.

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTISRF1
Reference Number

REGION I REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No.	10499	SAS No.		Sampling Date(s)	7/29/92 *
SDG. No.	FT0202	Matrix	WATER	Shipping Date(s)	
No. of Samples	6			Date Rec'd by Lab	7/29/92

Traffic Report Nos: FT0202, FT0302, FW0202, FW1202, FW2202.

Trip Blank No.: -
Equipment Blank No.: FT02EB
Field Dup Nos: -

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -Calibrations
- -Blanks
- -ICP Interference Check Results
- -Matrix Spike Recoveries
- -Laboratory Duplicates
- -Field Duplicates
- -Lab Control Sample Results
- -Furnace AA Results
- -ICP Serial Dilution Results
- -Detection Limit Results
- -Sample Quantitation

Overall Comments:

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Analyte not detected.

Reviewer: Melissa Solan Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D
CHAIN OF CUSTODY		

REGION I
Data Review Worksheets

ALL CRITERIA WAS MET

II. HOLDING TIMES

Complete table for all samples and circle the analysis date for samples not within criteria.

SAMPLE ID	DATE* SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
FT02EB	7/29/93	8/3/92 5	7/31/92 2	8/10/92 12		
FT0202	7/29/93	8/3/92 5	7/31/92 2	8/10/92 12		
FT0302	7/29/93	8/3/92 5	7/31/92 2	8/10/92 12		
FW0202	7/29/93	8/3/92 5	7/31/92 2	8/10/92 12		
FW1202	7/29/93	8/3/92 5	7/31/92 2	8/10/92 12		
FW2202	7/29/93	8/3/92 5	7/31/92 2	8/10/92 12		

METALS - 180 DAYS FROM SAMPLE COLLECTION
MERCURY - 28 DAYS FROM SAMPLE COLLECTION
CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

* COC IS MISSING. HOLDING TIMES ARE EVALUATED BASED ON DATE RECEIVED BY LAB.

ACTION:

1. If holding times are exceeded all positive results are estimated (J) and non-detects are estimated (UJ).

2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable (R).

REGION I
Data Review worksheets

III A. INSTRUMENT CALIBRATION (Section 1)

1. Recovery Criteria - all ok

List the analytes which did not meet the percent recovery (%R) criteria for Initial or Continuing Calibration.

DATE	ICV/CCV#	ANALYTE	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If any analyte does not meet the %R criteria follow the actions stated below:

For Positive Results:

	Accept	Estimate (J)	Reject (R)
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%R
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%R

For Non-detected Results:

	Accept	Estimate (UJ)	Reject (R)
Metals	90-125%R	75-89%R	<75%R, >125%R
Mercury	80-135%R	65-79%R	<65%R, >135%R
Cyanide	85-130%R	70-84%R	<70%R, >130%R

REGION I
Data Review Worksheets

III B. INSTRUMENT CALIBRATION (Section 2)

2. Analytical Sequence

A. Did the laboratory use the proper number of standards for calibration as described in the SOW? Yes or No

B. Were calibrations performed at the beginning of each analysis? Yes or No

C. Were calibration standards analyzed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during analysis, whichever is more frequent? Yes or No

D. Were the correlation coefficients for the calibration curves for AA, Hg, and CN $\geq$ 0.995? Yes or No

E. Was a standard at 2xCRDL analyzed for all ICP analyses? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

_____

REGION 1
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

MATRIX: WATER

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS ug/L
	CCB#1		Cu	7.8
	CCB#2		Cu	7.0
	CCB#3		Na	853.7
	CCB#6		Pb	1.1

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS (ug/L)
	FT02EB	Fe	24.1
	FT02EB	Mn	1.4
	FT02EB	Hg-	0.53

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? (Yes) or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? (Yes) or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION I
Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Levels for any analyte is equal to five times the highest concentration of that element's contamination in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL). Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

MATRIX: WATER

ELEMENT	MAX. CONC./ UNITS	AL/ UNITS
Cu	7.8ug/L	39ug/L
Na	853.7ug/L	4268.5ug/L
Pb	1.1ug/L	5.5ug/L
Fe	24.1ug/L	120.5ug/L
Mn	1.4 ug/L	7ug/L
Hg	0.53ug/L	2.65ug/L

MATRIX: _____

ELEMENT	MAX. CONC./ UNITS	AL/ UNITS

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{Conc. in ug/L} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1L}{1000ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the action level gives a final result in mg/kg which can then be compared to sample results.

REGION I
Data Review Worksheets

V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2)

1. Recovery Criteria - all ok

List any elements in the ICS AB solution which did not meet the criteria for %R.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If an element does not meet the %R criteria , follow the actions stated below:

	PERCENT RECOVERY		
	<50%	50-79%	>120%
Positive Sample Results	R	J	J
Non-detected Sample Results	R	UJ	A

2. Frequency Requirements

Were Interference QC samples run at the beginning and end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent? Yes or No

If no,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

REGION I
Data Review Worksheets

VI. MATRIX SPIKE

TR # FW22023 MATRIX: WATER

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spikes sample result
SR - sample result

Analyte	SSR	SR	S	%R	Action
Aluminum	8227.863	7588.891	2000.0	31.9	J, UJ
Antimony	181.837	39.0	500.0	26.9	J, UJ
Iron	14885.7180	17923.043	1000.0	-302.7	J, A
Lead	46.9880	33.3	20.0	68.9	J, UJ
Selenium	6.9	2.0	10.0	69.0	J, UJ
Thallium	23.648	2.0	50.0	47.3	J, UJ

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no action is taken.

2. If any analyte does not meet the %R criteria follow the actions stated below:

	PERCENT RECOVERY		
	<30%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No

B. Was a post digestion spike analyzed for elementa that did not meet required criteria for matrix spike recovery? Yes or No

A separate worksheet should be used for each matrix spike pair.

REGION I
Data Review Worksheets

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # FW0202	Duplicate# FW0202D	RPD	Action
Aluminum	200		196.4340	245.053	22.0	J
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100		251.961	361.624	35.9	J
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >20% for waters and >35% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results for elements whose absolute difference is >CRDL, (2xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES – not applicable

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX:_____

Element	CRDL water ug/L	CRDL soil mg/kg	Sample #	Duplicate#	RPD	Action
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

IX. LABORATORY CONTROL SAMPLE – all o/c

1. Aqueous LCS

List any LCS recoveries not within the 80-120% criteria and the samples affected.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

2. Solid LCS

List any analytes that were not within the control windows set by the EPA for the solid LCS sample. The 80-120% criteria is not used to evaluate solid LCS results.

ELEMENT	LCS CONC.	CONTROL WINDOWS	ACTION	SAMPLES AFFECTED

ACTIONS:

AQUEOUS LCS	Percent Recovery <50%	51-79%	>120%
Positive Results	R	J	J
Non-detected Results	R	UJ	A

SOLID LCS	<EPA Control Windows	>EPA Control Windows
Positive Results	J	J
Non-detected Results	UJ	A

3. Frequency Criteria

A. Was an LCS analyzed for every matrix, every digestion batch, and every 20 samples? Yes or No

REGION I
Data Review Worksheets

X A. FURNACE ATOMIC ABSORPTION ANALYSIS

1. Duplicate Precision

--X-- Duplicate injections and one-point analytical spikes were performed for all samples: duplicate injections agreed within ± 20%.

-------- Duplicate injections and/or spikes were not performed for the following samples/elements: _____

_____

-------- Duplicate injections did not agree within ± 20% for samples/elements: _____

_____

2. Post Digestion Spike Recoveries

--X-- Spike recoveries met the 85-115% recovery criteria for all samples.

-------- Spike recoveries did not meet the 85-115% criteria but did not require MSA for the following samples/elements:

_____

_____

-------- MSA was used to quantitate analytical results when contractually required.

--X-- Correlation coefficients ≥0.995, accept results.

_____ Correlation coefficients <0.995 for sample numbers/elements: _____

-------- Method of Standard Addition (MSA) was not performed as required for samples/elements: _____

ACTIONS:

1. Estimate (J) positive results if duplicate injections are outside ± 20 % RSD or CV.

2. If the sample absorbance is <50% of post digestion spike absorbance the following actions should be applied:

	PERCENT RECOVERY		
	<10%	11%-84%	>115%
Positive Sample Results	J or R	J	J
Non-detected Results	R	UJ	A

3. Estimate (J) sample results if MSA was required and not performed.

4. Estimate (J) sample results if correlation coefficient was <0.995.

REGION I
Data Review Worksheets

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

_____ Serial Dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

_____ Serial Dilutions were not performed for the following:

_____

X Serial Dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 50x the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

MATRIX: WATER

ELEMENT	IDL	50xIDL	SAMPLE RESULT	SERIAL DILUTION	%D	ACTION
Aluminum	43.0	2150	196.43B	215.0U	100	J,UJ
Barium						
Beryllium	1.0	50	1.23B	5.0U	100	J,UJ
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese	15	750	25.12	37.27B	48.4	J,UJ
Nickel						
Potassium						
Silver						
Sodium	589.0	29450	6580.19	10028.37	52.4	J,UJ
Vanadium						
Zinc	213.86	10693	81.36	145.83	79.3	J,UJ

Actions apply to all samples of the same matrix.

ACTIONS:

1. Estimate (J) positive results if %D >15.

REGION I
Data Review Worksheets

XII. DETECTION LIMIT RESULTS

1. Instrument Detection Limits

✓ Instrument Detection Limit results were present and found to be less than the Contract Required Detection Limits.

_____ IDLs were not included in the data package on Form XI.

_____ IDLs were present, but the criteria was not met for the following elements:_____

2. Reporting Requirements

_____ Were sample results on Form I reported down to the IDL not the CRDL for all analytes? Yes or No

_____ Were sample results that were analyzed by ICP for Se, Tl, As, or Pb at least 5x IDL. Yes or No

_____ Were sample weights, volumes, and dilutions taken into account when reporting detection limits on Form I. Yes or No

If No,

The reported results may be inaccurate. Make the necessary changes on the data summary tables and request that the laboratory resubmit the corrected data.

REGION I
Data Review Worksheets

XIII. SAMPLE QUANTITATION

_____ Sample results fall within the linear range for ICP and within the calibrated range for all other parameters.

_____ Sample results were beyond the linear range/ calibration range of the instrument for the following samples/elements:

_____

In the space below, please show a minimum of one sample calculation per method: SAMPLE FT0202 (1049905)

ICP AL on FORM I 14200 ug/L
14217 on Quant. Rep.

FURNACE As on FORM I 8.2B ug/L
8.2 on Quant. Rep.

MERCURY 0.2U on FORM I
0.199 on Quant Rep.

CYANIDE 10.0U on FORM I
0.27 on Quant. Rep.

For soil samples, the following equation may be necessary to convert raw data values (usually reported in ug/L) to actual sample concentrations (mg/kg):

The lab is required to use 1 gram sample (wet weight) to 200 ml.

Wet weight concentration =

$$\text{digest conc. in } \frac{ug}{L} \times \frac{200ml}{1\ gm} \times \frac{1L}{1000\ ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \frac{mg}{kg}$$

In addition the sample results are converted to dry weight using the percent solids calculations:

$$\frac{\text{Wet weight conc.}}{\%\text{solids}} \times 100 = \text{final concentration, dry weight (mg/kg)}$$

HMM Associates, Inc.
A Summit Company

6908/HAZ/12653I

April 15, 1993

Mr. James H. Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Inorganic Data Validation Report
Southwest Laboratory of Oklahoma
Metals: 10 low concentration samples
Cyanide: 8 low concentration samples

Dear Mr. Keith:

Data validation was performed on the inorganic analytical data from 10 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, February 1989:

* - data completeness
* - holding times
* - calibration verification
- field and laboratory blank results
* - ICP interference check sample results
- matrix spike percent recovery results
- laboratory and field duplicate results
* - laboratory control sample results
- ICP serial dilution analysis
* - sample results

196 Baker Avenue Concord, MA 01742 508/371-4000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-4642

* All criteria was met for this parameter.

Data Completeness

The packages were complete and legible.

Holding Times

All holding times were met for all analytes.

Calibration Verification

All calibration results were reviewed and found to be acceptable.

Field and Laboratory Blanks

The method blanks were prepared and analyzed at the required frequency. The initial and continuing calibration blanks were also reported. There were no field blanks collected.

The initial calibration blank (ICB) had a reported concentration of 1.1 ug/L for selenium and 2.7 ug/L for zinc. Continuing calibration blanks (CCBs) has reported concentrations of 8.9 ug/L for iron, 3.2 ug/L for manganese, 755.2 ug/L for potassium, and 2.5 ug/L for zinc. The preparation blank had reported concentrations of 2.1 ug/L for manganese and 2.0 for silver. The action level for these analytes is five times the reported concentration. Concentrations for iron were below the action level for samples MW12D3 and MW22D3 and will be qualified U. All results for potassium were below the action level and will be qualified U. Selenium results were below the action level in samples MIT3D3, MIT303, MW1203, MW22D3, MW2203, MW2403, and PGP103 and will be qualified U. Zinc results were below the action level in samples MW12D3 and MW22D3 and will be qualified U. All sample results for iron and manganese were above the action level and are accepted as reported.

A field blank was not collected.

ICP Interference Check Sample Results

The reported results for the ICP interference check sample A were acceptable.

Matrix Spike Recovery Results

The review of the matrix spike results revealed deficiencies summarized in the following table.

The actions apply to all samples of the same matrix.

Sample No.	Matrix	Analyte	Percent Recovery
MIT303	Water	Aluminum	44%
MIT303	Water	Antimony	66%
MIT303	Water	Arsenic	58.6%
MIT303	Water	Iron	129.2%
MIT303	Water	Lead	71.0%
MIT303	Water	Mercury	163%
MIT303	Water	Selenium	68.1%

The positive results for the above analytes have been estimated (J).

The non detect results for aluminum, antimony, arsenic, lead, and selenium have been estimated (UJ).

The non detect results for iron and mercury are accepted as reported by the laboratory.

Laboratory and Field Duplicates

Cobalt and mercury did not meet required criteria for laboratory duplicates. Positive results for these analytes will be estimated (J).

Field duplicate results were not met for the following analytes: aluminum, arsenic, chromium, cobalt, copper, iron, lead, manganese, nickel, vanadium, and zinc. Positive results for these analytes will be estimated (J). Aluminum, arsenic, iron, and lead results have already been qualified due to poor matrix spike recoveries.

Laboratory Control Sample Results

The laboratory control sample results were reviewed and found to be acceptable.

ICP Serial Dilution Analysis

The following compounds did not meet the required criteria for serial dilution: chromium, cobalt, nickel, potassium, and sodium. Positive results for these compounds will be estimated (J) and non detects will be estimated (UJ).

Sample Results

All sample results were reported accurately by the laboratory.

Data tables have been provide that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

JAK

CASE No. 12653 JT-3 dupe

MW-12 dupe MW-22 dupe

SUMMARY OF INORGANIC ANALYSES - WATER

PGP VALIDATED

EPA Sample No.	MIT203	MIT3D3	MIT303	MW12D3	MW1203	MW22D3	MW2203	MW2403	PGP103	PGP203
Lab Sample No.	1265305	1265303	1265302	1265311	1265310	1265308	1265307	1265301	1265304	1265306
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Date Collected	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93
Date Analyzed	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte										
Aluminum	991 J	5480 J	3200 J	129 J	3510 J	74.4 J	5160 J	10600 J	694 J	2910 J
Antimony	16.0 UJ	16.8 UJ	16.0 UJ	16.0 UJ	16.0 UJ	16.0 J	16.0 UJ	16.0 UJ	16.0 UJ	16.0 UJ
Arsenic	2.4 J	7.0 J	3.9 J	2.0 UJ	3.1 J	2.0 UJ	2.0 UJ	3.8 J	2.0 UJ	4.6 J
Barium	258	218	201	79.6 B	159 B	66.5 B	165 B	266	49.9 B	147 B
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Calcium	123000	263000	226000	90200	193000	82200	275000	390000	148000	303000
Chromium	6.0 J	18.1 J	13.2 J	6.0 UJ	11.6 J	6.0 UJ	17.8 J	30.3 J	6.0 UJ	20.0 J
Cobalt	6.0 UJ	15.1 J	6.2 J	6.0 UJ	6.3 J	6.0 UJ	13.0 J	22.9 J	6.0 UJ	7.3 J
Copper	7.5 J	32.1 J	23.4 J	2.2 J	23.8 J	2.0 U	96.2 J	78.9 J	9.0 J	37.0 J
Iron	2590 J	15100 J	8230 J	34.3 U	12900 J	26.5 U	12600 J	20100 J	1170 J	11900 J
Lead	2.5 J	19.9 J	11.9 J	2.0 UJ	22.3 J	2.0 UJ	29.2 J	75.4 J	3.2 J	18.3 J
Magnesium	41000	90800	67000	27000	45000	25400	97600	125000	46800	81600
Manganese	382 J	1720 J	939 J	131 J	762 J	387 J	1560 J	2010 J	130 J	802 J
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	20 U	0.20 U
Nickel	19.4 J	35.7 J	24.8 J	15.0 UJ	39.4 J	15.0 UJ	45.3 J	58.6 J	82.2 J	693 J
Potassium	1680 U	2510 U	2370 U	1590 U	2490 U	1590 U	2530 U	3050 U	892 U	2820 U
Selenium	1.0 U	1.5 U	1.6 UJ	1.0 U	2.1 U	1.9 U	2.0 U	2.2 U	1.0 U	1.0 U
Silver	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	14.7	2.0 U	2.0 U	2.0 U
Sodium	18800 J	7490 J	7490 J	8350 J	8250 J	5470 J	5480 J	6160 J	15100 J	17900 J
Thallium	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Vanadium	6.0 U	17.4 J	10.4 J	6.0 U	9.6 J	6.0 U	26.0 J	34.6 J	6.0 U	14.4 J
Zinc	15.3 J	76.9 J	49.4 J	3.4 U	69.6 J	3.2 U	106 J	164 J	56.5 J	614 J
Cyanide	10.0 U	10.0 U	10.0 U	NA	10.0 U	NA	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.

J = The associated value is an estimated quantity.

U = The analyte was analyzed for, but not detected.

UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be imprecise.

NA = Not analyzed

EPA Sample No.	MIT203	MIT3D3	MIT303	MW12D3	MW1203	MW22D3	MW2203	MW2403	PGP103	PGP203
Lab Sample No.	1265305	1265303	1265302	1265311	1265310	1265308	1265307	1265301	1265304	1265306
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Date Collected	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93
Date Analyzed	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93	2/24/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte										
Aluminum	991	5480	3200	129 B	3510	74.4 B	5160	10600	694	2910
Antimony	16.0 U	16.8 U	16.0 U	16.0 U	16.0 U	16.0 B	16.0 U	16.0 U	16.0 U	16.0 U
Arsenic	2.4 B	7.0 B	3.9 B	2.0 U	3.1 B	2.0 U	2.0 U	3.8 B	2.0 U	4.6 B
Barium	258	218	201	79.6 B	159 B	66.5 B	165 B	266	49.9 B	147 B
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Calcium	123000	263000	226000	90200	193000	82200	275000	390000	148000	303000
Chromium	6.0 B	18.1	13.2	6.0 U	11.6	6.0 U	17.8	30.3	6.0 U	20.0
Cobalt	6.0 U	15.1 B	6.2 B	6.0 U	6.3 B	6.0 U	13.0 B	22.9 B	6.0 U	7.3 B
Copper	7.5 B	32.1	23.4 B	2.2 B	23.8 B	2.0 U	96.2	78.9	9.0 B	37.0
Iron	2590	15100	8230	34.3 B	12900	26.5 B	12600	20100	1170	11900
Lead	2.5 B	19.9	11.9	2.0 U	22.3	2.0 U	29.2	75.4	3.2	18.3
Magnesium	41000	90800	67000	27000	45000	25400	97600	125000	46800	81600
Manganese	382	1720	939	131	762	387	1560	2010	130	802
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	20 U	0.20 U
Nickel	19.4 B	35.7 B	24.8 B	15.0 U	39.4 B	15.0 U	45.3	58.6	82.2	693
Potassium	1680 B	2510 B	2370 B	1590 B	2490 B	1590 B	2530 B	3050 B	892 B	2820 B
Selenium	1.0 U	1.5 B	1.6 B	1.0 U	2.1 B	1.9 B	2.0 B	2.2 B	1.0 B	1.0 U
Silver	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	14.7	2.0 U	2.0 U	2.0 U
Sodium	18800	7490	7490	8350	8250	5470	5480	6160	15100	17900
Thallium	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Vanadium	6.0 U	17.4 B	10.4 B	6.0 U	9.6 B	6.0 U	26.0 B	34.6 B	6.0 U	14.4 B
Zinc	15.3 B	76.9	49.4	3.4 B	69.6	3.2 B	106	164	56.5	614
Cyanide	10.0 U	10.0 U	10.0 U	NA	10.0 U	NA	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.
U = The analyte was analyzed for, but not detected.
NA = Not analyzed

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number _____

REGION I REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. 12653 SAS No. - Sampling Date(s) 2/16/93
SDG. No. HIT203 Matrix WATER Shipping Date(s) -
No. of Samples 10 Date Rec'd by Lab 2/18/93

Traffic Report Nos: MW2403, HIT203, HIT303, HW1203, MW1203, MW2203, MW2203, MW2403, PGP103, PGP203
Trip Blank No.: -
Equipment Blank No.: -
Field Dup Nos: HIT303

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -Calibrations
- -Blanks
- -ICP Interference Check Results
- -Matrix Spike Recoveries
- -Laboratory Duplicates
- -Field Duplicates
- -Lab Control Sample Results
- -Furnace AA Results
- -ICP Serial Dilution Results
- -Detection Limit Results
- -Sample Quantitation

Overall Comments: _____

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Analyte not detected.

Reviewer: Melissa J Solari Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets

- ALL CRITERIA WAS MET

II. HOLDING TIMES Complete table for all samples and circle the analysis date for samples not within criteria.

SAMPLE ID	DATE SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
MIT203	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
MIT3D3	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
MIT303	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
MW12D3	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
MW1203	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
MW22D3	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
MW2203	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
MW2403	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
PGP103	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		
PGP203	2/16/93	2/23/93 7	2/24/93 8	2/24/93 8		

METALS - 180 DAYS FROM SAMPLE COLLECTION
MERCURY - 28 DAYS FROM SAMPLE COLLECTION
CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

ACTION:

1. If holding times are exceeded all positive results are estimated (J) and non-detects are estimated (UJ).

2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable (R).

REGION I
Data Review worksheets

III A. INSTRUMENT CALIBRATION (Section 1)

1. Recovery Criteria - all OK

List the analytes which did not meet the percent recovery (%R) criteria for Initial or Continuing Calibration.

DATE	ICV/CCV#	ANALYTE	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If any analyte does not meet the %R criteria follow the actions stated below:

For Positive Results:

	Accept	Estimate (J)	Reject (R)
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%R
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%R

For Non-detected Results:

	Accept	Estimate (UJ)	Reject (R)
Metals	90-125%R	75-89%R	<75%R, >125%R
Mercury	80-135%R	65-79%R	<65%R, >135%R
Cyanide	85-130%R	70-84%R	<70%R, >130%R

REGION I
Data Review Worksheets

III B. INSTRUMENT CALIBRATION (Section 2)

2. Analytical Sequence

A. Did the laboratory use the proper number of standards for calibration as described in the SOW? Yes or No

B. Were calibrations performed at the beginning of each analysis? Yes or No

C. Were calibration standards analyzed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during analysis, whichever is more frequent? Yes or No

D. Were the correlation coefficients for the calibration curves for AA, Hg, and CN $\geq$ 0.995? Yes or No

E. Was a standard at 2xCRDL analyzed for all ICP analyses? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

_____

REGION 1
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

MATRIX: WATER

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS
	ICB#1		Sc	1.1 ug/L
	ICB#1		Zn	2.7 ug/L
	CCB#1		Zn	2.5 ug/L
	CCB#2		Mn	2.8 ug/L
	CCB#3		Fe	8.9 ug/L

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? Yes or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION I
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks MATRIX: WATER

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS (ug/L)
	CCB#3		Mn	3.2
	CCB#3		K	755.2
	CCB#3		Zn	2.2
		PB#1	Mn	2.103
		PB#1	Ag	-2.021

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? Yes or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION I
Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Levels for any analyte is equal to five times the highest concentration of that element's contamination in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL). Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

MATRIX: WATER

ELEMENT	MAX. CONC./ UNITS (ug/L)	AL/ UNITS (ug/L)	ELEMENT	MAX. CONC./ UNITS	AL/ UNITS
Sc	1.1	5.5			
Zn	2.7	13.5			
Mn	3.2	16			
Fe	8.9	44.5			
K	755.2	3776			
Ag	2.021	10.11			

MATRIX: _____

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{Conc. in ug/L} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1\text{L}}{1000\text{ml}} \times \frac{1000\text{gm}}{1\text{kg}} \times \frac{1\text{mg}}{1000\text{ug}} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the action level gives a final result in mg/kg which can then be compared to sample results.

REGION I
Data Review Worksheets

V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2)

1. Recovery Criteria - ALL CRITERIA WAS MET

List any elements in the ICS AB solution which did not meet the criteria for %R.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If an element does not meet the %R criteria , follow the actions stated below:

	PERCENT RECOVERY		
	<50%	50-79%	>120%
Positive Sample Results	R	J	J
Non-detected Sample Results	R	UJ	A

2. Frequency Requirements

Were Interference QC samples run at the beginning and end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent? Yes or No

If no,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

REGION I
Data Review Worksheets

VI. MATRIX SPIKE

TR # H1T303S MATRIX: WATER

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spikes sample result
SR - sample result

Analyte	SSR	SR	S	%R	Action
Aluminum	4078.9690	3198.8240	2000	44	J, UJ
Antimony	330.2	16.0	500.0	66	J, UJ
Arsenic	27.39	3.93	40.0	58.6	J, UJ
Iron	6934.867	8226.497	1000.0	129.2	J, A
Lead	26.1	11.9	20.0	71.0	J, UJ
Mercury	1.63	0.2	1.0	163.0	J, A
Selenium	8.38	1.57	10.0	68.1	J, UJ

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no action is taken.

2. If any analyte does not meet the %R criteria follow the actions stated below:

	PERCENT RECOVERY		
	<30%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No

B. Was a post digestion spike analyzed for elements that did not meet required criteria for matrix spike recovery? Yes or No

* The spike was analyzed for Antimony

A separate worksheet should be used for each matrix spike pair.

REGION I
Data Review Worksheets

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # MW2403	Duplicate# MW2403D	RPD	Action
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50		22.926	28.754	22.6	J
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2		0.2U	0.2	200	J
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
~~Cyanide~~	10					

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >20% for waters and >35% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results for elements whose absolute difference is >CRDL, (2xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # HIT303	Duplicate# HIT303	RPD	Action
Aluminum	200		3200	5480	53%	J
Antimony	60					
Arsenic	10		3.9B	7.0B	57%	J
Barium	200		201	218	8%	No action
Beryllium	5					
Cadmium	5					
Calcium	5000		226000	263000	15%	No action
Chromium	10		13.2	18.1	31%	J
Cobalt	50		6.2B	15.1B	84%	J
Copper	25		23.4	32.1	31%	J
Iron	100		8230	15100	59%	J
Lead	5		11.9	19.9	50%	J
Magnesium	5000		67000	90000	30%	No action
Manganese	15		939	1720	59%	J
Mercury	0.2					
Nickel	40		24.8	35.7 B	36%	J
Potassium	5000		2370	2510 B	5%	No action
Selenium	5		1.6	1.5 B	6%	No action
Silver	10					
Sodium	5000		7490	7490	0%	No action
Thallium	10					
Vanadium	50		10.4B	17.4B	50%	J
Zinc	20		49.4	76.9	43%	J
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

IX. LABORATORY CONTROL SAMPLE

1. Aqueous LCS - all ok

List any LCS recoveries not within the 80-120% criteria and the samples affected.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

2. Solid LCS

List any analytes that were not within the control windows set by the EPA for the solid LCS sample. The 80-120% criteria is not used to evaluate solid LCS results.

ELEMENT	LCS CONC.	CONTROL WINDOWS	ACTION	SAMPLES AFFECTED

ACTIONS:

AQUEOUS LCS	Percent Recovery <50%	51-79%	>120%
Positive Results	R	J	J
Non-detected Results	R	UJ	A

SOLID LCS	<EPA Control Windows	>EPA Control Windows
Positive Results	J	J
Non-detected Results	UJ	A

3. Frequency Criteria

A. Was an LCS analyzed for every matrix, every digestion batch, and every 20 samples? Yes or No

REGION I
Data Review Worksheets

X A. FURNACE ATOMIC ABSORPTION ANALYSIS

1. Duplicate Precision

---X--- Duplicate injections and one-point analytical spikes were performed for all samples: duplicate injections agreed within ± 20%.

-------- Duplicate injections and/or spikes were not performed for the following samples/elements:_____

_____

-------- Duplicate injections did not agree within ± 20% for samples/elements:_____

_____

2. Post Digestion Spike Recoveries

---X--- Spike recoveries met the 85-115% recovery criteria for all samples.

-------- Spike recoveries did not meet the 85-115% criteria but did not require MSA for the following samples/elements:

_____

_____

-------- MSA was used to quantitate analytical results when contractually required.

_____X_____ Correlation coefficients ≥0.995, accept results.

_____ Correlation coefficients <0.995 for sample numbers/elements:_____

-------- Method of Standard Addition (MSA) was not performed as required for samples/elements:_____

ACTIONS:

1. Estimate (J) positive results if duplicate injections are outside ± 20 % RSD or CV.

2. If the sample absorbance is <50% of post digestion spike absorbance the following actions should be applied:

	PERCENT RECOVERY		
	<10%	11%-84%	>115%
Positive Sample Results	J or R	J	J
Non-detected Results	R	UJ	A

3. Estimate (J) sample results if MSA was required and not performed.

4. Estimate (J) sample results if correlation coefficient was <0.995.

REGION I
Data Review Worksheets

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

_____ Serial Dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

_____ Serial Dilutions were not performed for the following:

_____

X Serial Dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 50x the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

MATRIX: WATER

ELEMENT	IDL	50xIDL	SAMPLE RESULT	SERIAL DILUTION	%D	ACTION
Aluminum						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium	6.0	300	30.32	37.4	23.4	J, UJ
Cobalt	6.0	300	22.938	30.0U	100	J, UJ
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Nickel	15.0	750	58.55	75.0	100	J, UJ
Potassium	743.0	37150	3051.85	3715.0	100	J, UJ
Silver						
Sodium	252.0	12600	6158.08	8535.67	38.6	J, UJ
Vanadium						
Zinc						

Actions apply to all samples of the same matrix.

ACTIONS:

1. Estimate (J) positive results if %D >15.

REGION I
Data Review Worksheets

XII. DETECTION LIMIT RESULTS

1. Instrument Detection Limits

X Instrument Detection Limit results were present and found to be less than the Contract Required Detection Limits.

_____ IDLs were not included in the data package on Form XI.

_____ IDLs were present, but the criteria was not met for the following elements:_____

2. Reporting Requirements

_____ Were sample results on Form I reported down to the IDL not the CRDL for all analytes? Yes or No

_____ Were sample results that were analyzed by ICP for Se, Tl, As, or Pb at least 5x IDL. Yes or No

_____ Were sample weights, volumes, and dilutions taken into account when reporting detection limits on Form I. Yes or No

If No,

The reported results may be inaccurate. Make the necessary changes on the data summary tables and request that the laboratory resubmit the corrected data.

REGION I
Data Review Worksheets

XIII. SAMPLE QUANTITATION

X Sample results fall within the linear range for ICP and within the calibrated range for all other parameters.

_____ Sample results were beyond the linear range/ calibration range of the instrument for the following samples/elements:

In the space below, please show a minimum of one sample calculation per method:

Sample PGP103 Aluminum 694 on FORM I

ICP

693.86 on Quant Rep.

FURNACE As 2.0U on FORM I
0.41 on Quant Rep.

MERCURY 0.2U on FORM I
L2 on Quant. Rep.

CYANIDE 10.0U on FORM I
-0.131 on Quant Rep.

For soil samples, the following equation may be necessary to convert raw data values (usually reported in ug/L) to actual sample concentrations (mg/kg):

The lab is required to use 1 gram sample (wet weight) to 200 ml.

Wet weight concentration =

$$\text{digest conc. in } \frac{ug}{L} \times \frac{200ml}{1\ gm} \times \frac{1L}{1000\ ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \frac{mg}{kg}$$

In addition the sample results are converted to dry weight using the percent solids calculations:

$$\frac{\text{Wet weight conc.}}{\%\text{solids}} \times 100 = \text{final concentration, dry weight (mg/kg)}$$

HMM Associates, Inc.
A Summit Company

6908/HAZ/12787I

April 16, 1993

Mr. James H. Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Inorganic Data Validation Report
Southwest Laboratory of Oklahoma
Metals: 13 low concentration samples
Cyanide: 14 low concentration samples

Dear Mr. Keith:

Data validation was performed on the inorganic analytical data from 14 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, February 1989:

* - data completeness
* - holding times
* - calibration verification
  - field and laboratory blank results
* - ICP interference check sample results
  - matrix spike percent recovery results
  - laboratory and field duplicate results
* - laboratory control sample results
  - ICP serial dilution analysis
* - sample results

196 Baker Avenue Concord, MA 01742 508/371-4000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-4642

* All criteria was met for this parameter.

Data Completeness

The packages were complete and legible.

Holding Times

All holding times were met for all analytes.

Calibration Verification

All calibration results were reviewed and found to be acceptable.

Field and Laboratory Blanks

The method blanks were prepared and analyzed at the required frequency. The initial and continuing calibration blanks were also reported. There were three field blanks, MP02EB, MP03EB, and MP13EB, included in the data package.

The initial calibration blank (ICB) had a reported concentrations of 4.7 ug/L for chromium, 1.2 ug/L for selenium, and 4.1 ug/L for vanadium. The preparation blank had reported concentrations of 4.9 ug/L for chromium, 40.8 ug/L for iron, and 3.2 ug/L for zinc. The action level for these analytes is five times the reported concentration. Samples with reported concentrations less than five times the blank result will be treated as non-detects and qualified U.

The following analytes were detected in field blanks:

Aluminum	270 ug/L
Calcium	1370 ug/L
Copper	5 ug/L
ron	664 ug/L
Magnesium	183 ug/L
Manganese	7.8 ug/L
Sodium	1360 ug/L
Zinc	19 ug/L

Sample results less than five times the reported result for the above analytes will be qualified U and treated as non-detects.

ICP Interference Check Sample Results

The reported results for the ICP interference check sample A were acceptable.

Matrix Spike Recovery Results

The review of the matrix spike results revealed deficiencies summarized in the following table.

The actions apply to all samples of the same matrix.

Sample No.	Matrix	Analyte	Percent Recovery
MP7190	Water	Aluminum	63.8%
MW23D3	Water	Arsenic	31.4%
MW23D3	Water	Iron	16.6%
MW23D3	Water	Selenium	62.4%
MP7190	Water	Cyanide	74.8%

The positive results for arsenic, iron, and selenium have been estimated (J).

The non detect results for arsenic and selenium have been estimated (UJ).

Laboratory and Field Duplicates

Aluminum, copper, iron, potassium, and zinc did not meet required criteria for laboratory duplicates, however, iron has already been qualified due to poor matrix spike recoveries.

Positive sample results for aluminum, copper, potassium, and zinc will be estimated (J).

Field duplicate results were not met for chromium. Positive results will be estimated (J) for chromium.

Laboratory Control Sample Results

The laboratory control sample results were reviewed and found to be acceptable.

ICP Serial Dilution Analysis

The following compounds did not meet the required criteria for serial dilution: aluminum, chromium, nickel, potassium, sodium, vanadium, and zinc. Positive results for these compounds will be estimated (J) and non detects will be estimated (UJ).

Sample Results

All sample results were reported accurately by the laboratory.

Data tables have been provide that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

CASE No. 12787

SUMMARY OF INORGANIC ANALYSES - WATER

VALIDATED

EPA Sample No.	MW02EB	MW03EB	MW10D3	MW1003	MP13EB	MP6130	MP6180	MP6250
	Blank	Blank	PGP-10	PGP-10dup	Blank	PGP6-13'	PGP6-18'	PGP6-25
Lab Sample No.	1278713	1278709	1280805	1280802	1280801	1278701	1278702	1278703
Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low	Low	Low
Date Collected	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93
Date Analyzed	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte								
Aluminum	NA	270 J	4100 J	4250 J	144 J	3540 J	3170 J	3600 J
Antimony	NA	24.0 U	24.0 U	24.0 U	24 U	24.0 U	24.0 U	24.0 U
Arsenic	NA	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	3.8 J	3.8 J	3.7 J
Barium	NA	8.0 U	99.7 B	111 B	8.0 U	176 B	124 B	174 B
Beryllium	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 B	2.0 U	2.3 B
Calcium	NA	1370 B	271000	329000	246 U	546000	380000	292000
Chromium	NA	4.0 UJ	10.7 UJ	9.9 UJ	4.0 UJ	18.6 UJ	11.4 UJ	28.3 J
Cobalt	NA	5.0 U	5.0 U	7.4 B	5.0 U	21.8 B	10.6 B	12.7 B
Copper	NA	5.0 J	27.8 J	27.0 J	8.7 J	28.4 J	21.9 U	30.9 J
Iron	NA	664 J	10100 J	9760 J	33 J	12100 J	11900 J	19100 J
Lead	NA	2.0 U	32.3	32.7	5.3	19.6	19.8	27.3
Magnesium	NA	183 B	97800	107000	149 U	135000	134000	96200
Manganese	NA	7.8 B	918	960	3.5 B	1860	825	671
Mercury	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	NA	27.0 UJ	30.8 J	27.0 UJ	27 UJ	306 J	93.5 J	153 J
Potassium	NA	888 J	2080 J	1740 J	888 UJ	5940 J	3400 J	7810 J
Selenium	NA	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.2 UJ	1.0 UJ	1.5 UJ
Silver	NA	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Sodium	NA	1360 J	15800 J	15700 J	470 J	16100 J	11200 J	9920 J
Thallium	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	NA	4.0 UJ	14.4 UJ	16.1 UJ	4.0 UJ	17.4 UJ	18.7 UJ	21.2 J
Zinc	NA	19.0 J	76.7 UJ	71.2 UJ	16.6 J	469 J	166 J	305 J
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.

J = The associated value is an estimated quantity.

U = The analyte was analyzed for, but not detected.

UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be imprecise.

NA = Not analyzed

CASE N... 12787

SUMMARY OF INORGANIC ANALYSES - WATER

VALIDATED

	PGP7-13	PGP7-Adupe	PGP-719'	PGP7-24.5	PGP8-20	PGP9-13
EPA Sample No.	**MP7130**	**MP719D**	**MP7190**	**MP7245**	**MP8200**	**MP9130**
Lab Sample No.	**1278704**	**1278705**	**1278707**	**1278706**	**1278710**	**1278708**
Matrix	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Level	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Date Collected	**3/2/93**	**3/2/93**	**3/2/93**	**3/2/93**	**3/2/93**	**3/2/93**
Date Analyzed	**3/15/93**	**3/15/93**	**3/15/93**	**3/15/93**	**3/15/93**	**3/15/93**
Units	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Analyte						
Aluminum	3640 J	2020 J	1780 J	480 UJ	2460 J	2230 J
Antimony	24.0 U	24.0 U	24.0 U	24.0 U	24.0 U	24.0 U
Arsenic	3.6 J	4.0 J	2.8 J	2.0 UJ	2.0 UJ	2.1 J
Barium	142 B	131 B	128 B	110 B	147 B	118 B
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Calcium	381000	232000	230000	159000	287000	269000
Chromium	46.2 J	13.3 UJ	7.6 UJ	5.7 UJ	13.0 UJ	12.8 UJ
Cobalt	26.8 B	21.2 B	18.3 B	5.0 U	8.5 B	5.0 U
Copper	32.6 J	18.9 U	17.4 U	7.3 U	20.0 U	14.8 U
Iron	19400 J	12500 J	9980 J	2360 UJ	9680 J	7550 J
Lead	33.8	32.9	24.4	3.7	13.3	12.2
Magnesium	129000	80700	73600	49200	89600	89000
Manganese	1560	1040	933	228	1530	497
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	160 J	39.2 J	34.8 J	27.0 UJ	54.8 J	27 UJ
Potassium	3460 J	2340 J	2130 J	3660 J	3350 J	1970 J
Selenium	1.0 UJ	1.6 UJ	1.0 UJ	1.0 UJ	1.3 UJ	2.9 UJ
Silver	3.0 U	3.0 U	3.0 B	3.0 U	3.0 U	3.0 U
Sodium	64500 J	8790 J	8970 J	10600 J	8330 J	12400 J
Thallium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	18.2 UJ	16.3 UJ	12.2 UJ	4.0 UJ	12.4 UJ	10.5 UJ
Zinc	224 J	83.5 UJ	67 UJ	35.1 UJ	178 J	64 UJ
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.

J = The associated value is an estimated quantity.

U = The analyte was analyzed for, but not detected.

UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be imprecise.

NA = Not analyzed

EPA Sample No.	MW02EB	MW03EB	MW10D3	MW1003	MP13EB	MP6130	MP6130	MP6250
Lab Sample No.	1278713	1278709	1280805	1280802	1280801	1278701	1278702	1278703
Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low	Low	Low
Date Collected	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93
Date Analyzed	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte								
Aluminum	NA	270	4100	4250	144 B	3540	3170	3600
Antimony	NA	24.0 U	24.0 U	24.0 U	24 U	24.0 U	24.0 U	24.0 U
Arsenic	NA	2.0 U	2.0 U	2.0 U	2 U	3.8 B	3.8 B	3.7 B
Barium	NA	8.0 U	99.7 B	111 B	8 U	176 B	124 B	174 B
Beryllium	NA	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Cadmium	NA	2.0 U	2.0 U	2.0 U	2 U	2.0 B	2.0 U	2.3 B
Calcium	NA	1370 B	271000	329000	246 U	546000	380000	292000
Chromium	NA	4.0 U	10.7	9.9 B	4 U	18.6	11.4	28.3
Cobalt	NA	5.0 U	5.0 U	7.4 B	5 U	21.8 B	10.6 B	12.7 B
Copper	NA	5.0 B	27.8	27.0	8.7 B	28.4	21.9 B	30.9
Iron	NA	664	10100	9760	33 B	12100	11900	19100
Lead	NA	2.0 U	32.3	32.7	5.3	19.6	19.8	27.3
Magnesium	NA	183 B	97800	107000	149 U	135000	134000	96200
Manganese	NA	7.8 B	918	960	3.5 B	1860	825	671
Mercury	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	NA	27.0 U	30.8 B	27.0 U	27 U	306	93.5	153
Potassium	NA	888 U	2080 B	1740 B	888 U	5940	3400 B	7810
Selenium	NA	1.0 U	1.0 U	1.0 U	1 U	1.2 B	1.0 U	1.5 B
Silver	NA	3.0 U	3.0 U	3.0 U	3 U	3.0 U	3.0 U	3.0 U
Sodium	NA	1360 B	15800	15700	470 B	16100	11200	9920
Thallium	NA	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 U	2.0 U
Vanadium	NA	4.0 U	14.4 B	16.1 B	4 U	17.4 B	18.7 B	21.2 B
Zinc	NA	19.0 B	76.7	71.2	16.6 B	469	166	305
Cyanide	10 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

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U = The analyte was analyzed for, but not detected.
NA = Not analyzed

SUMMARY OF INORGANIC ANALYSES - WATER

EPA Sample	MP7130	MP719D	MP7190	MP7245	MP8200	MP9130
Lab Sample	1278704	1278705	1278707	1278706	1278710	1278708
Mat	Water	Water	Water	Water	Water	Water
Le	Low	Low	Low	Low	Low	Low
Date Collect	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93	3/2/93
Date Analyz	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93	3/15/93
Un	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte						
Aluminum	3640	2020	1780	480	2460	2230
Antimony	24.0 U	24.0 U	24.0 U	24.0 U	24.0 U	24.0 U
Arsenic	3.6 B	4.0 B	2.8 B	2.0 U	2.0 U	2.1 B
Barium	142 B	131 B	128 B	110 B	147 B	118 B
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Calcium	381000	232000	230000	159000	287000	269000
Chromium	46.2	13.3	7.6 B	5.7 B	13.0 U	12.8
Cobalt	26.8 B	21.2 B	18.3 B	5.0 U	8.5 B	5 U
Copper	32.6	18.9 B	17.4 B	7.3 B	20.0 B	14.8 B
Iron	19400	12500	9980	2360	9680	7550
Lead	33.8	32.9	24.4	3.7	13.3	12.2
Magnesium	129000	80700	73600	49200	89600	89000
Manganese	1560	1040	933	228	1530	497
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	160	39.2 B	34.8 B	27.0 U	54.8	27 U
Potassium	3460 B	2340 B	2130 B	3660 B	3350 B	1970 B
Selenium	1.0 U	1.6 B	1.0 B	1.0 U	1.3 B	2.9 B
Silver	3.0 U	3.0 U	3.0 B	3.0 U	3.0 U	3.0 U
Sodium	64500	8790	8970	10600	8330	12400
Thallium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	18.2 B	16.3 B	12.2 B	4.0 U	12.4 B	10.5 B
Zinc	224	83.5	67	35.1	178	64
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.
U = The analyte was analyzed for, but not detected.
NA = Not analyzed

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number

REGION I REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No.	12787	SAS No.		Sampling Date(s)	3/2/93
SDG. No.	MP03EB	Matrix	WATER	Shipping Date(s)	
No. of Samples	4			Date Rec'd by Lab	3/2/93

Traffic Report Nos: MP1003, MP1003, MP6130, MP6180, MP6250 MP7130, MP719D, MP7245, MP8200, MP9130
Trip Blank No.:
Equipment Blank No.: MP02EB, MP03EB, MP13EB
Field Dup Nos: MP719D, MP1003

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- ICP Interference Check Results
- Matrix Spike Recoveries
- Laboratory Duplicates
- Field Duplicates
- Lab Control Sample Results
- Furnace AA Results
- ICP Serial Dilution Results
- Detection Limit Results
- Sample Quantitation

Overall Comments:

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Analyte not detected.

Reviewer: Melissa Elam Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets

all OK

II. HOLDING TIMES Complete table for all samples and circle the analysis date for samples not within criteria.

SAMPLE ID	DATE SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
HP02EB	3/2/93	3/9/93	3/4/93	3/15/93		
HP03EB	3/2/93	3/9/93	3/4/93	3/15/93		
HP1003	3/2/93	3/9/93	3/12/93	3/15/93		
HP1003	3/2/93	3/9/93	3/12/93	3/15/93		
HP13EB	3/2/93	3/9/93	3/12/93	3/15/93		
HP6130	3/2/93	3/9/93	3/4/93	3/15/93		
HP6180	3/2/93	3/9/93	3/4/93	3/15/93		
HP6250	3/2/93	3/9/93	3/4/93	3/15/93		
HP7130	3/2/93	3/9/93	3/4/93	3/15/93		
HP7190	3/2/93	3/9/93	3/4/93	3/15/93		
HP7140	3/2/93	3/9/93	3/5/93	3/15/93		
HP7245	3/2/93	3/9/93	3/4/93	3/15/93		
HP8200	3/2/93	3/9/93	3/4/93	3/15/93		
HP9130	3/2/93	3/9/93	3/4/93	3/15/93		

METALS - 180 DAYS FROM SAMPLE COLLECTION
MERCURY - 28 DAYS FROM SAMPLE COLLECTION
CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

ACTION:

1. If holding times are exceeded all positive results are estimated (J) and non-detects are estimated (UJ).

2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable (R).

REGION I
Data Review worksheets

III A. INSTRUMENT CALIBRATION (Section 1)

1. Recovery Criteria - all ok

List the analytes which did not meet the percent recovery (%R) criteria for Initial or Continuing Calibration.

DATE	ICV/CCV#	ANALYTE	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If any analyte does not meet the %R criteria follow the actions stated below:

For Positive Results:

	Accept	Estimate (J)	Reject (R)
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%R
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%R

For Non-detected Results:

	Accept	Estimate (UJ)	Reject (R)
Metals	90-125%R	75-89%R	<75%R, >125%R
Mercury	80-135%R	65-79%R	<65%R, >135%R
Cyanide	85-130%R	70-84%R	<70%R, >130%R

REGION I
Data Review Worksheets

III B. INSTRUMENT CALIBRATION (Section 2)

2. Analytical Sequence

A. Did the laboratory use the proper number of standards for calibration as described in the SOW? Yes or No

B. Were calibrations performed at the beginning of each analysis? Yes or No

C. Were calibration standards analyzed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during analysis, whichever is more frequent? Yes or No

D. Were the correlation coefficients for the calibration curves for AA, Hg, and CN $\geq$ 0.995? Yes or No

E. Was a standard at 2xCRDL analyzed for all ICP analyses? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

_____

REGION 1
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

MATRIX: WATER

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS (ug/L)
	CCB#1		Vn	4.1
	CCB#2		Se	1.2
	CCB#3		Cr	4.7
		PB#1	Cr	4.929
		PB#1	Fe	40.839
		PB#1	Zn	3.216

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS (ug/L)
	MPOZEB	AL	270
	MPOZEB	Ca	1370
	MPOZEB	CU	5
	MPOZEB	Fe	664
	MPOZEB	Mg	183

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? Yes or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION 1
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks MATRIX: WATER

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS (ug/L)
	HPOZEB	Mn	7.8
	HPOZEB	Na	1360
		Zn	19

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? Yes or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION I
Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Levels for any analyte is equal to five times the highest concentration of that element's contamination in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL). Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

MATRIX: WATER

ELEMENT	MAX. CONC./ UNITS(ug/L)	AL/ UNITS (ug/L)
Al	270	1350
Ca	1370	6850
Cr	4.929	24.7
Cu	5.0	25.0
Fe	664	3220
Mg	183	915
Mn	7.8	39

MATRIX: WATER

ELEMENT	MAX. CONC./ UNITS(ug/L)	AL/ UNITS (ug/L)
Na	1360	6800
Se	1.2	6
Vn	4.1	20.5
Zn	19.0	95

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{Conc. in ug/L} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1\text{L}}{1000\text{ml}} \times \frac{1000\text{gm}}{1\text{kg}} \times \frac{1\text{mg}}{1000\text{ug}} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the action level gives a final result in mg/kg which can then be compared to sample results.

REGION I
Data Review Worksheets

V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2)

1. Recovery Criteria - all ok-

List any elements in the ICS AB solution which did not meet the criteria for %R.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If an element does not meet the %R criteria , follow the actions stated below:

	PERCENT RECOVERY		
	<50%	50-79%	>120%
Positive Sample Results	R	J	J
Non-detected Sample Results	R	UJ	A

2. Frequency Requirements

Were Interference QC samples run at the beginning and end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent? Yes or No

If no,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

REGION I
Data Review Worksheets

VI. MATRIX SPIKE

TR # HP71905 MATRIX: WATER

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spikes sample result
SR - sample result

Analyte	SSR	SR	S	%R	Action
Antimony	318.857	24.0U	500.0	63.8	No action
Arsenic	15.37	2.82B	40.0	31.4	J, UJ
Iron	10141.441	9975.74B	1000.0	16.6	J POS
Selenium	6.24	1.0U	10.0	62.4	J, UJ
Cyanide	74.849	10.0U	100.0	74.8	No action

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no action is taken.

2. If any analyte does not meet the %R criteria follow the actions stated below:

	PERCENT RECOVERY		
	<30%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No

B. Was a post digestion spike analyzed for elements that did not meet required criteria for matrix spike recovery? Yes or No
but only for CN + Antimony

A separate worksheet should be used for each matrix spike pair.

REGION I
Data Review Worksheets

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # MP7190	Duplicate# MP7190D	RPD	Action
Aluminum	200				30.8	J
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25				36.7	J
Iron	100				37.8	J
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000				23.5	J
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20				26.7	J
Cyanide	10					

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >20% for waters and >35% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results for elements whose absolute difference is >CRDL, (2xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES - all ok

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # PGP10-03 MP1003	Duplicate# PGP10-03D MP1003D	RPD	Action
Aluminum	200		4250	4100	3.6%	No action
Antimony	60					
Arsenic	10					
Barium	200		111	99.7	11%	
Beryllium	5					
Cadmium	5					
Calcium	5000		328000	271000	19%	
Chromium	10		4.9	10.7	8%	
Cobalt	50		7.4		NC	
Copper	25		27.0	27.8	3%	
Iron	100		9760	10100	3%	
Lead	5		32.7	32.3	1.2%	
Magnesium	5000		107000	97800	9%	
Manganese	15		960	918	5%	
Mercury	0.2					
Nickel	40		27.0U	30.8	NC	
Potassium	5000		1740	2080	17.8%	
Selenium	5					
Silver	10					
Sodium	5000		15700	15800	0.63%	
Thallium	10					
Vanadium	50		16.1	14.4	11%	
Zinc	20		71.2	76.7	8%	↓
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # PGP7-19 MP-7190	Duplicate# PGP7-19D MP-7190D	RPD	Action
Aluminum	200		1780	2020	13%	No action
Antimony	60					
Arsenic	10		2.8	4.0	35%	
Barium	200		128	131	2.3%	
Beryllium	5					
Cadmium	5					
Calcium	5000		230000	232000	1%	
Chromium	10		7.6	13.3	55%	J pos
Cobalt	50		18.3	21.2	15%	No action
Copper	25		17.4	18.9	8%	
Iron	100		9980	12500	22%	
Lead	5		24.4	32.9	30%	
Magnesium	5000		73600	80700	9%	
Manganese	15		933	1040	11%	
Mercury	0.2					
Nickel	40		34.8	39.2	12%	
Potassium	5000		2130	2340	9%	
Selenium	5		1.0U	1.6	NC	
Silver	10					
Sodium	5000		8970	8790	2.9%	
Thallium	10					
Vanadium	50		12.2	16.3	29%	
Zinc	20		67.0	83.5	23%	
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

IX. LABORATORY CONTROL SAMPLE

1. Aqueous LCS - all ok

List any LCS recoveries not within the 80-120% criteria and the samples affected.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

2. Solid LCS

List any analytes that were not within the control windows set by the EPA for the solid LCS sample. The 80-120% criteria is not used to evaluate solid LCS results.

ELEMENT	LCS CONC.	CONTROL WINDOWS	ACTION	SAMPLES AFFECTED

ACTIONS:

AQUEOUS LCS	Percent Recovery <50%	51-79%	>120%
Positive Results	R	J	J
Non-detected Results	R	UJ	A

SOLID LCS	<EPA Control Windows	>EPA Control Windows
Positive Results	J	J
Non-detected Results	UJ	A

3. Frequency Criteria

A. Was an LCS analyzed for every matrix, every digestion batch, and every 20 samples? Yes or No

REGION I
Data Review Worksheets

X A. FURNACE ATOMIC ABSORPTION ANALYSIS

1. Duplicate Precision

--/-------- Duplicate injections and one-point analytical spikes were performed for all samples: duplicate injections agreed within ± 20%.

-------- Duplicate injections and/or spikes were not performed for the following samples/elements: _____

_____

-------- Duplicate injections did not agree within ± 20% for samples/elements: _____

_____

2. Post Digestion Spike Recoveries

-------- Spike recoveries met the 85-115% recovery criteria for all samples.

-------- Spike recoveries did not meet the 85-115% criteria but did not require MSA for the following samples/elements:

_____

_____

X
-------- MSA was used to quantitate analytical results when contractually required.

_X_ Correlation coefficients ≥0.995, accept results.

____ Correlation coefficients <0.995 for sample numbers/elements: _____

-------- Method of Standard Addition (MSA) was not performed as required for samples/elements: _____

ACTIONS:

1. Estimate (J) positive results if duplicate injections are outside ± 20 % RSD or CV.

2. If the sample absorbance is <50% of post digestion spike absorbance the following actions should be applied:

	PERCENT RECOVERY		
	<10%	11%-84%	>115%
Positive Sample Results	J or R	J	J
Non-detected Results	R	UJ	A

3. Estimate (J) sample results if MSA was required and not performed.

4. Estimate (J) sample results if correlation coefficient was <0.995.

REGION I
Data Review Worksheets

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

_____ Serial Dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

_____ Serial Dilutions were not performed for the following:

_____

X Serial Dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 50x the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

MATRIX: WATER

ELEMENT	IDL	50xIDL	SAMPLE RESULT	SERIAL DILUTION	%D	ACTION
Aluminum	79.0	3950	1781.66	2419.09	35.8	J,UJ
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium	4.0	200	7.63B	20.0U	100	J,UJ
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Nickel	27.0	1350	34.83B	135.0U	100	J,UJ
Potassium	888.0	44400	2132.75B	4440.0U	100	J,UJ
Silver						
Sodium	442.0	22100	8966.82	11428.73B	27.5	J,UJ
Vanadium	4.0	200	12.12B	20.0U	100	J,UJ
Zinc	3.0	150	67.0	78.61B	17.3	J,UJ

Actions apply to all samples of the same matrix.

ACTIONS:

1. Estimate (J) positive results if %D >15.

REGION I
Data Review Worksheets

XII. DETECTION LIMIT RESULTS

1. Instrument Detection Limits

X Instrument Detection Limit results were present and found to be less than the Contract Required Detection Limits.

_____ IDLs were not included in the data package on Form XI.

_____ IDLs were present, but the criteria was not met for the following elements:_____

2. Reporting Requirements

_____ Were sample results on Form I reported down to the IDL not the CRDL for all analytes? Yes or No

_____ Were sample results that were analyzed by ICP for Se, Tl, As, or Pb at least 5x IDL. Yes or No

_____ Were sample weights, volumes, and dilutions taken into account when reporting detection limits on Form I. Yes or No

If No,

The reported results may be inaccurate. Make the necessary changes on the data summary tables and request that the laboratory resubmit the corrected data.

REGION I
Data Review Worksheets

XIII. SAMPLE QUANTITATION

_____ Sample results fall within the linear range for ICP and within the calibrated range for all other parameters.

_____ Sample results were beyond the linear range/ calibration range of the instrument for the following samples/elements:

_____

In the space below, please show a minimum of one sample calculation per method:

ICP sample HP7130 Report Form 1 Al 3640 ug/L
Quant Report 3640 ug/L

FURNACE Form 1 As 3.6B
Quant Report 3.65

MERCURY Form 1 Hg 0.2U
Quant Rep. 0.68

CYANIDE Form 1 CN 10.0U
Quant Rep. 287 ug/L

For soil samples, the following equation may be necessary to convert raw data values (usually reported in ug/L) to actual sample concentrations (mg/kg):

The lab is required to use 1 gram sample (wet weight) to 200 ml.

Wet weight concentration =

$$\text{digest conc. in } \frac{ug}{L} \times \frac{200ml}{1\ gm} \times \frac{1L}{1000\ ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \frac{mg}{kg}$$

In addition the sample results are converted to dry weight using the percent solids calculations:

$$\frac{\text{Wet weight conc.}}{\%\text{solids}} \times 100 = \text{final concentration, dry weight (mg/kg)}$$

HMM Associates, Inc.
A Summit Company

6908/HAZ/12669I

April 16, 1993

Mr. James H. Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Inorganic Data Validation Report
Southwest Laboratory of Oklahoma
Metals: 15 low concentration samples
Cyanide: 17 low concentration samples

Dear Mr. Keith:

Data validation was performed on the inorganic analytical data from 17 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, February 1989:

* - data completeness
* - holding times
* - calibration verification
- field and laboratory blank results
* - ICP interference check sample results
- matrix spike percent recovery results
- laboratory and field duplicate results
* - laboratory control sample results
- ICP serial dilution analysis
* - sample results

196 Baker Avenue Concord, MA 01742 508/371-1000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-4612

* All criteria was met for this parameter.

Data Completeness

The packages were complete and legible.

Holding Times

All holding times were met for all analytes.

Calibration Verification

All calibration results were reviewed and found to be acceptable.

Field and Laboratory Blanks

The method blanks were prepared and analyzed at the required frequency. The initial and continuing calibration blanks were also reported. There were four field blanks, MGPOEB, MW03EB, MSWEB3, and MWEB03, included in the data package.

The initial calibration blank (ICB) had a reported concentration of 4.2 ug/L for vanadium. The action level for vanadium is 21.0 ug/L. Samples MW23D3 and MW2503 had results less than the action level. These samples will be treated as non-detects and qualified U.

The following analytes were detected in field blanks:

Aluminum	94.8 ug/L
Copper	8.4 ug/L
Iron	22.5 ug/L
Lead	2.1 ug/L
Manganese	2.2 ug/L
Sodium	1240 ug/L

Sample results less than five times the reported result for the above analytes will be qualified U and treated as non-detects.

ICP Interference Check Sample Results

The reported results for the ICP interference check sample A were acceptable.

Matrix Spike Recovery Results

The review of the matrix spike results revealed deficiencies summarized in the following table.

The action apply to all samples of the same matrix.

Sample No.	Matrix	Analyte	Percent Recovery
MW23D3	Water	Aluminum	331.5%
MW23D3	Water	Antimony	24.7%
MW23D3	Water	Arsenic	16.2
MW23D3	Water	Iron	339.2
MW23D3	Water	Mercury	163

The positive results for the above analytes have been estimated (J).

The non detect results for antimony and arsenic have been estimated (UJ).

The non detect results for aluminum, mercury, and iron are accepted as reported by the laboratory.

Laboratory and Field Duplicates

Arsenic did not meet required criteria for laboratory duplicates, however, arsenic has already been qualified due to poor matrix spike recoveries.

Field duplicate results were not met for the following analytes: aluminum, chromium, iron, manganese, nickel, and zinc. Positive results for chromium, manganese, nickel, and zinc will be estimated (J). aluminum and iron have already been qualified due to poor matrix spike recoveries.

Laboratory Control Sample Results

The laboratory control sample results were reviewed and found to be acceptable.

ICP Serial Dilution Analysis

The following compounds did not meet the required criteria for serial dilution: chromium, cobalt, nickel, potassium, and vanadium. Positive results for these compounds will be estimated (J) and non detects will be estimated (UJ).

Sample Results

All sample results were reported accurately by the laboratory.

Data tables have been provide that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa Solari

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

Case No. 12669

SUMMARY OF INORGANIC ANALYSES - WATER

UNVALIDATED

EPA Sample No.	MGPOEB	MGP3D3	MGP303	MGP4D3	MGP4S3	MIT103	MSWEB3	MWEBO3	MW02D3
Lab Sample No.	1266902	1266902	1268101	1266908	1266907	1266909	1266918	1266901	1266914
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low	Low	Low	Low
Date Collected	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93
Date Analyzed	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte									
Aluminum	79.0 U	168 B	432	814	946	3270	NA	79.0 U	NA
Antimony	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	NA	35.0 U	NA
Arsenic	2.0 U	2.0 U	2.0 U	4.7 B	2.5 B	40.8	NA	2.0 U	NA
Barium	8.0 U	94.2 B	96 B	117 B	94.2 B	120 B	NA	8.0 U	NA
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	NA
Cadmium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.4	NA	2.0 U	NA
Calcium	246 U	128000	142000	232000	153000	66300	NA	246 U	NA
Chromium	4.0 U	4.0 U	4.0 U	5.4 B	4.0 U	8.3 B	NA	4.0 U	NA
Cobalt	5.0 U	5.0 U	5.0 U	5.5 B	6.2 B	5.0 U	NA	5.0 U	NA
Copper	8.4 B	3.0 U	7.8 B	10.7 B	16.4 B	14.8 B	NA	3.0 U	NA
Iron	22.5 B	633	1450	4660	4330	7010	NA	9.6 B	NA
Lead	1.2 B	1.0 U	1.2 B	4.5	6.1	6.3	NA	2.1 B	NA
Magnesium	149 U	38800	44200	40700	44100	30400	NA	149 U	NA
Manganese	2.0 U	54.9	124	606	394	333	NA	2.0 U	NA
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.33	0.33	NA	0.2 U	NA
Nickel	18.0 U	18.0 U	18.0 U	400	65.3	18.0 U	NA	18.0 U	NA
Potassium	888 U	2770 B	3220 B	3820 B	3090 B	2130 B	NA	888 U	NA
Selenium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	NA
Silver	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	NA	3.0 U	NA
Sodium	1240 B	5990	6260	9290	8000	29300	NA	442 U	NA
Thallium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	NA
Vanadium	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	NA	4.0 U	NA
Zinc	3.0 U	23.4	56.6	289	173	23.9	NA	3.0 U	NA
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	NA	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.
U = The analyte was analyzed for, but not detected.
NA = Not analyzed

JK

Case No. 12669

SUMMARY OF INORGANIC ANALYSES - WATER

UNVALIDATED

	MW0203	MW03EB	MW23D3	MW2303	MW2503	MW2703	MW2803	MW2903	MW3003
EPA Sample No.	MW0203	MW03EB	MW23D3	MW2303	MW2503	MW2703	MW2803	MW2903	MW3003
Lab Sample No.	1266913	1266917	1266911	1266910	1266912	1266904	1266903	1266906	1266905
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low	Low	Low	Low
Date Collected	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93
Date Analyzed	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte									
Aluminum	NA	94.8 B	7140	12700	6730	13500	3990	11200	8310
Antimony	NA	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U
Arsenic	NA	2.0 U	16.9	13.5	4.2 B	6.8 B	5.5 B	6.2 B	16.2
Barium	NA	8.0 U	456	442	162 B	509	127 B	701	569
Beryllium	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.9 B	1.0 U	1.0 B	1.0 U
Cadmium	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 B	2.0 U	2.0 U	2.0 U
Calcium	NA	246 U	164000	153000	181000	998000	202000	1100000	936000
Chromium	NA	4.0 U	7.2 B	13.3	16.3	35.4	19.7	22.9	22.1
Cobalt	NA	5.0 U	8.4 B	10.5 B	12.0 B	22.6 B	14.8 B	41 B	22.9 B
Copper	NA	3.0 B	67.7	82.1	41.2	233	80.3	82.7	62.9
Iron	NA	22.4 B	21800	22400	13000	26000	12700	30500	24300
Lead	NA	1.6 B	29.4	38.5	24.9	112	41.6	109	37.4
Magnesium	NA	149 U	65800	58900	62800	172000	67400	181000	98700
Manganese	NA	2.2 B	3150	3340	2070	2270	803	4000	4460
Mercury	NA	0.2 U	0.2 U	0.54	0.2 U	0.2 U	0.2 U	0.57	0.2 U
Nickel	NA	18.0 U	26.1 B	40.2	40.1	123	40.0	95.8	77.4
Potassium	NA	888 U	2400 B	2760 B	2640 B	3800 B	2360 B	5470	4130 B
Selenium	NA	1.0 U	1.0 U	1.0 U	1.0 U	6.8 B	1.0 U	5.0 U	5.0 U
Silver	NA	3.0 U	3.0 U	3.0 U	3.0 U	8.4 B	3.0 U	3.0 U	3.0 U
Sodium	NA	542 B	28400	29300	28000	5810	5440	7840	6500
Thallium	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	NA	4.0 U	20.7 B	25.5 B	16.4 B	36.9 B	23.1 B	36.0 B	23.8 B
Zinc	NA	3.0 U	86.3	107	103	296	86.2	458.0	151
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.
U = The analyte was analyzed for, but not detected.
NA = Not analyzed

SUMMARY OF INORGANIC ANALYSES - WATER

VALIDATED

EPA Sample No.	MGPOEB	MGP3D3	MGP303	MGP4D3	MGP4S3	MIT103	MSWEB3	MWEBO3	MW02D3
Lab Sample No.	1266902	1266902	1268101	1266908	1266907	1266909	1266918	1266901	1266914
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low	Low	Low	Low
Date Collected	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93
Date Analyzed	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte									
Aluminum	79.0 U	168 U	432 U	814 J	946 J	3270 J	NA	79.0 U	NA
Antimony	35.0 UJ	35.0 UJ	35.0 UJ	35.0 UJ	35.0 UJ	35.0 UJ	NA	35.0 UJ	NA
Arsenic	2.0 UJ	2.0 UJ	2.0 UJ	4.7 J	2.5 J	40.8 J	NA	2.0 UJ	NA
Barium	8.0 U	94.2 B	96 B	117 B	94.2 B	120 B	NA	8.0 U	NA
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	NA
Cadmium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.4	NA	2.0 U	NA
Calcium	246 U	128000	142000	232000	153000	66300	NA	246 U	NA
Chromium	4.0 U	4.0 U	4.0 U	5.4 J	4.0 U	8.3 J	NA	4.0 U	NA
Cobalt	5.0 UJ	5.0 UJ	5.0 UJ	5.5 J	6.2 J	5.0 UJ	NA	5.0 UJ	NA
Copper	8.4 B	3.0 U	7.8 U	10.7 U	16.4 U	14.8 U	NA	3.0 U	NA
Iron	22.5 J	633 J	1450 J	4660 J	4330 J	7010 J	NA	9.6 J	NA
Lead	1.2 B	1.0 U	1.2 U	4.5 U	6.1 U	6.3 U	NA	2.1 B	NA
Magnesium	149 U	38800	44200	40700	44100	30400	NA	149 U	NA
Manganese	2.0 U	54.9 J	124 J	606 J	394 J	333 J	NA	2.0 U	NA
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.33 J	0.33 J	NA	0.2 U	NA
Nickel	18.0 UJ	18.0 UJ	18.0 UJ	400 J	65.3 J	18.0 UJ	NA	18.0 UJ	NA
Potassium	888 UJ	2770 J	3220 J	3820 J	3090 J	2130 J	NA	888 UJ	NA
Selenium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	NA
Silver	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	NA	3.0 U	NA
Sodium	1240 B	5990 U	6260	9290	8000	29300	NA	442 U	NA
Thallium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	NA
Vanadium	4.0 UJ	4.0 UJ	4.0 UJ	4.0 UJ	4.0 UJ	4.0 UJ	NA	4.0 UJ	NA
Zinc	3.0 U	23.4 J	56.6 J	289 J	173 J	23.9 J	NA	3.0 U	NA
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	NA	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.

J = The associated value is an estimated quantity.

U = The analyte was analyzed for, but not detected.

UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be imprecise.

NA = Not analyzed

CASE No. 12669 SUMMARY OF INORGANIC ANALYSES - WATER VALIDATED

EPA Sample No.	MW0203	MW03EB	MW23D3	MW2303	MW2503	MW2703	MW2803	MW2903	MW3003
Lab Sample No.	1266913	1266917	1266911	1266910	1266912	1266904	1266903	1266906	1266905
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water
Level	Low	Low	Low	Low	Low	Low	Low	Low	Low
Date Collected	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93	2/17/93
Date Analyzed	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93	3/1/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte									
Aluminum	NA	94.8 J	7140 J	12700 J	6730 J	13500 J	3990 J	11200 J	8310 J
Antimony	NA	35.0 UJ	35.0 UJ	35.0 UJ	35.0 UJ	35.0 UJ	35.0 UJ	35.0 UJ	35.0 UJ
Arsenic	NA	2.0 UJ	16.9 J	13.5 J	4.2 J	6.8 J	5.5 J	6.2 J	16.2 J
Barium	NA	8.0 U	456	442	162 B	509	127 B	701	569
Beryllium	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.9 B	1.0 U	1.0 B	1.0 U
Cadmium	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 B	2.0 U	2.0 U	2.0 U
Calcium	NA	246 U	164000	153000	181000	998000	202000	1100000	936000
Chromium	NA	4.0 U	7.2 J	13.3 J	16.3 J	35.4 J	19.7 J	22.9 J	22.1 J
Cobalt	NA	5.0 UJ	8.4 J	10.5 J	12.0 J	22.6 J	14.8 J	41 J	22.9 J
Copper	NA	3.0 B	67.7	82.1	41.2 U	233	80.3	82.7	62.9
Iron	NA	22.4 J	21800 J	22400 J	13000 J	26000 J	12700 J	30500 J	24300 J
Lead	NA	1.6 B	29.4	38.5	24.9	112	41.6	109	37.4
Magnesium	NA	149 U	65800	58900	62800	172000	67400	181000	98700
Manganese	NA	2.2 J	3150 J	3340 J	2070 J	2270 J	803 J	4000 J	4460 J
Mercury	NA	0.2 U	0.2 U	0.54 J	0.2 U	0.2 U	0.2 U	0.57 J	0.2 U
Nickel	NA	18.0 UJ	26.1 J	40.2 J	40.1 J	123 J	40.0 J	95.8 J	77.4 J
Potassium	NA	888 UJ	2400 J	2760 J	2640 J	3800 J	2360 J	5470 J	4130 J
Selenium	NA	1.0 U	1.0 U	1.0 U	1.0 U	6.8 B	1.0 U	5.0 U	5.0 U
Silver	NA	3.0 U	3.0 U	3.0 U	3.0 U	8.4 B	3.0 U	3.0 U	3.0 U
Sodium	NA	542 B	28400	29300	28000	5810	5440	7840	6500
Thallium	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	NA	4.0 UJ	20.7 UJ	25.5 J	16.4 UJ	36.9 J	23.1 J	36.0 J	23.8 J
Zinc	NA	3.0 U	86.3 J	107 J	103 J	296 J	86.2 J	458.0 J	151 J
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Notes:

B = The reported value is less than the CRDL, but greater than or equal to the IDL.

J = The associated value is an estimated quantity.

U = The analyte was analyzed for, but not detected.

UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be imprecise.

NA = Not analyzed

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number

REGION I REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. 12669 SAS No. Sampling Date(s) 2/17/93
SDG. No. HGP0EB Matrix WATER Shipping Date(s)
No. of Samples 18 Date Rec'd by Lab 2/19/93

Traffic Report Nos: HGP303, HGP4D3, HGP453, HIT103, MW0203, MW2303, MW2503, MW2703, MW2803, MW2903, MW3003
Trip Blank No.:
Equipment Blank No.: HGP0EB, MW03EB, MSWEB3, MWEB03
Field Dup Nos: MW2303D, MW23D3, HGP3D3, MW02D3

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -Calibrations
- -Blanks
- -ICP Interference Check Results
- -Matrix Spike Recoveries
- -Laboratory Duplicates
- -Field Duplicates
- -Lab Control Sample Results
- -Furnace AA Results
- -ICP Serial Dilution Results
- -Detection Limit Results
- -Sample Quantitation

Overall Comments:

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Analyte not detected.

Reviewer: Melissa Solari Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets

all OK

II. HOLDING TIMES

Complete table for all samples and circle the analysis date for samples not within criteria.

SAMPLE ID	DATE SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
MGP0EB	2/17/93	2/25/93	2/24/93	3/1/93		
MGP3D3	2/17/93	2/25/93	2/24/93	3/1/93		
MGP3D3	2/17/93	2/25/93	2/24/93	3/1/93		
MGP4D3	2/17/93	2/25/93	2/24/93	3/1/93		
MGP4S3	2/17/93	2/25/93	2/24/93	3/1/93		
MITD3	2/17/93	2/25/93	2/24/93	3/11/93		
MSWEB3	2/17/93	2/25/93	2/24/93	3/1/93		
MWEB03	2/17/93	2/25/93	2/24/93	3/1/93		
MW02D3	2/17/93	2/25/93	2/24/93	3/1/93		
MW02D3	2/17/93	2/25/93	2/24/93	3/1/93		
MW03EB	2/17/93	2/25/93	2/24/93	3/1/93		
MW23D3	2/17/93	2/26/93	2/24/93	3/1/93		
MW23D3	2/17/93	2/26/93	2/24/93	3/1/93		
MW25D3	2/17/93	2/25/93	2/24/93	3/1/93		
MW27D3	2/17/93	2/25/93	2/24/93	3/1/93		

METALS - 180 DAYS FROM SAMPLE COLLECTION
MERCURY - 28 DAYS FROM SAMPLE COLLECTION
CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

ACTION:

1. If holding times are exceeded all positive results are estimated (J) and non-detects are estimated (UJ).

2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable (R).

REGION I
Data Review Worksheets

II. HOLDING TIMES

Complete table for all samples and circle the analysis date for samples not within criteria.

SAMPLE ID	DATE SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
MW2803	2/17/93	2/25/93	2/24/93	3/1/93		
MW2903	2/17/93	2/25/93	2/24/93	3/1/93		
MW3003	2/17/93	2/25/93	2/24/93	3/1/93		

METALS - 180 DAYS FROM SAMPLE COLLECTION
MERCURY - 28 DAYS FROM SAMPLE COLLECTION
CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

ACTION:

1. If holding times are exceeded all positive results are estimated (J) and non-detects are estimated (UJ).

2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable (R).

REGION I
Data Review worksheets

III A. INSTRUMENT CALIBRATION (Section 1)

1. Recovery Criteria - all ok

List the analytes which did not meet the percent recovery (%R) criteria for Initial or Continuing Calibration.

DATE	ICV/CCV#	ANALYTE	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If any analyte does not meet the %R criteria follow the actions stated below:

For Positive Results:

	Accept	Estimate (J)	Reject (R)
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%R
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%R

For Non-detected Results:

	Accept	Estimate (UJ)	Reject (R)
Metals	90-125%R	75-89%R	<75%R, >125%R
Mercury	80-135%R	65-79%R	<65%R, >135%R
Cyanide	85-130%R	70-84%R	<70%R, >130%R

REGION I
Data Review Worksheets

III B. INSTRUMENT CALIBRATION (Section 2)

2. Analytical Sequence

A. Did the laboratory use the proper number of standards for calibration as described in the SOW? Yes or No

B. Were calibrations performed at the beginning of each analysis? Yes or No

C. Were calibration standards analyzed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during analysis, whichever is more frequent? Yes or No

D. Were the correlation coefficients for the calibration curves for AA, Hg, and CN $\geq$ 0.995? Yes or No

E. Was a standard at 2xCRDL analyzed for all ICP analyses? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

_____

REGION 1
Data Review worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

MATRIX: WATER

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS (ug/L)
	ICB#1		Zn	-4.2

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS (ug/L)
	MGPOEB	CU	8.4
		Fe	22.5
		Pb	1.2
		Na	1240
	MW03EB	AL	94.8

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? Yes or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION 1
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks MATRIX: WATER

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS

2. Equipment/Trip Blanks

DATE	EQUIP BL#	ANALYTE	CONC./UNITS (ug/L)
	MW03EB	CU	3.0
	MW03EB	FE	22.4
	MW03EB	PB	1.6
	MW03EB	MN	2.2
	~~HW03~~ EB	NA	542
	MWEB03	FE	9.6
	MWEB03	PB	2.1

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples and for each digestion batch? Yes or No

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

REGION I
Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Levels for any analyte is equal to five times the highest concentration of that element's contamination in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL). Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

MATRIX: WATER

ELEMENT	MAX. CONC./ UNITS	AL/ UNITS
AL	94.8 ug/L	474 ug/L
Cu	8.4 ug/L	42 ug/L
Fe	22.5 ug/L	112.5 ug/L
Mn	2.2 ug/L	11 ug/L
Na	1240 ug/L	6200 ug/L
Pb	2 ug/L	10.5 ug/L
Vn	4.2 ug/L	210 ug/L

MATRIX: _____

ELEMENT	MAX. CONC./ UNITS	AL/ UNITS

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{Conc. in ug/L} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1\text{L}}{1000\text{ml}} \times \frac{1000\text{gm}}{1\text{kg}} \times \frac{1\text{mg}}{1000\text{ug}} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the action level gives a final result in mg/kg which can then be compared to sample results.

REGION I
Data Review Worksheets

V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2)

1. Recovery Criteria - allot

List any elements in the ICS AB solution which did not meet the criteria for %R.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

ACTIONS:

If an element does not meet the %R criteria , follow the actions stated below:

	PERCENT RECOVERY		
	<50%	50-79%	>120%
Positive Sample Results	R	J	J
Non-detected Sample Results	R	UJ	A

2. Frequency Requirements

Were Interference QC samples run at the beginning and end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent? Yes or No

If no,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

_____

_____

_____

REGION I
Data Review Worksheets

VI. MATRIX SPIKE

TR # HW23035 MATRIX: WATER

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spikes sample result
SR - sample result

Analyte	SSR	SR	S	%R	Action
Mercury	1.63	0.2U	1.0	163	J, A
Aluminum	13341.254	12711.318	2000.0	331.5	J, A
Antimony	123.276	35.0	500.0	24.7	J, UJ
Arsenic	20.0	13.5	40.0	16.2	J, UJ
Iron	25785.133	22342.82	1000.0	339.2	J, A

Matrix Spike Actions apply to all samples of the same matrix.
A = Accept (non-detects)

ACTIONS:

1. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no action is taken.

2. If any analyte does not meet the %R criteria follow the actions stated below:

	PERCENT RECOVERY		
	<10%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No

B. Was a post digestion spike analyzed for elements that did not meet required criteria for matrix spike recovery? Yes or No

A separate worksheet should be used for each matrix spike pair.

REGION I
Data Review Worksheets

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # HW02303	Duplicate# HW02303D	RPD	Action
Aluminum	200					
Antimony	60					
Arsenic	10		13.5	7.5240	76.8	J
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >20% for waters and >35% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results for elements whose absolute difference is >CRDL, (2xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # HGP303	Duplicate# HGP303	RPD	Action
Aluminum	200		432	168	88%	J
Antimony	60					
Arsenic	10					
Barium	200		96.0	94.2	2%	
Beryllium	5					
Cadmium	5					
Calcium	5000		142000	128000	10%	
Chromium	10					
Cobalt	50					
Copper	25		7.8B	3.0U	NC	
Iron	100		1450	633	78%	J
Lead	5		1.2B	1.0U	NC	
Magnesium	5000		44200	38800	13%	
Manganese	15		124	54.9	77%	J
Mercury	0.2					
Nickel	40					
Potassium	5000		3220	2770	15%	
Selenium	5					
Silver	10					
Sodium	5000		6260	5990	4%	
Thallium	10					
Vanadium	50					
Zinc	20		56.6	23.4	83%	J
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # MW0203	Duplicate# MW0203	RPD	Action
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10		10.0U	10.0U	NC	

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evalute the precision by circling either the RPD or CRDL for each element.

MATRIX: WATER

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # MW2303	Duplicate# MW23D3	RPD	Action
Aluminum	200		12700	7140	56%	J
Antimony	60					
Arsenic	10		13.5	16.9	22%	
Barium	200		442	450	3%	
Beryllium	5					
Cadmium	5					
Calcium	5000		153000	164000	7%	
Chromium	10		13.3	7.2	60%	J
Cobalt	50		10.5	8.4	22%	
Copper	25		182.1	67.7		
Iron	100		22400	21800	3%	
Lead	5		38.5	29.4	27%	
Magnesium	5000		58900	65800	11%	
Manganese	15		3340	3150	6%	
Mercury	0.2		0.54	0.20U	NC	
Nickel	40		40.2	26.1	43%	J
Potassium	5000		2760	2400	14%	
Selenium	5					
Silver	10					
Sodium	5000		29300	28400	3%	
Thallium	10					
Vanadium	50		25.5	20.7	21%	
Zinc	20		107	86.3	21%	
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positive results ~~and (UJ) nondetected results~~ for elements whose absolute difference is >2xCRDL, (4xCRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

REGION I
Data Review Worksheets

IX. LABORATORY CONTROL SAMPLE

1. Aqueous LCS - all OK

List any LCS recoveries not within the 80-120% criteria and the samples affected.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED

2. Solid LCS

List any analytes that were not within the control windows set by the EPA for the solid LCS sample. The 80-120% criteria is not used to evaluate solid LCS results.

ELEMENT	LCS CONC.	CONTROL WINDOWS	ACTION	SAMPLES AFFECTED

ACTIONS:

AQUEOUS LCS	Percent Recovery <50%	51-79%	>120%
Positive Results	R	J	J
Non-detected Results	R	UJ	A

SOLID LCS	<EPA Control Windows	>EPA Control Windows
Positive Results	J	J
Non-detected Results	UJ	A

3. Frequency Criteria

A. Was an LCS analyzed for every matrix, every digestion batch, and every 20 samples? Yes or No

REGION I
Data Review Worksheets

X A. FURNACE ATOMIC ABSORPTION ANALYSIS

1. Duplicate Precision

--X------ Duplicate injections and one-point analytical spikes were performed for all samples: duplicate injections agreed within ± 20%.

-------- Duplicate injections and/or spikes were not performed for the following samples/elements:_____

_____

-------- Duplicate injections did not agree within ± 20% for samples/elements:_____

_____

2. Post Digestion Spike Recoveries

--X------ Spike recoveries met the 85-115% recovery criteria for all samples.

-------- Spike recoveries did not meet the 85-115% criteria but did not require MSA for the following samples/elements:

_____

_____

-------- MSA was used to quantitate analytical results when contractually required.

_____X_____ Correlation coefficients ≥0.995, accept results.

_____ Correlation coefficients <0.995 for sample numbers/elements:_____

-------- Method of Standard Addition (MSA) was not performed as required for samples/elements:_____

ACTIONS:

1. Estimate (J) positive results if duplicate injections are outside ± 20 % RSD or CV.

2. If the sample absorbance is <50% of post digestion spike absorbance the following actions should be applied:

	PERCENT RECOVERY		
	<10%	11%-84%	>115%
Positive Sample Results	J or R	J	J
Non-detected Results	R	UJ	A

3. Estimate (J) sample results if MSA was required and not performed.

4. Estimate (J) sample results if correlation coefficient was <0.995.

REGION I
Data Review Worksheets

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

_____ Serial Dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

_____ Serial Dilutions were not performed for the following: _____

X Serial Dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 50x the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

MATRIX: WATER

ELEMENT	IDL	50xIDL	SAMPLE RESULT	SERIAL DILUTION	%D	ACTION
Aluminum						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium	4.0	200.0	13.28	20.0	100.0	J, UJ
Cobalt	5.0	250.0	10.52	25.0	100.0	J, UJ
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Nickel	18.0	900.0	40.18	90.0	100.0	J, UJ
Potassium	888.0	44400	2756.75	4440.0	100.0	J, UJ
Silver						
Sodium						
Vanadium	4.0	200.0	25.46	21.04	17.4	J, UJ
Zinc						

Actions apply to all samples of the same matrix.

ACTIONS:

1. Estimate (J) positive results if %D >15.

REGION I
Data Review Worksheets

XII. DETECTION LIMIT RESULTS

1. Instrument Detection Limits

X Instrument Detection Limit results were present and found to be less than the Contract Required Detection Limits.

_____ IDLs were not included in the data package on Form XI.

_____ IDLs were present, but the criteria was not met for the following elements:_____

2. Reporting Requirements

_____ Were sample results on Form I reported down to the IDL not the CRDL for all analytes? Yes or No

_____ Were sample results that were analyzed by ICP for Se, Tl, As, or Pb at least 5x IDL. Yes or No

_____ Were sample weights, volumes, and dilutions taken into account when reporting detection limits on Form I. Yes or No

If No,

The reported results may be inaccurate. Make the necessary changes on the data summary tables and request that the laboratory resubmit the corrected data.

REGION I
Data Review Worksheets

XIII. SAMPLE QUANTITATION

X Sample results fall within the linear range for ICP and within the calibrated range for all other parameters.

____ Sample results were beyond the linear range/ calibration range of the instrument for the following samples/elements:

_____

In the space below, please show a minimum of one sample calculation per method: sample HITI03 (.1266909)

ICP AL on FORM I 3270
3274.1 on Quant. Rep.

FURNACE As on FORM I 40.8
40.79 on Quant Rep.

MERCURY 0.33 on FORM I
0.32 on Quant Rep.

CYANIDE 10.00 on FORM I
-1.228 on Quant Rep.

For soil samples, the following equation may be necessary to convert raw data values (usually reported in ug/L) to actual sample concentrations (mg/kg):

The lab is required to use 1 gram sample (wet weight) to 200 ml.

Wet weight concentration =

$$\text{digest conc. in } \frac{ug}{L} \times \frac{200ml}{1\ gm} \times \frac{1L}{1000\ ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \frac{mg}{kg}$$

In addition the sample results are converted to dry weight using the percent solids calculations:

$$\frac{\text{Wet weight conc.}}{\%\text{solids}} \times 100 = \text{final concentration, dry weight (mg/kg)}$$

HMM Associates, Inc.
A Summit Company

6908/HAZ/12302O

April 16, 1993

Mr. James Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Organic Data Validation Report
Southwest Laboratory of Oklahoma
VOCs: 2 low concentration samples
2 med concentration samples

Dear Mr. Keith:

Data validation was performed on the organic analytical data from 4 low level soil samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988:

* - data completeness
* - holding times
* - GC/MS tuning
  - calibration
  - laboratory, field, and trip blanks
* - surrogate spike recoveries
* - matrix spike/matrix spike duplicates
* - field duplicates
* - internal standard performance

196 Baker Avenue Concord, MA 01742 508/371-4000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-4612

* - sample quantitation

* All criteria was met for this parameter

Data Completeness

The data package was complete and legible.

Holding Times

Samples were analyzed 15, 16, and 17 days after collection. This is not considered to be a gross exceedence of the criteria and no action will be taken.

GC/MS Tuning

All reported bromofluorobenzene (BFB) tunes met the requirements.

Calibrations

The volatile calibration summaries were reviewed, and all calibration check compound (CCC) and system performance check compound (SPCC) requirements were met. Acetone had a percent relative standard deviation (%RSD) of 32.0 in the water continuing calibration on 1/18/93, which is greater than the requirement of less than 30%. All positive sample results for acetone will be estimated (J) due to variable instrument response. Two other compounds had %RSDs greater than 30%. No action was taken as there were no positive results for either compound in the samples. One other compound had a percent difference (%D) in the water continuing calibration which was greater than the functional guidelines requirement of %D less than 25%. No action was taken as the compounds were not detected in the associated samples.

Blanks

Acetone was detected in low level method VBLK1 at 3 ug/kg and in low level VBLK2 at 4 ug/kg. Acetone in sample MW27EB-03 will be qualified U and treated as a non detect.

Acetone was detected in med level method blank VBLK3 at 370 ug/kg. Results for acetone in samples MW27150-03 and MW27-150D will be qualified U and Treated as non detects.

Surrogate Spike Recoveries

All reported volatile surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate

A MS/MSD sample was not submitted to the laboratory, therefore, laboratory control samples were analyzed. All volatile laboratory control samples were found to be acceptable.

Field Duplicates

One field duplicate, MW27150-03, was collected. The RPDs were reviews and found to be acceptable.

Internal Standard Performance

The internal standard performance was acceptable in the volatile analyses.

Sample Quantitation

The reported sample results were reviewed and found to be reported accurately.

Data tables have been provided that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

JK

CASE No. 12302 SUMMARY OF VOLATILE ORGANIC ANALYSES -SOIL VALIDATED

	MW27-15'	MW27-15' Dup	MW27-23'	Blank
EPA Sample No.	**MW27150-03**	**MW27150-03D**	**MW27230-03**	**MW27EB-03**
Lab Sample No.	**1230201**	**1230202**	**1230204**	**1230203**
Matrix:	**Soil**	**Soil**	**Soil**	**Soil**
Level:	**Med**	**Med**	**Low**	**Low**
Date Collected:	**1/3/93**	**1/3/93**	**1/3/93**	**1/3/93**
Date Analyzed:	**1/20/93**	**1/20/93**	**1/18/93**	**1/19/93**
Dilution Factor:	**1**	**1**	**1**	**1**
Units:	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
Compound				
Chloromethane	1400 U	1300 U	12 U	10 U
Bromomethane	1400 U	1300 U	12 U	10 U
Vinyl Chloride	1400 U	1300 U	12 U	10 U
Chloroethane	1400 U	1300 U	12 U	10 U
Methylene Chloride	660 J	1300 U	2 J	10 U
Acetone	1400 U	1300 U	59 B	10 U
Carbon Disulfide	1400 U	1300 U	12 U	10 U
1,1-Dichloroethene	1400 U	1300 U	12 U	10 U
1,1-Dichloroethane	1400 U	1300 U	12 U	10 U
1,2-Dichloroethene (total)	1400 U	1300 U	12 U	10 U
Chloroform	1400 U	1300 U	3 J	10 U
1,2-Dichloroethane	1400 U	1300 U	12 U	10 U
2-Butanone	1400 U	390 J	7 J	10 U
1,1,1-Trichloroethane	1400 U	1300 U	3 J	10 U
Carbon Tetrachloride	1400 U	1300 U	12 U	10 U
Bromodichloromethane	1400 U	1300 U	12 U	10 U
1,2-Dichloropropane	1400 U	1300 U	12 U	10 U
cis-1,3-Dichloropropene	1400 U	1300 U	12 U	10 U
Trichloroethene	1400 U	1300 U	12 U	10 U
Dibromochloromethane	1400 U	1300 U	12 U	10 U
1,1,2-Trichloroethane	1400 U	1300 U	12 U	10 U
Benzene	1400 U	1300 U	12 U	10 U
trans-1,3-Dichloropropene	1400 U	1300 U	12 U	10 U
Bromoform	1400 U	1300 U	12 U	10 U
4-Methyl-2-Pentanone	1400 U	1300 U	12 U	10 U
2-Hexanone	1400 U	1300 U	12 U	10 U
Tetrachloroethene	17000	25000	100	10 U
1,1,2,2-Tetrachloroethane	1400 U	1300 U	12 U	10 U
Toluene	1400 U	1300 U	12 U	10 U
Chlorobenzene	1400 U	1300 U	12 U	10 U
Ethylbenzene	1400 U	1300 U	12 U	10 U
Styrene	1400 U	1300 U	12 U	10 U
Xylene	1400 U	1300 U	2 J	10 U

Notes:

B = The analyte was found in the blank as well as the sample. It indicates probable blank contaminantion.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/kg = micrograms per kilogram

EPA Sample No.	MW27150-03	MW27150-03D	MW27230-03	MW27EB-03
Lab Sample No.	1230201	1230202	1230204	1230203
Matrix:	Soil	Soil	Soil	Soil
Level:	Med	Med	Low	Low
Date Collected:	1/3/93	1/3/93	1/3/93	1/3/93
Date Analyzed:	1/20/93	1/20/93	1/18/93	1/19/93
Dilution Factor:	1	1	1	1
Units:	ug/kg	ug/kg	ug/kg	ug/kg
Compound				
Chloromethane	1400 U	1300 U	12 U	10 U
Bromomethane	1400 U	1300 U	12 U	10 U
Vinyl Chloride	1400 U	1300 U	12 U	10 U
Chloroethane	1400 U	1300 U	12 U	10 U
Methylene Chloride	660 J	1300 U	2 J	10 U
Acetone	680 BJ	500 BJ	59 B	9 BJ
Carbon Disulfide	1400 U	1300 U	12 U	10 U
1,1-Dichloroethene	1400 U	1300 U	12 U	10 U
1,1-Dichloroethane	1400 U	1300 U	12 U	10 U
1,2-Dichloroethene (total)	1400 U	1300 U	12 U	10 U
Chloroform	1400 U	1300 U	3 J	10 U
1,2-Dichloroethane	1400 U	1300 U	12 U	10 U
2-Butanone	1400 U	390 J	7 J	10 U
1,1,1-Trichloroethane	1400 U	1300 U	3 J	10 U
Carbon Tetrachloride	1400 U	1300 U	12 U	10 U
Bromodichloromethane	1400 U	1300 U	12 U	10 U
1,2-Dichloropropane	1400 U	1300 U	12 U	10 U
cis-1,3-Dichloropropene	1400 U	1300 U	12 U	10 U
Trichloroethene	1400 U	1300 U	12 U	10 U
Dibromochloromethane	1400 U	1300 U	12 U	10 U
1,1,2-Trichloroethane	1400 U	1300 U	12 U	10 U
Benzene	1400 U	1300 U	12 U	10 U
trans-1,3-Dichloropropene	1400 U	1300 U	12 U	10 U
Bromoform	1400 U	1300 U	12 U	10 U
4-Methyl-2-Pentanone	1400 U	1300 U	12 U	10 U
2-Hexanone	1400 U	1300 U	12 U	10 U
Tetrachloroethene	17000	25000	100	10 U
1,1,2,2-Tetrachloroethane	1400 U	1300 U	12 U	10 U
Toluene	1400 U	1300 U	12 U	10 U
Chlorobenzene	1400 U	1300 U	12 U	10 U
Ethylbenzene	1400 U	1300 U	12 U	10 U
Styrene	1400 U	1300 U	12 U	10 U
Xylene	1400 U	1300 U	2 J	10 U

Notes:

B = The analyte was found in the blank as well as the sample. It indicates probable blank contaminantion.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/kg = micrograms per kilogram

FIGURE 8

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number

REGION I REVIEW OF ORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. WWENG SAS No. Sampling Date(s) 1/3/93
SDG No. 12302 Matrix SOIL Shipping Date(s) -
No. of Samples 4 Date Rec'd by Lab 1/15/93

Traffic Report Nos: MW27150-03, MW27230-03, MW27EB-03

Trip Blank No.:
Equipment Blank No.:
Field Dup Nos: MW27150-03D

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -GC/MS Tuning
- -Calibrations
- -Blanks
- -Surrogate Recoveries
- -Matrix Spike/Matrix Spike Dup
- -Field Duplicates
- -Internal Standard Performance
- -Pesticide Inst. Performance
- -Compound Identification
- -Compound Quantitation

Overall comments

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Compound not detected.

Reviewer: Melissa Solay Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets

II. HOLDING TIMES

Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED	VOA DATE ANAL	BNA DATE EXTR	BNA DATE ANAL	PEST DATE EXTR	PEST DATE ANAL
MW27150-03	1/3/93	1/20/93 17				
MW27150-03D	1/3/93	1/20/93 17				
MW27250-03	1/3/93	1/18/93 15				
MW27EB-03	1/3/93	1/19/93 16				

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

BNA & PEST - Extracted within 7 days, analyzed within 40 days, soils and water.

ACTION:

1. If holding times are exceeded all positive results are estimate (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

* NOTE: NO ACTION WILL BE TAKEN AS THIS IS NOT CONSIDERED A GROSS EXCEENCE OF THE CRITERIA.

REGION I
Data Review Worksheets

III. GC/MS TUNING

___ The DFTPP performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

X The BFB performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

If mass calibration is in error refer to the Region guidelines for expanded criteria. If necessary, all associated data as unusable (R).

REGION I
Data Review Worksheets

IV A. VOLATILE CALIBRATION VERIFICATION

Date of Initial Calibration : 12/17/92 1/18/93
Dates of Continuing Calibrations: 1/18/93, 1/19/93, 1/20
Instrument ID : K
Matrix/Level : LOW

DATE	CRITERIA OUT RF, %RSD, RF, %D	COMPOUND (VALUE)
1/18/93	%RSD	ACETONE (32.0)
	Samples Affected: MW27150-030, MW27150-03, MW27230-03, MW27E13-03	
1/18/93	%RSD	2-BUTANONE (31.8)
	Samples Affected: none	
1/18/93	%RSD	2-HEXANONE (33.8)
	Samples Affected: none	
1/20/93	%D	CHLOROMETHANE (-36.6)
	Samples Affected: none	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	

1. All $\overline{RF}$'s, and RF's must be >0.05
2. All %RSD's must be<30%
3. All %D's must be <25%

ACTION:
1. If any compound has an initial $\overline{RF}$ or a continuing RF of <0.05:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as unusable (R).

2. If any compound has a %RSD >30% or a %D >25%:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as estimated (UJ) if the %RSD or %D is >50%.

A separate worksheet should be filled out for each initial curve.

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks

Level: LOW

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS (ug/kg)
1/18/93	VBLK1	VOC/SOIL	ACETONE	43
1/19/93	VBLK2	VOC/SOIL	ACETONE	4

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks

Level: MED

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS (ug/kg)
1/20/93	VBLK3	VOC/SOIL	ACETONE	370

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: LOW

COMPOUND	MAX. CONC./ UNITS (ug/kg)	ACTION LEVEL/ UNITS	CRQL
ACETONE	4	40	

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: MED

COMPOUND	MAX. CONC./ UNITS (ug/kg)	ACTION LEVEL/ UNITS (ug/kg)	CRQL
ACETONE	370	3700	

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets all OK

VI. SURROGATE SPIKE RECOVERIES

List the percent recoveries which do not meet the criteria for surrogate recovery.

Matrix: SOIL

	VOA			B/N			A			PEST*
TR #'S	TOL	BFB	DCE	NBZ	FBP	TPH	PHL	2FP	TBP	DBC
QC Limits										
	to	to	to	to	to	to	to	to	to	to

Surrogate Actions: *-Advisory only

PERCENT RECOVERY

	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
Non-detected results	R	UJ	A

CRR = Contract Required Recovery Range.
Surrogate action should be applied:

1. If at least two surrogates in a B/N or A fraction or one surrogate in the VOA fraction are out of specification, but have recoveries of >10%.
2. If any one surrogate in a fraction shows <10% recovery.

REGION I
Data Review Worksheets

VII A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - all criteria was met

1. Matrix Spike/Matrix Spike Duplicate Recoveries and Precision

TR Nos. LCS1 LCS2 Level: LOW Matrix: SOIL

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ MS OR MSD	COMPOUND	%REC/ RPD	QC LIMITS

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY		
	<10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).

A separate worksheet should be used for each MS/MSD pair.

REGION I
Data Review Worksheets

VII A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - ALL CRITERIA WAS MET

1. Matrix Spike/Matrix Spike Duplicate Recoveries and Precision

TR Nos. LCS3 , _____ Level: MED Matrix: SOIL

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ MS OR MSD	COMPOUND	%REC/ RPD	QC LIMITS

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY		
	<10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).

A separate worksheet should be used for each MS/MSD pair.

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATE PRECISION - all o2

TR Nos. MW27150-03 MW27150-03D Matrix: SOIL

List the concentrations of the compounds which do not meet the following RPD criteria:

1. An RPD of <30% for water duplicates.
2. An RPD of <50% for soil duplicates.

FRACTION	COMPOUND	SAMPLE CONC	DUP SAMPLE CONC	RPD
SOIL/VOC	METHYLENE CHLORIDE	660 J	1300 U	NC
SOIL/VOC	2-BUTANONE	1400 U	390 J	NC
SOIL/VOC	TETRACHLOROETHENE	17000	25000	38

ACTIONS:

1. If the results for any componds do not meet the RPD criteria, flag the positive results for that compound as estimated.

2. If one value is non-detected, and one is above the CRQL:
   a. Flag the positive result as estimated (J).
   b. Flag the non-detected result as estimated (UJ).

NOTE: Professional judgement may be utilized to apply duplicate actions to all samples of a similar matrix.

A separate worksheet should be filled out for each field duplicate pair.

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE all ok

List the internal standard areas of samples which do not meet the criteria of +100% or -50% of the internal standard area in the associated continuing calibration standard.

SAMPLE ID	DATE	IS OUT	IS AREA/ RT	ACCEPTABLE RANGE	ACTION

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagged as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity is indicated. Non-detects should then be flagged as unusable (R).

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction.

REGION I
Data Review Worksheets

XII. SAMPLE QUANTITATION

In the space below, please show a minimum of one sample calculation per fraction:

VOA: Sample MW27150-03
Tetrachloroethene 17000

$$\frac{(148572)(250)(10000)(1)}{(189027)(0.375)(100)(4)(0.88)} \approx 15000$$

BNA: NOT APPLICABLE

PEST/PCB: NOT APPLICABLE

HMM Associates, Inc.
A Summit Company

6908/HAZ/10499O

April 16, 1993

Mr. James Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Organic Data Validation Report
Southwest Laboratory of Oklahoma
VOCs: 7 low concentration samples

Dear Mr. Keith:

Data validation was performed on the organic analytical data from 7 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988:

- data completeness
- holding times
- GC/MS tuning
- calibration
- laboratory, field, and trip blanks
- surrogate spike recoveries
- matrix spike/matrix spike duplicates
- field duplicates
- internal standard performance
- sample quantitation

- All criteria was met for this parameter

Data Completeness

A chain of custody was not provided with the data package. All laboratory forms were complete and legible.

196 Baker Avenue Concord, MA 01742 508/371-8000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-1042

Holding Times

The chain of custody was not provided, therefore, the data was evaluated based on the date received at the laboratory. All volatile organic analyses were performed within the required holding time.

GC/MS Tuning

All reported bromofluorobenzene (BFB) tunes met the requirements.

Calibrations

The volatile calibration summaries were reviewed, and all calibration check compound (CCC) and system performance check compound (SPCC) requirements were met. Two compounds had percent relative standard deviation (%RSDs) greater than 30%, but no action was taken as the compounds were not detected in the associated samples. Acetone had a percent difference (%D) in the water continuing calibration on 7/30/92 of 26, which exceeds the functional guidelines requirement of %D less than 25%. The positive results for acetone in water samples will be estimated (J) due to variable instrument response. Two other compounds had %Ds greater than 25%, but no action was taken as the compounds were not detected in the associated samples.

Blanks

There were no positive results reported in any of the volatile organic method blanks.

The following compounds were detected in field and trip blanks:

Acetone	84 ug/L
2-Butanone	41 ug/L
1,2-Dichloropropane	1 ug/L
Methylene Chloride	7 ug/L
Tetrachloroethene	1 ug/L
Toluene	2 ug/L
Xylene	2 ug/L

Results for acetone, 2-butanone, methylene chloride, and toluene less than ten times the blank concentration have been qualified U and treated as non detects. Results for 1,2-dichloropropane, tetrachloroethene, and xylene less than five times the blank concentration have been qualified U and treated as non detects.

Surrogate Spike Recoveries

All reported volatile surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate

The were no MS/MSD samples submitted to the laboratory, therefore, the lab analyzed laboratory control samples. All results for the laboratory control samples were reviewed and found to be acceptable.

Field Duplicates

No field duplicates were collected.

Internal Standard Performance

The internal Standard performance was acceptable in the volatile analyses.

Sample Quantitation

The reported sample results were reviewed and found to be reported accurately.

Data tables have been provided that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa Solari

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro

Cosmo Gallinaro
Project Manager

CASE No. 10499 SUMMARY OF VOLATILE ORGANIC ANALYSES - WATER 7K VALIDATED

	Blank	IT-2	IT-3	MW-12
EPA Sample No.	**FCRGW10302EB**	**FCRGWIT202**	**FCRGWIT302**	**FCRGWMW1202**
Lab Sample ID:	**1049906**	**1049905**	**1049904**	**1049903**
Matrix:	**Water**	**Water**	**Water**	**Water**
Level:	**Low**	**Low**	**Low**	**Low**
Date Collected:	**7/29/92**	**7/29/92**	**7/29/92**	**7/29/92**
Date Analyzed:	**8/4/92**	**7/30/92**	**7/30/92**	**8/4/92**
Dilution Factor:	**1**	**1**	**1**	**1**
Units:	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Compound				
Chloromethane	10 U	10 U	10 U	500 U
Bromomethane	10 U	10 U	10 U	500 U
Vinyl Chloride	10 U	10 U	10 U	500 U
Chloroethane	10 U	10 U	10 U	500 U
Methylene Chloride	2 J	5 U	5 U	250 U
Acetone	84 J	12 U	11 U	500 U
Carbon Disulfide	5 U	5 U	5 U	250 U
1,1-Dichloroethene	5 U	5 U	5 U	250 U
1,1-Dichloroethane	5 U	17	4 J	190 J
1,2-Dichloroethene (total)	5 U	30	5 U	250 U
Chloroform	5 U	5 U	5 U	250 U
1,2-Dichloroethane	5 U	5 U	5 U	250 U
2-Butanone	41	10 U	10 U	500 U
1,1,1-Trichloroethane	5 U	28	67	5400
Carbon Tetrachloride	5 U	5 U	5 U	250 U
Vinyl Acetate	10 U	10 U	10 U	500 U
Bromodichloromethane	5 U	5 U	5 U	250 U
1,2-Dichloropropane	1 J	5 U	5 U	250 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	250 U
Trichloroethene	5 U	39	22	4700
Dibromochloromethane	5 U	5 U	5 U	250 U
1,1,2-Trichloroethane	5 U	5 U	5 U	250 U
Benzene	5 U	5 U	5 U	250 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	250 U
Bromoform	5 U	5 U	5 U	250 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	150 J
2-Hexanone	10 U	10 U	10 U	500 U
Tetrachloroethene	5 U	10 U	8	5900
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	250 U
Toluene	2 J	5 U	5 U	250 U
Chlorobenzene	5 U	5 U	5 U	250 U
Ethylbenzene	5 U	5 U	5 U	250 U
Styrene	5 U	5 U	5 U	250 U
Xylene	5 U	5 U	5 U	250 U

Notes:

J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

JK

CASE No. 10499 SUMMARY OF VOLATILE ORGANIC ANALYSES - WATER VALIDATED

	MW2202	Trip Blank	SW-2
EPA Sample No.	**FCRGWMW2202**	**FCRGWTB4**	**FCRSWSW0202**
Lab Sample ID:	**1049902**	**1049907**	**1049901**
Matrix:	**Water**	**Water**	**Water**
Level:	**Low**	**Low**	**Low**
Date Collected:	**7/29/92**	**7/29/92**	**7/29/92**
Date Analyzed:	**8/4/92**	**8/4/92**	**7/30/92**
Dilution Factor:	**1**	**1**	**1**
Units:	**ug/L**	**ug/L**	**ug/L**
Compound			
Chloromethane	2000 U	10 U	10 U
Bromomethane	2000 U	10 U	10 U
Vinyl Chloride	2000 U	10 U	10 U
Chloroethane	2000 U	10 U	10 U
Methylene Chloride	1000 U	7	5 U
Acetone	2000 U	37 J	11 U
Carbon Disulfide	1000 U	5 U	5 U
1,1-Dichloroethene	1000 U	5 U	5 U
1,1-Dichloroethane	1000 U	5 U	5 U
1,2-Dichloroethene (total)	1000 U	5 U	5 U
Chloroform	1000 U	5 U	5 U
1,2-Dichloroethane	1000 U	5 U	5 U
2-Butanone	2000 U	10 U	10 U
1,1,1-Trichloroethane	1000 U	5 U	9
Carbon Tetrachloride	1000 U	5 U	5 U
Vinyl Acetate	2000 U	10 U	10 U
Bromodichloromethane	1000 U	5 U	5 U
1,2-Dichloropropane	1000 U	5 U	5 U
cis-1,3-Dichloropropene	1000 U	5 U	5 U
Trichloroethene	2500	5 U	17
Dibromochloromethane	1000 U	5 U	5 U
1,1,2-Trichloroethane	1000 U	5 U	5 U
Benzene	1000 U	5 U	5 U
trans-1,3-Dichloropropene	1000 U	5 U	5 U
Bromoform	1000 U	5 U	5 U
4-Methyl-2-Pentanone	2000 U	10 U	10 U
2-Hexanone	2000 U	10 U	10 U
Tetrachloroethene	21000	1 J	35
1,1,2,2-Tetrachloroethane	1000 U	5 U	5 U
Toluene	1000 U	5 U	5 U
Chlorobenzene	1000 U	5 U	5 U
Ethylbenzene	1000 U	5 U	5 U
Styrene	1000 U	5 U	5 U
Xylene	1000 U	2 J	5 U

Notes:

J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

EPA Sample No.	FCRGW10302EB	FCRGWIT202	FCRGWIT302	FCRGWMW1202
Lab Sample ID:	1049906	1049905	1049904	1049903
Matrix:	Water	Water	Water	Water
Level:	Low	Low	Low	Low
Date Collected:	7/29/92	7/29/92	7/29/92	7/29/92
Date Analyzed:	8/4/92	7/30/92	7/30/92	8/4/92
Dilution Factor:	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	10 U	10 U	10 U	500 U
Bromomethane	10 U	10 U	10 U	500 U
Vinyl Chloride	10 U	10 U	10 U	500 U
Chloroethane	10 U	10 U	10 U	500 U
Methylene Chloride	2 J	1 J	5 U	250 U
Acetone	84	12	11	500 U
Carbon Disulfide	5 U	5 U	5 U	250 U
1,1-Dichloroethene	5 U	5 U	5 U	250 U
1,1-Dichloroethane	5 U	17	4 J	190 J
1,2-Dichloroethene (total)	5 U	30	5 U	250 U
Chloroform	5 U	5 U	5 U	250 U
1,2-Dichloroethane	5 U	5 U	5 U	250 U
2-Butanone	41	10 U	10 U	500 U
1,1,1-Trichloroethane	5 U	28	67	5400
Carbon Tetrachloride	5 U	5 U	5 U	250 U
Vinyl Acetate	10 U	10 U	10 U	500 U
Bromodichloromethane	5 U	5 U	5 U	250 U
1,2-Dichloropropane	1 J	5 U	5 U	250 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	250 U
Trichloroethene	5 U	39	22	4700
Dibromochloromethane	5 U	5 U	5 U	250 U
1,1,2-Trichloroethane	5 U	5 U	5 U	250 U
Benzene	5 U	5 U	5 U	250 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	250 U
Bromoform	5 U	5 U	5 U	250 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	150 J
2-Hexanone	10 U	10 U	10 U	500 U
Tetrachloroethene	5 U	2 J	8	5900
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	250 U
Toluene	2 J	5 U	1 J	250 U
Chlorobenzene	5 U	5 U	5 U	250 U
Ethylbenzene	5 U	5 U	5 U	250 U
Styrene	5 U	5 U	5 U	250 U
Xylene	5 U	5 U	1 J	250 U

Notes:

J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

EPA Sample No.	FCRGWMW2202	FCRGWTB4	FCRSWSW0202
Lab Sample ID:	1049902	1049907	1049901
Matrix:	Water	Water	Water
Level:	Low	Low	Low
Date Collected:	7/29/92	7/29/92	7/29/92
Date Analyzed:	8/4/92	8/4/92	7/30/92
Dilution Factor:	1	1	1
Units:	ug/L	ug/L	ug/L
Compound			
Chloromethane	2000 U	10 U	10 U
Bromomethane	2000 U	10 U	10 U
Vinyl Chloride	2000 U	10 U	10 U
Chloroethane	2000 U	10 U	10 U
Methylene Chloride	1000 U	7	5 U
Acetone	2000 U	37	11
Carbon Disulfide	1000 U	5 U	5 U
1,1-Dichloroetbene	1000 U	5 U	5 U
1,1-Dichloroethane	1000 U	5 U	5 U
1,2-Dichloroethene (total)	1000 U	5 U	5 U
Chloroform	1000 U	5 U	5 U
1,2-Dichloroethane	1000 U	5 U	5 U
2-Butanone	2000 U	10 U	10 U
1,1,1-Trichloroethane	1000 U	5 U	9
Carbon Tetrachloride	1000 U	5 U	5 U
Vinyl Acetate	2000 U	10 U	10 U
Bromodichloromethane	1000 U	5 U	5 U
1,2-Dichloropropane	1000 U	5 U	5 U
cis-1,3-Dicbloropropene	1000 U	5 U	5 U
Trichloroethene	2500	5 U	17
Dibromochloromethane	1000 U	5 U	5 U
1,1,2-Trichloroethane	1000 U	5 U	5 U
Benzene	1000 U	5 U	5 U
trans-1,3-Dichloropropene	1000 U	5 U	5 U
Bromoform	1000 U	5 U	5 U
4-Methyl-2-Pentanone	2000 U	10 U	10 U
2-Hexanone	2000 U	10 U	10 U
Tetrachloroethene	21000	1 J	35
1,1,2,2-Tetrachloroethane	1000 U	5 U	5 U
Toluene	1000 U	5 U	5 U
Chlorobenzene	1000 U	5 U	5 U
Ethylbenzene	1000 U	5 U	5 U
Styrene	1000 U	5 U	5 U
Xylene	1000 U	2 J	5 U

Notes:

J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

FIGURE 8

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number

REGION I REVIEW OF ORGANIC
CONTRACT LABORATORY DATA PACKAGE

SOUTHWEST LABORATORY

The hardcopied (laboratory name) OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. WWENG SAS No. — Sampling Date(s) 7/29/92
SDG No. 10499 Matrix WATER Shipping Date(s) —
No. of Samples 7 Date Rec'd by Lab 7/29/92

Traffic Report Nos: FCRGWIT302, FCRGWMW1202, FCRGWMW2202, FCRGWIT202, FCRSWXW0202-
Trip Blank No.: FCRGWTB4
Equipment Blank No.: FCRGW10302EB
Field Dup Nos: —

SOW No. 2/88 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Data Completeness
- Holding Times
- GC/MS Tuning
- Calibrations
- Blanks
- Surrogate Recoveries
- Matrix Spike/Matrix Spike Dup
- Field Duplicates
- Internal Standard Performance
- Pesticide Inst. Performance
- Compound Identification
- Compound Quantitation

Overall Comments

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Compound not detected.

Reviewer: Melissa Stai Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets - all criteria was met

II. HOLDING TIMES

Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED*	VOA DATE ANAL	BNA DATE EXTR	BNA DATE ANAL	PEST DATE EXTR	PEST DATE ANAL
FCRGWI0230	7/29/92	8/4/92				
FCRGWIT202	7/29/92	7/30/92				
FCRGWIT302	7/29/92	7/30/92				
FCRGWMW202	7/29/92	8/4/92				
FCRGWMW2202	7/29/92	8/4/92				
FCRGWTB4	7/29/92	8/4/92				
FCRGWSW0202	7/29/92	7/30/92				

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

BNA & PEST - Extracted within 7 days, analyzed within 40 days, soils and water.

ACTION:

1. If holding times are exceeded all positive results are estimate (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

* HOLDING TIMES WERE EVALUATED BASED UPON DATE OF SAMPLE RECEIPT AT THE LABORATORY. A CHAIN OF CUSTODY WAS NOT PROVIDED WITH THE DATA PACKAGE.

REGION I
Data Review Worksheets

III. GC/MS TUNING

___ The DFTPP performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

X The BFB performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

If mass calibration is in error refer to the Region guidelines for expanded criteria. If necessary, all associated data as unusable (R).

REGION I
Data Review Worksheets

IV A. VOLATILE CALIBRATION VERIFICATION

Date of Initial Calibration : 7/17, 7/28
Dates of Continuing Calibrations: 8/3, 8/4, 7/30
Instrument ID : C
Matrix/Level : LOW

DATE	CRITERIA OUT RF, %RSD, RF, %D	COMPOUND (VALUE)
7/17	%RSD	VINYL ACETATE (48.4)
	Samples Affected: none	
7/17	%RSD	2-HEXANONE (31.6)
	Samples Affected: none	
8/3	%D	BROMOFORM (30.0)
	Samples Affected: none	
8/4	%D	BROMOFORM (32.8)
	Samples Affected: none	
8/4	%D	2-HEXANONE (39.3)
	Samples Affected:	
7/30	%D	ACETONE (-26.0)
	Samples Affected: FCRGWSW0202, FCRGWTB4, FCRGWIT302, FCRGWIT202, FCRGW1030ZEB	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	

1. All $\overline{RF}$'s, and RF's must be >0.05
2. All %RSD's must be<30%
3. All %D's must be <25%

ACTION:
1. If any compound has an initial $\overline{RF}$ or a continuing RF of <0.05:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as unusable (R).

2. If any compound has a %RSD >30% or a %D >25%:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as estimated (UJ) if the %RSD or %D is >50%.

A separate worksheet should be filled out for each initial curve.

ALL POSITIVE RESULTS FOR ACETONE WILL BE ESTIMATED (J).

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks-all ok

Level: LOW

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS (ug/L)
8/4/92	FCRGW1030ZEB	WATER/VOC	ACETONE	84
↓	↓	↓	2-BUTANONE	41
↓	↓	↓	METHYLENE CHLORIDE	2
↓	↓	↓	1,2-DICHLOROPROPANE	1
↓	↓	↓	TOLUENE	2
8/4/92	FCRGWTP34	WATER/VOC	METHYLENE CHLORIDE	7
↓	↓	↓	ACETONE	37
↓	↓	↓	TETRACHLOROETHENE	1
↓	↓	↓	XYLENE	2

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: LOW

COMPOUND	MAX. CONC./ UNITS (ug/L)	ACTION LEVEL/ UNITS (ug/L)	CRQL
ACETONE	84	840	10
2-BUTANONE	41	410	10
1,2-DICHLOROPROPANE	1	5	5
METHYLENE CHLORIDE	7	70	5
TETRACHLOROETHENE	1	5	5
TOLUENE	2	20	5
XYLENE	2	10	5

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

VI. SURROGATE SPIKE RECOVERIES - all criteria was met

List the percent recoveries which do not meet the criteria for surrogate recovery.

Matrix: WATER

	VOA			B/N			A			PEST*
TR #'S	TOL	BFB	DCF	NBZ	FBP	TPH	PHL	2FP	TBP	DBC
QC Limits										
	to	to	to	to	to	to	to	to	to	to

Surrogate Actions: *-Advisory only

	PERCENT RECOVERY		
	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
Non-detected results	R	UJ	A

CRR = Contract Required Recovery Range.
Surrogate action should be applied:

1. If at least two surrogates in a B/N or A fraction or one surrogate in the VOA fraction are out of specification, but have recoveries of >10%.
2. If any one surrogate in a fraction shows <10% recovery.

REGION I
Data Review Worksheets

VII A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - all criteria was met

1. Matrix Spike/Matrix Spike Duplicate Recoveries and Precision

TR Nos. LCS1, LCS2, LCS3 Level: LOW Matrix: WATER

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ MS OR MSD	COMPOUND	%REC/ RPD	QC LIMITS

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY		
	<10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).

A separate worksheet should be used for each MS/MSD pair.

NOTE: THERE WERE NO MS/MSD SAMPLES SUBMITTED, THEREFORE THE LABORATORY ANALYZED A CONTROL SAMPLE.

REGION I
Data Review Worksheets

VII B. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (Section 2)

3. Matrix Spike Duplicate - Unspiked Compounds – NOT APPLICABLE

TR Nos._____ , _____

List the concentrations of the unspiked compounds and determine the percent RSD's of the unspiked sample, matrix spike, and matrix spike duplicate. No limits have been developed for the RSD values of the unspiked compounds. .

FRACTION	COMPOUND	SAMPLE, MS, MSD CONC	%RSD

The reviewer must use professional judgement to determine if there is a need to qualify any of the unspiked compounds in the sample.

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATE PRECISION - NO FIELD DUPS. WERE COLLECTED

TR Nos._____ , _____ Matrix:_____

List the concentrations of the compounds which do not meet the following RPD criteria:

1. An RPD of <30% for water duplicates.
2. An RPD of <50% for soil duplicates.

FRACTION	COMPOUND	SAMPLE CONC	DUP SAMPLE CONC	RPD

ACTIONS:

1. If the results for any componds do not meet the RPD criteria, flag the positive results for that compound as estimated.

2. If one value is non-detected, and one is above the CRQL:
   a. Flag the positive result as estimated (J).
   b. Flag the non-detected result as estimated (UJ).

NOTE: Professional judgement may be utilized to apply duplicate actions to all samples of a similar matrix.

A separate worksheet should be filled out for each field duplicate pair.

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE - ALL CRITERIA WAS MET

List the internal standard areas of samples which do not meet the criteria of +100% or -50% of the internal standard area in the associated continuing calibration standard.

SAMPLE ID	DATE	IS OUT	IS AREA/ RT	ACCEPTABLE RANGE	ACTION

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagged as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity is indicated. Non-detects should then be flagged as unusable (R).

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction.

REGION I
Data Review Worksheets

XII. SAMPLE QUANTITATION

In the space below, please show a minimum of one sample calculation per fraction:

VOA: SAMPLE FCRGW1T302 FORM I 1,1,1-TCA = 67 ug/L

$$\frac{16224 \times 50}{151563 \times 0.753} \approx 70 \text{ ug/L}$$

BNA: NOT APPLICABLE

PEST/PCB: NOT APPLICABLE

HMM Associates, Inc.
A Summit Company

6908/HAZ/12787O

April 16, 1993

Mr. James Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Organic Data Validation Report
Southwest Laboratory of Oklahoma
VOCs: 12 low concentration samples

Dear Mr. Keith:

Data validation was performed on the organic analytical data from 12 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988:

* - data completeness
* - holding times
* - GC/MS tuning
  - calibration
  - laboratory, field, and trip blanks
* - surrogate spike recoveries
  - matrix spike/matrix spike duplicates
* - field duplicates
* - internal standard performance

196 Baker Avenue Concord, MA 01742 508/371-4000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-4642

* - sample quantitation

* All criteria was met for this parameter

Data Completeness

The package was complete and legible.

Holding Times

All volatile organic analyses were performed within the required holding time.

GC/MS Tuning

All reported bromofluorbenzene (BFB) tunes met the requirements.

Calibrations

The volatile calibration summaries were reviewed, and all calibration check compound (CCC) and system performance check compound (SPCC) requirements were met. All percent relative standard deviations (%RSDs) and percent differences (%Ds) were found to be within the required criteria.

Blanks

All method blanks analyzed by the laboratory were free of contamination.
The trip blank, 003TB, had a reported concentration of 10 ug/L of acetone.
The field blank, 003EB, had a reported concentration of 3 ug/L of chloroform.

Positive results for acetone that are less than ten times the blank concentration will be qualified U and treated as non detects.

Positive results for chloroform that are less than five times the blank concentration will be qualified U and treated as non detects.

Surrogate Spike Recoveries

All reported volatile surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate

All volatile MS/MSD recoveries were acceptable. The RPD for trichloroethene was greater than the QC limit of 14, therefore, trichloroethene will be estimated (J) in sample 8202203.

Field Duplicates

One field duplicate, 719021003D, was collected. The RPDs were found to be acceptable and no action will be taken.

Internal Standard Performance

The internal Standard performance was acceptable in the volatile analyses.

Sample Quantitation

The reported sample results were reviewed and found to be reported accurately.

Data tables have been provided that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa Solari

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

7K

CASE No. 12787 SUMMARY OF VOLATILE ORGANIC ANALYSES - WATER UNVALIDATED

	E. Blank	Trip Blank	PGP9-13'	PGP8-20	PGP6-25'	PGP7 13-15
EPA Sample No.	**003EB**	**03TB**	**613015003**	**618020003**	**625027003**	**713015003**
Lab Sample ID:	**12787.09**	**12787.14**	**12787.01**	**12787.02**	**12787.03**	**12787.04**
Matrix:	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Level:	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Date Collected:	**2/26/93**	**2/26/93**	**2/26/93**	**2/26/93**	**2/26/93**	**2/26/93**
Date Analyzed:	**3/9/93**	**3/8/93**	**3/8/93**	**3/8/93**	**3/8/93**	**3/8/93**
Dilution Factor:	**1**	**1**	**1**	**1**	**1**	**1**
Units:	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Compound						
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 U	10	15	12	10 U	16
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	2 J	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	2 J	42	10 U
Chloroform	3 J	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	2 J	11	2 J
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	3 J	1 J
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	3 J	4 J	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U
Xylene	10 U	10 U	1 J	2 J	10 U	10 U

Notes:

D = Identifies all compounds reported in an anlysis at a secondary dilution factor.

E = Identifies compounds that have exceeded the calibration range of the instrument.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

CASE No. 12787 SUMMARY OF VOLATILE ORGANIC ANALYSES - WATER JK UNVALIDATED

	PGP7-19	PGP7-19dupe	PGP7-24.5	PGP8	PGP-9	dilution
EPA Sample No.	719021003	719021003D	724526503	820022003	913015003	913015003DL
Lab Sample ID:	12787.05	12787.07	12787.06	12787.10	12787.08	12787.08dl
Matrix:	Water	Water	Water	Water	Water	Water
Level:	Low	Low	Low	Low	Low	Low
Date Collected:	2/26/93	2/26/93	2/26/93	2/26/93	2/26/93	2/26/93
Date Analyzed:	3/8/93	3/8/93	3/8/93	3/8/93	3/8/93	39/93
Dilution Factor:	1	1	1	1	1	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Compound						
Chloromethane	10 U	10 U	10 U	10 U	10 U	100 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	100 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	100 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	100 U
Methylene Chloride	10 U	10 U	10 U	10 U	2 J	100 U
Acetone	13	13	10 U	10 U	10 U	100 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	100 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	6 J	100 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	18	100 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U	100 U
Chloroform	10 U	10 U	10 U	10 U	10 U	100 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	100 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	100 U
1,1,1-Trichloroethane	14	14	10 U	82	340 E	280 D
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	100 U
[illegible]nodichloromethane	10 U	10 U	10 U	10 U	10 U	100 U
[illegible]-Dichloropropane	10 U	10 U	10 U	10 U	10 U	100 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	100 U
Trichloroethene	14	14	10 U	120	1600 E	1400 D
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	100 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	100 U
Benzene	10 U	10 U	10 U	10 U	10 U	100 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	100 U
Bromoform	10 U	10 U	10 U	10 U	10 U	100 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	100 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	100 U
Tetrachloroethene	10 U	10 U	10 U	51	10 U	100 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	100 U
Toluene	10 U	10 U	10 U	10 U	10 U	100 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	100 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	100 U
Styrene	10 U	10 U	10 U	10 U	10 U	100 U
Xylene	10 U	10 U	10 U	10 U	10 U	100 U

Notes:

D = Identifies all compounds reported in an anlysis at a secondary dilution factor.

E = Identifies compounds that have exceeded the calibration range of the instrument.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

EPA Sample No.	003EB	03TB	613015003	618020003	625027003	713015003
Lab Sample ID:	12787.09	12787.14	12787.01	12787.02	12787.03	12787.04
Matrix:	Water	Water	Water	Water	Water	Water
Level:	Low	Low	Low	Low	Low	Low
Date Collected:	2/26/93	2/26/93	2/26/93	2/26/93	2/26/93	2/26/93
Date Analyzed:	3/9/93	3/8/93	3/8/93	3/8/93	3/8/93	3/8/93
Dilution Factor:	1	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Compound						
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 U	10	15 U	12 U	10 U	16 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	2 J	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	2 J	42	10 U
Chloroform	3 J	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	2 J	11	2 J
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	3 J	1 J
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	3 J	4 J	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U
Xylene	10 U	10 U	1 J	2 J	10 U	10 U

Notes:

D = Identifies an analysis at a secondary dilution factor.

E = Identifies compounds that have exceeded the calibration range of the instrument.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

CASE No. 12787 SUMMARY OF VOLATILE ORGANIC ANALYSES - WATER VALIDATED

EPA Sample No.	719021003	719021003D	724526503	820022003	913015003	913015003DL
Lab Sample ID:	12787.05	12787.07	12787.06	12787.10	12787.08	12787.08dl
Matrix:	Water	Water	Water	Water	Water	Water
Level:	Low	Low	Low	Low	Low	Low
Date Collected:	2/26/93	2/26/93	2/26/93	2/26/93	2/26/93	2/26/93
Date Analyzed:	3/8/93	3/8/93	3/8/93	3/8/93	3/8/93	39/93
Dilution Factor:	1	1	1	1	1	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Compound						
Chloromethane	10 U	10 U	10 U	10 U	10 U	100 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	100 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	100 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	100 U
Methylene Chloride	10 U	10 U	10 U	10 U	2 J	100 U
Acetone	13 U	13 U	10 U	10 U	10 U	100 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	100 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	6 J	100 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	18	100 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U	100 U
Chloroform	10 U	10 U	10 U	10 U	10 U	100 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	100 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	100 U
1,1,1-Trichloroethane	14	14	10 U	82	340 E	280 D
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	100 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	100 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	100 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	100 U
Trichloroethene	14	14	10 U	120 J	1600 E	1400 D
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	100 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	100 U
Benzene	10 U	10 U	10 U	10 U	10 U	100 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	100 U
Bromoform	10 U	10 U	10 U	10 U	10 U	100 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	100 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	100 U
Tetrachloroethene	10 U	10 U	10 U	51	10 U	100 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	100 U
Toluene	10 U	10 U	10 U	10 U	10 U	100 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	100 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	100 U
Styrene	10 U	10 U	10 U	10 U	10 U	100 U
Xylene	10 U	10 U	10 U	10 U	10 U	100 U

Notes:
D = Identifies an analysis at a secondary dilution factor.
E = Identifies compounds that have exceeded the calibration range of the instrument.
J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

FIGURE 8

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number

REGION I REVIEW OF ORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. WWENG SAS No. Sampling Date(s) 2/26/93
SDG No. 12987 Matrix WATER Shipping Date(s) —
No. of Samples 12 Date Rec'd by Lab 3/2/93

Traffic Report Nos: 613015003, 618020003, 625027003, 713015003, 719021003, 913015003, 913015003DL, 724526503, 820022003
Trip Blank No.: 003TB
Equipment Blank No.: 003EB
Field Dup Nos: 719021003D

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Data Completeness
- Holding Times
- GC/MS Tuning
- Calibrations
- Blanks
- Surrogate Recoveries
- Matrix Spike/Matrix Spike Dup
- Field Duplicates
- Internal Standard Performance
- Pesticide Inst. Performance
- Compound Identification
- Compound Quantitation

Overall comments

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Compound not detected.

Reviewer: Melissa Solari Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets - all criteria was met

II. HOLDING TIMES

Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED	VOA DATE ANAL	BNA DATE EXTR	BNA DATE ANAL	PEST DATE EXTR	PEST DATE ANAL
003EB	2/26/93	3/9/93 10				
03TB	2/26/93	3/8/93 10				
613015003	2/26/93	3/8/93 10				
618022003	2/26/93	3/8/93 10				
625027003	2/26/93	3/8/93 10				
713015003	2/26/93	3/8/93 10				
719021003	2/26/93	3/8/93 10				
719021003D	2/26/93	3/8/93 10				
724526503	2/26/93	3/8/93 10				
820022003	2/26/93	3/8/93 10				
913015003	2/26/93	3/8/93 10				
913015003DL	2/26/93	3/8/93 10				

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

BNA & PEST - Extracted within 7 days, analyzed within 40 days, soils and water.

ACTION:

1. If holding times are exceeded all positive results are estimate (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

REGION I
Data Review Worksheets

III. GC/MS TUNING

___ The DFTPP performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

X The BFB performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

If mass calibration is in error refer to the Region guidelines for expanded criteria. If necessary, all associated data as unusable (R).

REGION I
Data Review Worksheets

IV A. VOLATILE CALIBRATION VERIFICATION - ALL CRITERIA WAS MET

Date of Initial Calibration : 2/23
Dates of Continuing Calibrations: 3/8, 3/9
Instrument ID : R
Matrix/Level : LOW

DATE	CRITERIA OUT RF, %RSD, RF, %D	COMPOUND	(VALUE)
	Samples Affected:		
	Samples Affected:		
	Samples Affected:		
	Samples Affected:		
	Samples Affected:		
	Samples Affected:		
	Samples Affected:		
	Samples Affected:		
	Samples Affected:		
	Samples Affected:		

1. All $\overline{RF}$'s, and RF's must be >0.05
2. All %RSD's must be<30%
3. All %D's must be <25%

ACTION:
1. If any compound has an initial $\overline{RF}$ or a continuing RF of <0.05:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as unusable (R).

2. If any compound has a %RSD >30% or a %D >25%:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as estimated (UJ) if the %RSD or %D is >50%.

A separate worksheet should be filled out for each initial curve.

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks - all ok

Level: LOW

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS (ug/L)
3/9/93	003EB	VOC/WATER	CHLOROFORM	3
3/8/93	003TB	VOC/WATER	ACETONE	10

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: LOW

COMPOUND	MAX. CONC./ UNITS (ug/L)	ACTION LEVEL/ UNITS	CRQL
ACETONE	10	100	10
CHLOROFORM	3	15	10

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

VI. SURROGATE SPIKE RECOVERIES - ALL CRITERIA WAS MET

List the percent recoveries which do not meet the criteria for surrogate recovery.

Matrix: WATER

	VOA			B/N			A			PEST*
TR #'S	TOL	BFB	DCF	NBZ	FBP	TPH	PHL	2FP	TBP	DBC
QC Limits										
	to	to	to	to	to	to	to	to	to	to

Surrogate Actions: *-Advisory only

	PERCENT RECOVERY		
	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
Non-detected results	R	UJ	A

CRR = Contract Required Recovery Range.
Surrogate action should be applied:

1. If at least two surrogates in a B/N or A fraction or one surrogate in the VOA fraction are out of specification, but have recoveries of >10%.
2. If any one surrogate in a fraction shows <10% recovery.

REGION I
Data Review Worksheets

VII A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

1. Matrix Spike/Matrix Spike Duplicate Recoveries and Precision

TR Nos. 82002203MS, 82002203MSD Level: LOW Matrix: WATER

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ MS OR MSD	COMPOUND	%REC/ RPD	QC LIMITS
VOC/MSD	TCE	40 RPD	14

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY		
	<10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).
TCE WILL BE ESTIMATED (J) FOR POSITIVE RESULTS.

A separate worksheet should be used for each MS/MSD pair.

REGION I
Data Review Worksheets

VII B. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (Section 2)

3. Matrix Spike Duplicate - Unspiked Compounds - all OK

TR Nos 8200220345, 8200220345MSD

List the concentrations of the unspiked compounds and determine the percent RSD's of the unspiked sample, matrix spike, and matrix spike duplicate. No limits have been developed for the RSD values of the unspiked compounds. .

FRACTION	COMPOUND	SAMPLE	MS	MSD	CONC	%RSD
WATER	1,1,1-TRICHLOROETHANE	82	78	71		5.14
WATER	TETRACHLOROETHENE	51	52	49		2.4

The reviewer must use professional judgement to determine if there is a need to qualify any of the unspiked compounds in the sample.

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATE PRECISION - all ok

TR Nos. 719021003, 719021003D Matrix: WATER

List the concentrations of the compounds which do not meet the following RPD criteria:

1. An RPD of <30% for water duplicates.
2. An RPD of <50% for soil duplicates.

FRACTION	COMPOUND	SAMPLE CONC	DUP SAMPLE CONC	RPD
	1,1,1-TRICHLOROETHANE	14	14	0
	TRICHLOROETHENE	14	14	0

ACTIONS:

1. If the results for any componds do not meet the RPD criteria, flag the positive results for that compound as estimated.

2. If one value is non-detected, and one is above the CRQL:
   a. Flag the positive result as estimated (J).
   b. Flag the non-detected result as estimated (UJ).

NOTE: Professional judgement may be utilized to apply duplicate actions to all samples of a similar matrix.

A separate worksheet should be filled out for each field duplicate pair.

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE - ALL CRITERIA WAS MET.

List the internal standard areas of samples which do not meet the criteria of +100% or -50% of the internal standard area in the associated continuing calibration standard.

SAMPLE ID	DATE	IS OUT	IS AREA/ RT	ACCEPTABLE RANGE	ACTION

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagged as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity is indicated. Non-detects should then be flagged as unusable (R).

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction.

REGION I
Data Review Worksheets

XII. SAMPLE QUANTITATION

In the space below, please show a minimum of one sample calculation per fraction:

VOA: SAMPLE 7190210030 TCE = 14ug/L on FORM I

$$\frac{61092 \times 50}{455020 \times 0.449} = \approx 14.95 \text{ ug/L}$$

BNA: NOT APPLICABLE

PEST/PCB: NOT APPLICABLE

HMM Associates, Inc.
A Summit Company

6908/HAZ/12808O

April 15, 1993

Mr. James Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Organic Data Validation Report
Southwest Laboratory of Oklahoma
VOCs: 4 low concentration samples

Dear Mr. Keith:

Data validation was performed on the organic analytical data from 4 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988:

* - data completeness
* - holding times
* - GC/MS tuning
* - calibrations
  - laboratory, field, and trip blanks
* - surrogate spike recoveries
* - matrix spike/matrix spike duplicates
* - field duplicates
* - internal standard performance
* - sample quantitation

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Three Executive Park Drive Bedford, NH 03110 603/647-4010 Fax 603/626-4642

* All criteria was met for this parameter

Data Completeness

The package was complete and legible.

Holding Times

All volatile organic analyses were performed within the required holding time.

GC/MS Tuning

All reported bromofluorobenzene (BFB) tunes met the requirements.

Calibrations

The volatile calibration summaries were reviewed, and all calibration check compound (CCC) and system performance check compound (SPCC) requirements were met. All percent relative standard deviations (%RSDs) and percent differences (%Ds) were found to be within the required criteria.

Blanks

There were no positive results reported in any of the volatile organic method blanks.

The field blank, GWPGP03EB, had reported concentrations of 26 ug/L for acetone and 2 ug/L for toluene.

Results for acetone and toluene less than ten times the blank concentration have been qualified U and treated as non detects.

Surrogate Spike Recoveries

All reported volatile surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate

All volatile MS/MSD recoveries and relative percent differences (RPDs) were acceptable.

Field Duplicates

One field duplicate, GWPGP1003D, was collected. The RPDs were found to be acceptable and no action was taken.

Internal Standard Performance

The internal Standard performance was acceptable in the volatile analyses.

Sample Quantitation

The reported sample results were reviewed and found to be reported accurately.

Data tables have been provided that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa Solari

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

JK

CASE No. 12808 SUMMARY OF VOLATILE ORGANIC ANALYSES - WATER VALIDATED

	Blank	PGP-10	PGP-10 Dupe	Trip Blank
EPA Sample No.	**GWPGP03EB**	**GWPGP1003**	**GWPGP1003D**	**GWPGP1003TB**
LAB Sample ID:	**12808.01**	**12808.02**	**12808.05**	**12808.06**
Matrix:	**Water**	**Water**	**Water**	**Water**
Level:	**Low**	**Low**	**Low**	**Low**
Date Collected:	**3/2/93**	**3/2/93**	**3/2/93**	**3/2/93**
Date Analyzed:	**3/5/93**	**3/5/93**	**3/5/93**	**3/5/93**
Dilution Factor:	**1**	**1**	**1**	**1**
Units:	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Compound				
Chloromethane	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U
Acetone	26	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U
1,2-Dichloroethene	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	15	13	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U
Toluene	2 J	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U
Xylene	10 U	10 U	10 U	10 U

Notes:

J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

EPA Sample No.	GWPGP03EB	GWPGP1003	GWPGP1003D	GWPGP1003TB
LAB Sample ID:	12808.01	12808.02	12808.05	12808.06
Matrix:	Water	Water	Water	Water
Level:	Low	Low	Low	Low
Date Collected:	3/2/93	3/2/93	3/2/93	3/2/93
Date Analyzed:	3/5/93	3/5/93	3/5/93	3/5/93
Dilution Factor:	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U
Acetone	26	10 U	9 J	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U
1,2-Dichloroethene	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	15	13	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U
Toluene	2 J	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U
Xylene	10 U	10 U	10 U	10 U

Notes:

J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

FIGURE 8

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number _____

REGION I REVIEW OF ORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. WWENG SAS No. _____ Sampling Date(s) 3/2/93
SDG No. 12808 Matrix WATER Shipping Date(s) —
No. of Samples 6 Date Rec'd by Lab 3/3/93

Traffic Report Nos: GWPGP1003, GWPGP1003MS, GWPGP1003MSD

Trip Blank No.: GWPGP1003TB
Equipment Blank No.: GWPGP03EB
Field Dup Nos: GWPGP1003D

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -GC/MS Tuning
- -Calibrations
- -Blanks
- -Surrogate Recoveries
- -Matrix Spike/Matrix Spike Dup
- -Field Duplicates
- -Internal Standard Performance
- -Pesticide Inst. Performance
- -Compound Identification
- -Compound Quantitation

Overall comments _____

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Compound not detected.

Reviewer: Melissa Solari Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets - all criteria was met

II. HOLDING TIMES

Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED	VOA DATE ANAL	BNA DATE EXTR	BNA DATE ANAL	PEST DATE EXTR	PEST DATE ANAL
GWPGP03EB	3/2/93	3/5/93 3				
GWPGP1003	3/2/93	3/5/93 3				
GWPGP1003D	3/2/93	3/5/93 3				
GWPGP1003TB	3/2/93	3/5/93 3				

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

BNA & PEST - Extracted within 7 days, analyzed within 40 days, soils and water.

ACTION:

1. If holding times are exceeded all positive results are estimate (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

REGION I
Data Review Worksheets

III. GC/MS TUNING

___ The DFTPP performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

X The BFB performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

If mass calibration is in error refer to the Region guidelines for expanded criteria. If necessary, all associated data as unusable (R).

REGION I
Data Review Worksheets

IV A. VOLATILE CALIBRATION VERIFICATION - ALL CRITERIA WAS MET

Date of Initial Calibration : 2/23
Dates of Continuing Calibrations: 3/5
Instrument ID : F
Matrix/Level : LOW

DATE	CRITERIA OUT RF, %RSD, RF, %D	COMPOUND (VALUE)
____	Samples Affected:	
____	Samples Affected:	
____	Samples Affected:	
____	Samples Affected:	
____	Samples Affected:	
____	Samples Affected:	
____	Samples Affected:	
____	Samples Affected:	
____	Samples Affected:	
____	Samples Affected:	

1. All $\overline{RF}$'s, and RF's must be >0.05
2. All %RSD's must be<30%
3. All %D's must be <25%

ACTION:
1. If any compound has an initial $\overline{RF}$ or a continuing RF of <0.05:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as unusable (R).

2. If any compound has a %RSD >30% or a %D >25%:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as estimated (UJ) if the %RSD or %D is >50%.

A separate worksheet should be filled out for each initial curve.

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks - all ok

Level: LOW

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS (ug/L)
3/5/93	GWPGP03EB	VOC/WATER	ACETONE	26
3/5/93	GWPGP03EB	VOC/WATER	TOLUENE	2

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: LOW

COMPOUND	MAX. CONC./ UNITS (UG/L)	ACTION LEVEL/ UNITS(UG/L)	CRQL
ACETONE	26	260	10
TOLUENE	2	20	10

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

VI. SURROGATE SPIKE RECOVERIES - all critria was met

List the percent recoveries which do not meet the criteria for surrogate recovery.

Matrix: WATER

	VOA			B/N			A			PEST*
TR #'S	TOL	BFB	DCF	NBZ	FBP	TPH	PHL	2FP	TBP	DBC
QC Limits										
	to	to	to	to	to	to	to	to	to	to

Surrogate Actions: *-Advisory only

	PERCENT RECOVERY		
	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
Non-detected results	R	UJ	A

CRR = Contract Required Recovery Range.
Surrogate action should be applied:

1. If at least two surrogates in a B/N or A fraction or one surrogate in the VOA fraction are out of specification, but have recoveries of >10%.
2. If any one surrogate in a fraction shows <10% recovery.

REGION I
Data Review Worksheets

VII A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - all criteria was met.

1. Matrix Spike/Matrix Spike Duplicate Recoveries and Precision

TR Nos. GWPGP1003MS, GWPGP1003MS Level: LOW Matrix: WATER

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ MS OR MSD	COMPOUND	%REC/ RPD	QC LIMITS

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY		
	<10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).

A separate worksheet should be used for each MS/MSD pair.

REGION I
Data Review Worksheets

VII B. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (Section 2)

3. Matrix Spike Duplicate - Unspiked Compounds

TR Nos. GWPGP1003MS GWPGP1003MSD

List the concentrations of the unspiked compounds and determine the percent RSD's of the unspiked sample, matrix spike, and matrix spike duplicate. No limits have been developed for the RSD values of the unspiked compounds. .

FRACTION	COMPOUND	SAMPLE, MS, MSD CONC			%RSD
WATER/VOC	1,1,1-TCA	15	8	7	60,72
WATER/VOC	ACETONE	10U	10U	11	NC*

The reviewer must use professional judgement to determine if there is a need to qualify any of the unspiked compounds in the sample.

* DUE TO BLANK CONTAMINATION

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATE PRECISION - ALL CRITERIA WAS MET

TR Nos. GWPGP1003, GWPGP1003D Matrix: WATER

List the concentrations of the compounds which do not meet the following RPD criteria:

1. An RPD of <30% for water duplicates.
2. An RPD of <50% for soil duplicates.

FRACTION	COMPOUND	SAMPLE CONC	DUP SAMPLE CONC	RPD
VOC	1,1,1-TCA	15	13	14
VOC	ACETONE	ND	9	NC *

* ACETONE WILL NOT BE QUALIFIED DUE TO BLANK CONTAMINATION

ACTIONS:

1. If the results for any componds do not meet the RPD criteria, flag the positive results for that compound as estimated.

2. If one value is non-detected, and one is above the CRQL:
   a. Flag the positive result as estimated (J).
   b. Flag the non-detected result as estimated (UJ).

NOTE: Professional judgement may be utilized to apply duplicate actions to all samples of a similar matrix.

A separate worksheet should be filled out for each field duplicate pair.

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE - ALL CRITERIA WAS MET

List the internal standard areas of samples which do not meet the criteria of +100% or -50% of the internal standard area in the associated continuing calibration standard.

SAMPLE ID	DATE	IS OUT	IS AREA/ RT	ACCEPTABLE RANGE	ACTION

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagged as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity is indicated. Non-detects should then be flagged as unusable (R).

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction.

HMM Associates, Inc.
A Summit Company

6908/HAZ/12681O

April 16, 1993

Mr. James Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Organic Data Validation Report
Southwest Laboratory of Oklahoma
VOCs: 3 low concentration samples

Dear Mr. Keith:

Data validation was performed on the organic analytical data from 3 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988:

* - data completeness
* - holding times
* - GC/MS tuning
  - calibration
  - laboratory, field, and trip blanks
* - surrogate spike recoveries
* - matrix spike/matrix spike duplicates
  - field duplicates
* - internal standard performance

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Three Executive Park Drive Bedford, NH 03110 603/647-1010 Fax 603/626-4642

* - sample quantitation

* All criteria was met for this parameter

Data Completeness

The package was complete and legible.

Holding Times

All volatile organic analyses were performed within the required holding time.

GC/MS Tuning

All reported BFB tunes met the requirements.

Calibrations

The volatile calibration summaries were reviewed, and all calibration check compound (CCC) and system performance check compound (SPCC) requirements were met. 2-Hexanone had a percent relative standard deviation (%RSD) of 33.6 in the water continuing calibration on 2/22/93, which is greater than the requirement of less than 30%. No action was taken because there were no positive results for 2-hexanone. Three other compounds had percent differences (%Ds) in the water continuing calibrations which were greater than the functional guidelines requirement of %D less than 25%. No action was taken as the compounds were not detected in the associated samples.

Blanks

Method VBLK2 had a reported concentration of 1 ug/L of chloroform, however, there were no positive results reported in any of the volatile organic samples.

The following compounds were detected in the trip blank:

Acetone	4 ug/L
Tetrachloroethene	2 ug/L

Results for acetone less than ten times the blank concentration have been qualified U and treated as non detects.

Results for tetrachloroethene less than five times the blank concentration have been qualified U and treated as non detects.

Surrogate Spike Recoveries

All reported volatile surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate

All volatile MS/MSD recoveries and relative percent differences (RPDs) were acceptable.

Field Duplicates

One field duplicate, FCRGWPGP303, was collected. The (RPD) for 1,1-dichloroethane was 66%, which is greater than the less than 30% requirement for water samples.

However, 1,1-dichloroethane has already been estimated (J) and no action will be taken.

Internal Standard Performance

The internal standard performance was acceptable in the volatile analyses.

Sample Quantitation

The reported sample results were reviewed and found to be reported accurately.

Data tables have been provided that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa Solari

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

JK

	Trip Blank	PGP-3	PGP-3 dup
EPA Sample No.	**RGWPGP0003tb**	**RGWPGP303**	**FCRGWPGP303d**
Lab Sample ID	**12681.05**	**12681.01**	**12681.02**
Matrix:	**Water**	**Water**	**Water**
Level:	**Low**	**Low**	**Low**
Date Collected:	**2/20/93**	**2/20/93**	**2/20/93**
Date Analyzed:	**2/27/93**	**2/26/93**	**2/26/93**
Dilution Factor:	**1**	**1**	**1**
Units:	**ug/L**	**ug/L**	**ug/L**
Compound			
Chloromethane	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U
Acetone	4 J	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,1-Dichloroethane	10 U	2 J	1 J
1,2-Dichloroethene (total)	10 U	2 J	2 J
Chloroform	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	1 J	1 J
Carbon Tetrachloride	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
Benzene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
Tetrachloroethene	2 J	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
Toluene	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U
Styrene	10 U	10 U	10 U
Xylene	10 U	10 U	10 U

Notes:

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

EPA Sample No.	RGWPGP0003tb	RGWPGP303	FCRGWPGP303d
Lab Sample ID	12681.05	12681.01	12681.02
Matrix:	Water	Water	Water
Level:	Low	Low	Low
Date Collected:	2/20/93	2/20/93	2/20/93
Date Analyzed:	2/27/93	2/26/93	2/26/93
Dilution Factor:	1	1	1
Units:	ug/L	ug/L	ug/L
Compound			
Chloromethane	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U
Acetone	4 J	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,1-Dichloroethane	10 U	2 J	1 J
1,2-Dichloroethene (total)	10 U	2 J	2 J
Chloroform	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	1 J	1 J
Carbon Tetrachloride	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
Benzene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
Tetrachloroethene	2 J	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
Toluene	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U
Styrene	10 U	10 U	10 U
Xylene	10 U	10 U	10 U

Notes:
J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

FIGURE 8

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RF1
Reference Number

REGION I REVIEW OF ORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. WWENG SAS No. Sampling Date(s) 2/18/93
SDG No. 12681 Matrix WATER Shipping Date(s) —
No. of Samples 5 Date Rec'd by Lab 2/20/93

Traffic Report Nos: RGWPGP303, RGWPGP303MS, RGWPGP303MSD

Trip Blank No.: RGWPGP0003TB
Equipment Blank No.: —
Field Dup Nos: RGWPGP303d

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -GC/MS Tuning
- -Calibrations
- -Blanks
- -Surrogate Recoveries
- -Matrix Spike/Matrix Spike Dup
- -Field Duplicates
- -Internal Standard Performance
- -Pesticide Inst. Performance
- -Compound Identification
- -Compound Quantitation

Overall comments

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Compound not detected.

Reviewer: Melissa Blau Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets - all ok

II. HOLDING TIMES Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED	VOA DATE ANAL	BNA DATE EXTR	BNA DATE ANAL	PEST DATE EXTR	PEST DATE ANAL
RGWPGP0003tb	2/18/93	2/27/93 9				
RGWPGP303	2/18/93	2/26/93 8				
FC RGWPGP303d	2/18/93	2/26/93 8				
RGWPGP303MS	2/18/93	2/26/93 8				
RGWPGP303MSD	2/18/93	2/26/93 8				

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

BNA & PEST - Extracted within 7 days, analyzed within 40 days, soils and water.

ACTION:
1. If holding times are exceeded all positive results are estimate (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

REGION I
Data Review Worksheets

III. GC/MS TUNING

___ The DFTPP performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

X The BFB performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

If mass calibration is in error refer to the Region guidelines for expanded criteria. If necessary, all associated data as unusable (R).

REGION I
Data Review Worksheets

IV A. VOLATILE CALIBRATION VERIFICATION

Date of Initial Calibration : 2/22/93
Dates of Continuing Calibrations: 2/26/93, 2/27/93
Instrument ID : N
Matrix/Level : LOW

DATE	CRITERIA OUT RF, %RSD, RF, %D	COMPOUND (VALUE)
2/22		2-HEXANONE (33.6)
	Samples Affected: none	
2/26	%D	2-BUTANONE (29.7)
	Samples Affected: none	
2/26	%D	4-METHYL-2-PENTANONE (33.7)
	Samples Affected: none	
2/26	%D	2-HEXANONE (46.3)
	Samples Affected: none	
2/27	%D	2-BUTANONE (33.4)
	Samples Affected: none	
2/27	%D	4-METHYL-2-PENTANONE (40.4)
	Samples Affected: none	
2/27	%D	2-HEXANONE (35.3)
	Samples Affected: none	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	

1. All $\overline{RF}$'s, and RF's must be >0.05
2. All %RSD's must be<30%
3. All %D's must be <25%

ACTION:
1. If any compound has an initial $\overline{RF}$ or a continuing RF of <0.05:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as unusable (R).

2. If any compound has a %RSD >30% or a %D >25%:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as estimated (UJ) if the %RSD or %D is >50%.

A separate worksheet should be filled out for each initial curve.

* NO ACTION TAKEN DUE TO CALIBRATIONS

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks

Level: LOW

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS(ug/L)
2/27	VBLK2	VOC/WATER	CHLOROFORM	1

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS(ug/L)
2/27	RGNPGP0003tb	VOC/WATER	ACETONE	4
2/27	RGNRGP0003tb	VOC/WATER	PCE	2

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: LOW

COMPOUND	MAX. CONC./ UNITS (ug/L)	ACTION LEVEL/ UNITS (ug/L)	CRQL
CHLOROFORM	1	5	10
ACETONE	4	40	10
TETRACHLOROETHENE	2	10	10

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

VI. SURROGATE SPIKE RECOVERIES - all ok

List the percent recoveries which do not meet the criteria for surrogate recovery.

Matrix: WATER

	VOA			B/N			A			PEST*
TR #'S	TOL	BFB	DCE	NBZ	FBP	TPH	PHL	2FP	TBP	DBC
QC Limits										
	to	to	to	to	to	to	to	to	to	to

Surrogate Actions: *-Advisory only

	PERCENT RECOVERY		
	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
Non-detected results	R	UJ	A

CRR = Contract Required Recovery Range.
Surrogate action should be applied:

1. If at least two surrogates in a B/N or A fraction or one surrogate in the VOA fraction are out of specification, but have recoveries of >10%.
2. If any one surrogate in a fraction shows <10% recovery.

REGION I
Data Review Worksheets

VII A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - all OK

1. Matrix Spike/Matrix Spike Duplicate Recoveries and Precision

TR Nos. RGW76P303MS, RGW76P303MSD Level: LOW Matrix: WATER

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ MS OR MSD	COMPOUND	%REC/ RPD	QC LIMITS

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY		
	<10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).

A separate worksheet should be used for each MS/MSD pair.

REGION I
Data Review Worksheets

VII B. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (Section 2)

3. Matrix Spike Duplicate - Unspiked Compounds

TR Nos. RGWPGP303HS RGWPGP303HSD

List the concentrations of the unspiked compounds and determine the percent RSD's of the unspiked sample, matrix spike, and matrix spike duplicate. No limits have been developed for the RSD values of the unspiked compounds. .

FRACTION	COMPOUND	SAMPLE	MS	MSD	CONC	%RSD
WATER/VOC	1,1-DICHLOROETHANE	2	1	1		60,60
WATER/VOC	1,2-DICHLOROETHENE	2	2	1		0,40
WATER/VOC	1,1,1-TRICHLOROETHANE	1	1	ND		0, NC

The reviewer must use professional judgement to determine if there is a need to qualify any of the unspiked compounds in the sample.

* NO ACTION TAKEN DUE TO UNSPIKED COMPOUNDS.

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATE PRECISION - all ok

TR Nos. RGWPGP303, RGWPGP303d Matrix: WATER

List the concentrations of the compounds which do not meet the following RPD criteria:

1. An RPD of <30% for water duplicates.
2. An RPD of <50% for soil duplicates.

FRACTION	COMPOUND	SAMPLE CONC	DUP SAMPLE CONC	RPD
WATER	1,1-DICHLOROETHANE	2	1	66*
WATER	1,2-DICHLOROETHENE	2	2	0
WATER	1,1,1-TRICHLOROETHANE	1	1	0

ACTIONS:

1. If the results for any componds do not meet the RPD criteria, flag the positive results for that compound as estimated.

2. If one value is non-detected, and one is above the CRQL:
   a. Flag the positive result as estimated (J).
   b. Flag the non-detected result as estimated (UJ).

NOTE: Professional judgement may be utilized to apply duplicate actions to all samples of a similar matrix.

A separate worksheet should be filled out for each field duplicate pair.

* NO ACTION TAKEN. THE SAMPLE RESULT HAS ALREADY BEEN ESTIMATED (J).

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE - all ok

List the internal standard areas of samples which do not meet the criteria of +100% or -50% of the internal standard area in the associated continuing calibration standard.

SAMPLE ID	DATE	IS OUT	IS AREA/ RT	ACCEPTABLE RANGE	ACTION

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagged as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity is indicated. Non-detects should then be flagged as unusable (R).

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction.

REGION I
Data Review Worksheets

XII. SAMPLE QUANTITATION

In the space below, please show a minimum of one sample calculation per fraction:

VOA: SAMPLE RGNPGP303 1,1-DCA = 1 ug/L on FORM I

$$\frac{12243 \times 50}{166027 \times 2.763} = \approx 1.33 \text{ ug/L}$$

BNA: NOT APPLICABLE

PEST/PCB: NOT APPLICABLE

HMM Associates, Inc.
A Summit Company

6908/HAZ/12669O

April 16, 1993

Mr. James Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Organic Data Validation Report
Southwest Laboratory of Oklahoma
VOCs: 18 low concentration samples

Dear Mr. Keith:

Data validation was performed on the organic analytical data from 18 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988:

- data completeness
* - holding times
* - GC/MS tuning
- calibration
- laboratory, field, and trip blanks
* - surrogate spike recoveries
* - matrix spike/matrix spike duplicates
- field duplicates
* - internal standard performance

196 Baker Avenue Concord, MA 01742 508/371-4000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/637-4010 Fax 603/626-4642

* - sample quantitation

* All criteria was met for this parameter

Data Completeness

A chain of custody was not provided with the data package. All laboratory forms were complete and legible.

Holding Times

The chain of custody was not provided, therefore, the data was evaluated based on the date received at the laboratory. All volatile organic analyses were performed within the required holding time.

GC/MS Tuning

All reported bromofluorobenzene (BFB) tunes met the requirements.

Calibrations

The volatile calibration summaries were reviewed, and all calibration check compound (CCC) and system performance check compound (SPCC) requirements were met. Acetone had a percent difference (%D) in the water continuing calibration on 2/24/93 of 36, which exceeds the functional guidelines requirement of %D less than 25%. The positive results for acetone in water samples will be estimated (J) due to variable instrument response. Two other compounds had %Ds greater than 25%, but no action was taken as the compounds were not detected in the associated samples.

Blanks

There were no positive results reported in any of the volatile organic method blanks.

The following compounds were detected in field and trip blanks:

Acetone	373 ug/L
Benzene	4 ug/L
Chloroform	4 ug/L
Ethylbenzene	2 ug/L
1,2-Dichloropropane	24 ug/L
Tetrachloroethene	12 ug/L
Toluene	8 ug/L
Xylene	7 ug/L

Results for acetone and toluene less than ten times the blank concentration have been qualified U and treated as non detects. Results for benzene, chloroform, ethylbenzene, 1,2-dichloropropane, tetrachloroethene, and xylene less than five times the blank concentration have been qualified U and treated as non detects.

Surrogate Spike Recoveries

All reported volatile surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate

The were no MS/MSD samples submitted to the laboratory, therefore, the lab analyzed laboratory control samples. All results for the laboratory control samples were reviewed and found to be acceptable.

Field Duplicates

Two field duplicates, FCRGWMW2303D and FCRSWSW0203D, were collected. Sample results for trichloroethene in duplicate FCRGWMW2303D did not meet the required criteria. Positive results for trichloroethene in the sample and duplicate sample will be estimated (J).

Internal Standard Performance

The internal standard performance was acceptable in the volatile analyses.

Sample Quantitation

The reported sample results were reviewed and found to be reported accurately.

Data tables have been provided that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa Solari

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro
Project Manager

CASE No. 12669 SUMMARY OF VOLATILE ORGANIC ANALYSES -WATER JK VALIDATED

	IT-1A	MW-23	MW-23 dupe	MW-25
EPA Sample No.	**FCRGWIT1A03**	**FCRGWMW2303**	**FCRGWMW2303d**	**FCRGWMW2503**
Lab Sample ID:	**12669.09**	**12669.10**	**12669.11**	**12669.12**
Matrix:	**Water**	**Water**	**Water**	**Water**
Level:	**Low**	**Low**	**Low**	**Low**
Date Collected:	**2/17/93**	**2/17/93**	**2/17/93**	**2/17/93**
Dare Analyzed:	**2/26/93**	**2/26/93**	**2/24/93**	**2/24/93**
Dilution Factor:	**1**	**1**	**1**	**1**
Units:	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Compound				
Chloromethane	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U
Acetone	10 U	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U
1,2-Dichloroethene	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	2 J	2 J	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Trichloroethene	10 U	13 J	21 J	11
Dibromochloromethane	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	31 U	38 U	19 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U
Xylene	10 U	10 U	10 U	10 U

Notes:
D = Identifies compounds reported in an analysis at a secondary dilution factor.
E = Identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
J = The reported value is an estimated quanitity.
U = The analyte was analyzed for, but not detected.
ug/L = micrograms per liter

CASE No. 12669 SUMMARY OF VOLATILE ORGANIC ANALYSES -WATER VALIDATED

EPA Sample No.	FCRGWMW2703	FCRGWMW2803	FCRGWMW2903	FCRGWMW3003
Lab Sample ID:	12669.04	12669.03	12669.06	12669.05
Matrix:	Water	Water	Water	Water
Level:	Low	Low	Low	Low
Date Collected:	2/17/93	2/17/93	2/17/93	2/17/93
Dare Analyzed:	2/24/93	2/24/93	2/24/93	2/26/93
Dilution Factor:	5	5	1	2
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	50 U	50 U	10 U	20 U
Bromomethane	50 U	50 U	10 U	20 U
Vinyl Chloride	50 U	50 U	10 U	20 U
Chloroethane	50 U	50 U	10 U	20 U
Methylene Chloride	50 U	50 U	10 U	20 U
Acetone	120 U	50 U	18 U	27 U
Carbon Disulfide	50 U	50 U	10 U	20 U
1,1-Dichloroethene	50 U	6 J	10 U	5 J
1,1-Dichloroethane	50 U	50 U	2 J	59
1,2-Dichloroethene	50 U	50 U	10 U	20 U
Chloroform	50 U	50 U	10 U	20 U
1,2-Dichloroethane	50 U	50 U	10 U	20 U
2-Butanone	50 U	50 U	10 U	20 U
1,1,1-Trichloroethane	24 J	415	16	311
Carbon Tetrachloride	50 U	52	10 U	20 U
Bromodichloromethane	50 U	50 U	10 U	20 U
1,2-Dichloropropane	50 U	50 U	10 U	20 U
cis-1,3-Dichloropropene	50 U	50 U	10 U	20 U
Trichloroethene	50 U	230	14	295
Dibromochloromethane	50 U	50 U	10 U	20 U
1,1,2-Trichloroethane	50 U	50 U	10 U	20 U
Benzene	50 U	50 U	10 U	20 U
trans-1,3-Dichloropropene	50 U	50 U	10 U	20 U
Bromoform	50 U	50 U	10 U	20 U
4-Methyl-2-Pentanone	50 U	50 U	10 U	20 U
2-Hexanone	50 U	50 U	10 U	20 U
Tetrachloroethene	587	318	98	20 U
1,1,2,2-Tetrachloroethane	50 U	50 U	10 U	20 U
Toluene	50 U	50 U	10 U	20 U
Chlorobenzene	50 U	50 U	10 U	20 U
Ethylbenzene	50 U	50 U	10 U	20 U
Styrene	50 U	50 U	10 U	20 U
Xylene	50 U	50 U	10 U	20 U

Notes:

D = Identifies compounds reported in an analysis at a secondary dilution factor.

E = Identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

CASE No. 12669 SUMMARY OF VOLATILE ORGANIC ANALYSES -WATER JK VALIDATED

	Blank	PGP4 deep	PGP4-shallow	Trip Blank
EPA Sample No.	**FCRGWPGPOEB**	**FCRGWPGP4DO3**	**FCRGWPGP4S03**	**FCR-GW03tb**
Lab Sample ID:	**12669.02**	**12669.08**	**12669.07**	**12669.19**
Matrix:	**Water**	**Water**	**Water**	**Water**
Level:	**Low**	**Low**	**Low**	**Low**
Date Collected:	**2/17/93**	**2/17/93**	**2/17/93**	**2/17/93**
Date Analyzed:	**2/24/93**	**2/26/93**	**2/26/93**	**2/26/93**
Dilution Factor:	**1**	**100**	**50**	**1**
Units:	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Compound				
Chloromethane	10 U	1000 U	500 U	10 U
Bromomethane	10 U	1000 U	500 U	10 U
Vinyl Chloride	10 U	1000 U	500 U	10 U
Chloroethane	10 U	1000 U	500 U	10 U
Methylene Chloride	10 U	1000 U	500 U	10 U
Acetone	15 J	1051 U	500 U	12 J
Carbon Disulfide	10 U	1000 U	500 U	10 U
1,1-Dichloroethene	10 U	1000 U	500 U	10 U
1,1-Dichloroethane	10 U	817 J	138 J	10 U
1,2-Dichloroethene	10 U	1000 U	500 U	10 U
Chloroform	4 J	1000 U	500 U	10 U
1,2-Dichloroethane	10 U	1000 U	500 U	10 U
2-Butanone	10 U	1000 U	500 U	10 U
1,1,1-Trichloroethane	10 U	1159	1722	10 U
Carbon Tetrachloride	10 U	1000 U	500 U	10 U
Bromodichloromethane	10 U	1000 U	500 U	10 U
1,2-Dichloropropane	10 U	1000 U	500 U	10 U
cis-1,3-Dichloropropene	10 U	1000 U	500 U	10 U
Trichloroethene	10 U	4244	5957	10 U
Dibromochloromethane	10 U	1000 U	500 U	10 U
1,1,2-Trichloroethane	10 U	1000 U	500 U	10 U
Benzene	10 U	1000 U	500 U	10 U
trans-1,3-Dichloropropene	10 U	1000 U	500 U	10 U
Bromoform	10 U	1000 U	500 U	10 U
4-Methyl-2-Pentanone	10 U	1000 U	500 U	10 U
2-Hexanone	10 U	1000 U	500 U	10 U
Tetrachloroethene	10 U	6749	3004	3 J
1,1,2,2-Tetrachloroethane	10 U	1000 U	500 U	10 U
Toluene	10 U	1000 U	500 U	10 U
Chlorobenzene	10 U	1000 U	500 U	10 U
Ethylbenzene	10 U	1000 U	500 U	10 U
Styrene	10 U	1000 U	500 U	10 U
Xylene	10 U	1000 U	500 U	10 U

Notes:

D = Identifies compounds reported in an analysis at a secondary dilution factor.

E = Identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

J = The reported value is an estimated quanitity.

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ug/L = micrograms per liter

CASE No. 12669 SUMMARY OF VOLATILE ORGANIC ANALYSES -WATER VALIDATED

	Blank	Dilution	Blank	Blank
EPA Sample No.	**FCRGW105EB03**	**RGW105EB03DL**	**FCRGW11003eb**	**FCRSW0003eb**
Lab Sample ID:	**12669.01**	**12669.01DL**	**12669.17**	**12669.18**
Matrix:	**Water**	**Water**	**Water**	**Water**
Level:	**Low**	**Low**	**Low**	**Low**
Date Collected:	**2/17/93**	**2/17/93**	**2/17/93**	**2/17/93**
Date Analyzed:	**2/23/93**	**3/16/93**	**2/26/93**	**2/26/93**
Dilution Factor:	**1**	**2**	**2**	**2**
Units:	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Compound				
Chloromethane	10 U	20 U	20 U	20 U
Bromomethane	10 U	20 U	20 U	20 U
Vinyl Chloride	10 U	20 U	20 U	20 U
Chloroethane	10 U	20 U	20 U	20 U
Methylene Chloride	10 U	20 U	20 U	20 U
Acetone	280 E	300 JD	373 J	370 J
Carbon Disulfide	10 U	20 U	20 U	20 U
1,1-Dichloroethene	10 U	20 U	20 U	20 U
1,1-Dichloroethane	10 U	20 U	20 U	20 U
1,2-Dichloroethene	10 U	20 U	20 U	20 U
Chloroform	10 U	20 U	20 U	20 U
1,2-Dichloroethane	10 U	20 U	20 U	20 U
2-Butanone	10 U	20 U	20 U	20 U
1,1,1-Trichloroethane	10 U	20 U	20 U	20 U
Carbon Tetrachloride	10 U	20 U	20 U	20 U
Bromodichloromethane	10 U	20 U	20 U	20 U
1,2-Dichloropropane	18	18 JD	23	24
cis-1,3-Dichloropropene	10 U	20 U	20 U	20 U
Trichloroethene	10 U	20 U	20 U	20 U
Dibromochloromethane	10 U	20 U	20 U	20 U
1,1,2-Trichloroethane	10 U	20 U	20 U	20 U
Benzene	4 J	20 U	20 U	20 U
trans-1,3-Dichloropropene	10 U	20 U	20 U	20 U
Bromoform	10 U	20 U	20 U	20 U
4-Methyl-2-Pentanone	10 U	20 U	20 U	20 U
2-Hexanone	10 U	20 U	20 U	20 U
Tetrachloroethene	10 U	20 U	6 J	5 J
1,1,2,2-Tetrachloroethane	10 U	20 U	20 U	20 U
Toluene	8 J	20 U	20 U	20 U
Chlorobenzene	10 U	20 U	20 U	20 U
Ethylbenzene	2 J	20 U	20 U	20 U
Styrene	10 U	20 U	20 U	20 U
Xylene	7 J	20 U	20 U	20 U

Notes:

D = Identifies compounds reported in an analysis at a secondary dilution factor.

E = Identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

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ug/L = micrograms per liter

EPA Sample No.	RSWSW0203	FCRSWSWO203d
Lab Sample ID:	12669.13	12669.14
Matrix:	Water	Water
Level:	Low	Low
Date Collected:	2/17/93	2/17/93
Dare Analyzed:	2/26/93	2/26/93
Dilution Factor:	1	1
Units:	ug/L	ug/L
Compound		
Chloromethane	10 U	10 U
Bromomethane	10 U	10 U
Vinyl Chloride	10 U	10 U
Chloroethane	10 U	10 U
Methylene Chloride	10 U	10 U
Acetone	11 U	11 U
Carbon Disulfide	10 U	10 U
1,1-Dichloroethene	10 U	10 U
1,1-Dichloroethane	3 J	3 J
1,2-Dichloroethene	10 U	10 U
Chloroform	10 U	10 U
1,2-Dichloroethane	10 U	10 U
2-Butanone	10 U	10 U
1,1,1-Trichloroethane	33	35
Carbon Tetrachloride	10 U	10 U
Bromodichloromethane	10 U	10 U
1,2-Dichloropropane	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U
Trichloroethene	65	66
Dibromochloromethane	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U
Benzene	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U
Bromoform	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U
2-Hexanone	10 U	10 U
Tetrachloroethene	84	86
1,1,2,2-Tetrachloroethane	10 U	10 U
Toluene	10 U	10 U
Chlorobenzene	10 U	10 U
Ethylbenzene	10 U	10 U
Styrene	10 U	10 U
Xylene	10 U	10 U

Notes:

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EPA Sample No.	FCRGWIT1A03	FCRGWMW2303	FCRGWMW2303d	FCRGWMW2503
Lab Sample ID:	12669.09	12669.10	12669.11	12669.12
Matrix:	Water	Water	Water	Water
Level:	Low	Low	Low	Low
Date Collected:	2/17/93	2/17/93	2/17/93	2/17/93
Dare Analyzed:	2/26/93	2/26/93	2/24/93	2/24/93
Dilution Factor:	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U
Acetone	7 J	8 J	10	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U
1,2-Dichloroethene	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	2 J	2 J	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Trichloroethene	10 U	13	21	11
Dibromochloromethane	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U
Tetrachloroethene	4 J	31	38	19
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U
Xylene	10 U	10 U	10 U	10 U

Notes:

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EPA Sample No.	FCRGWMW2703	FCRGWMW2803	FCRGWMW2903	FCRGWMW3003
Lab Sample ID:	12669.04	12669.03	12669.06	12669.05
Matrix:	Water	Water	Water	Water
Level:	Low	Low	Low	Low
Date Collected:	2/17/93	2/17/93	2/17/93	2/17/93
Dare Analyzed:	2/24/93	2/24/93	2/24/93	2/26/93
Dilution Factor:	5	5	1	2
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	50 U	50 U	10 U	20 U
Bromomethane	50 U	50 U	10 U	20 U
Vinyl Chloride	50 U	50 U	10 U	20 U
Chloroethane	50 U	50 U	10 U	20 U
Methylene Chloride	50 U	50 U	10 U	20 U
Acetone	120	50 U	18	27
Carbon Disulfide	50 U	50 U	10 U	20 U
1,1-Dichloroethene	50 U	6 J	10 U	5 J
1,1-Dichloroethane	50 U	50 U	2 J	59
1,2-Dichloroethene	50 U	50 U	10 U	20 U
Chloroform	50 U	50 U	10 U	20 U
1,2-Dichloroethane	50 U	50 U	10 U	20 U
2-Butanone	50 U	50 U	10 U	20 U
1,1,1-Trichloroethane	24 J	415	16	311
Carbon Tetrachloride	50 U	52	10 U	20 U
Bromodichloromethane	50 U	50 U	10 U	20 U
1,2-Dichloropropane	50 U	50 U	10 U	20 U
cis-1,3-Dichloropropene	50 U	50 U	10 U	20 U
Trichloroethene	50 U	230	14	295
Dibromochloromethane	50 U	50 U	10 U	20 U
1,1,2-Trichloroethane	50 U	50 U	10 U	20 U
Benzene	50 U	50 U	10 U	20 U
trans-1,3-Dichloropropene	50 U	50 U	10 U	20 U
Bromoform	50 U	50 U	10 U	20 U
4-Methyl-2-Pentanone	50 U	50 U	10 U	20 U
2-Hexanone	50 U	50 U	10 U	20 U
Tetrachloroethene	587	318	98	20 U
1,1,2,2-Tetrachloroethane	50 U	50 U	10 U	20 U
Toluene	50 U	50 U	10 U	20 U
Cblorobenzene	50 U	50 U	10 U	20 U
Ethylbenzene	50 U	50 U	10 U	20 U
Styrene	50 U	50 U	10 U	20 U
Xylene	50 U	50 U	10 U	20 U

Notes:

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ug/L = micrograms per liter

EPA Sample No.	FCRGWPGPOEB	FCRGWPGP4DO3	FCRGWPGP4S03	FCR-GW03tb
Lab Sample ID:	12669.02	12669.08	12669.07	12669.19
Matrix:	Water	Water	Water	Water
Level:	Low	Low	Low	Low
Date Collected:	2/17/93	2/17/93	2/17/93	2/17/93
Dare Analyzed:	2/24/93	2/26/93	2/26/93	2/26/93
Dilution Factor:	1	100	50	1
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	10 U	1000 U	500 U	10 U
Bromomethane	10 U	1000 U	500 U	10 U
Vinyl Chloride	10 U	1000 U	500 U	10 U
Chloroethane	10 U	1000 U	500 U	10 U
Methylene Chloride	10 U	1000 U	500 U	10 U
Acetone	15	1051	500 U	12
Carbon Disulfide	10 U	1000 U	500 U	10 U
1,1-Dichloroethene	10 U	1000 U	500 U	10 U
1,1-Dichloroethane	10 U	817 J	138 J	10 U
1,2-Dichloroethene	10 U	1000 U	500 U	10 U
Chloroform	4 J	1000 U	500 U	10 U
1,2-Dichloroethane	10 U	1000 U	500 U	10 U
2-Butanone	10 U	1000 U	500 U	10 U
1,1,1-Trichloroethane	10 U	1159	1722	10 U
Carbon Tetrachloride	10 U	1000 U	500 U	10 U
Bromodichloromethane	10 U	1000 U	500 U	10 U
1,2-Dichloropropane	10 U	1000 U	500 U	10 U
cis-1,3-Dichloropropene	10 U	1000 U	500 U	10 U
Trichloroethene	10 U	4244	5957	10 U
Dibromochloromethane	10 U	1000 U	500 U	10 U
1,1,2-Trichloroethane	10 U	1000 U	500 U	10 U
Benzene	10 U	1000 U	500 U	10 U
trans-1,3-Dichloropropene	10 U	1000 U	500 U	10 U
Bromoform	10 U	1000 U	500 U	10 U
4-Methyl-2-Pentanone	10 U	1000 U	500 U	10 U
2-Hexanone	10 U	1000 U	500 U	10 U
Tetrachloroethene	10 U	6749	3004	3 J
1,1,2,2-Tetrachloroethane	10 U	1000 U	500 U	10 U
Toluene	10 U	1000 U	500 U	10 U
Chlorobenzene	10 U	1000 U	500 U	10 U
Ethylbenzene	10 U	1000 U	500 U	10 U
Styrene	10 U	1000 U	500 U	10 U
Xylene	10 U	1000 U	500 U	10 U

Notes:

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EPA Sample No.	FCRGW105EB03	RGW105EB03DL	FCRGW11003eb	FCRSW0003eb
Lab Sample ID:	12669.01	12669.01DL	12669.17	12669.18
Matrix:	Water	Water	Water	Water
Level:	Low	Low	Low	Low
Date Collected:	2/17/93	2/17/93	2/17/93	2/17/93
Dare Analyzed:	2/23/93	3/16/93	2/26/93	2/26/93
Dilution Factor:	1	2	2	2
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	10 U	20 U	20 U	20 U
Bromomethane	10 U	20 U	20 U	20 U
Vinyl Chloride	10 U	20 U	20 U	20 U
Chloroethane	10 U	20 U	20 U	20 U
Methylene Chloride	10 U	20 U	20 U	20 U
Acetone	280 E	300 D	373	370
Carbon Disulfide	10 U	20 U	20 U	20 U
1,1-Dichloroethene	10 U	20 U	20 U	20 U
1,1-Dichloroethane	10 U	20 U	20 U	20 U
1,2-Dichloroethene	10 U	20 U	20 U	20 U
Chloroform	10 U	20 U	20 U	20 U
1,2-Dichloroethane	10 U	20 U	20 U	20 U
2-Butanone	10 U	20 U	20 U	20 U
1,1,1-Trichloroethane	10 U	20 U	20 U	20 U
Carbon Tetrachloride	10 U	20 U	20 U	20 U
Bromodichloromethane	10 U	20 U	20 U	20 U
1,2-Dichloropropane	18	18 JD	23	24
cis-1,3-Dichloropropene	10 U	20 U	20 U	20 U
Trichloroethene	10 U	20 U	20 U	20 U
Dibromochloromethane	10 U	20 U	20 U	20 U
1,1,2-Trichloroethane	10 U	20 U	20 U	20 U
Benzene	4 J	20 U	20 U	20 U
trans-1,3-Dichloropropene	10 U	20 U	20 U	20 U
Bromoform	10 U	20 U	20 U	20 U
4-Methyl-2-Pentanone	10 U	20 U	20 U	20 U
2-Hexanone	10 U	20 U	20 U	20 U
Tetrachloroethene	10 U	20 U	6 J	5 J
1,1,2,2-Tetrachloroethane	10 U	20 U	20 U	20 U
Toluene	8 J	20 U	20 U	20 U
Chlorobenzene	10 U	20 U	20 U	20 U
Ethylbenzene	2 J	20 U	20 U	20 U
Styrene	10 U	20 U	20 U	20 U
Xylene	7 J	20 U	20 U	20 U

Notes:

D = Identifies compounds reported in an analysis at a secondary dilution factor.

E = Identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

EPA Sample No.	RSWSW0203	FCRSWSW0203d
Lab Sample ID:	12669.13	12669.14
Matrix:	Water	Water
Level:	Low	Low
Date Collected:	2/17/93	2/17/93
Date Analyzed:	2/26/93	2/26/93
Dilution Factor:	1	1
Units:	ug/L	ug/L
Compound		
Chloromethane	10 U	10 U
Bromomethane	10 U	10 U
Vinyl Chloride	10 U	10 U
Chloroethane	10 U	10 U
Methylene Chloride	10 U	10 U
Acetone	11	11
Carbon Disulfide	10 U	10 U
1,1-Dichloroethene	10 U	10 U
1,1-Dichloroethane	3 J	3 J
1,2-Dichloroethene	10 U	10 U
Chloroform	10 U	10 U
1,2-Dichloroethane	10 U	10 U
2-Butanone	10 U	10 U
1,1,1-Trichloroethane	33	35
Carbon Tetrachloride	10 U	10 U
Bromodichloromethane	10 U	10 U
1,2-Dichloropropane	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U
Trichloroethene	65	66
Dibromochloromethane	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U
Benzene	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U
Bromoform	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U
2-Hexanone	10 U	10 U
Tetrachloroethene	84	86
1,1,2,2-Tetrachloroethane	10 U	10 U
Toluene	10 U	10 U
Chlorobenzene	10 U	10 U
Ethylbenzene	10 U	10 U
Styrene	10 U	10 U
Xylene	10 U	10 U

Notes:

D = Identifies compounds reported in an analysis at a secondary dilution factor.

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J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

FIGURE 8

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number _____

REGION I REVIEW OF ORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. WWENG SAS No. _____ Sampling Date(s) 2/17/93
SDG No. 12669 Matrix WATER Shipping Date(s) —
No. of Samples 18 Date Rec'd by Lab 2/19/93

Traffic Report Nos: FCRGWITA03, FCRGWMW2303, FCRGWMW2303d, RSWSW0203
FCRGWMW2703, FCRGWMW2803, FCRGWMW2903, FCRGWMW3003, FCRGWPGP4D03, FCRGWPGP4D03
Trip Blank No.: FCR-GW03tb
Equipment Blank No.: FCRGWPGP0EB, FCRGW105EB03, FCRGW1003cb, FCRSW0003cb
Field Dup Nos: FCRGWMW2303d, FCRSWSW0203d

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -GC/MS Tuning
- -Calibrations
- -Blanks
- -Surrogate Recoveries
- -Matrix Spike/Matrix Spike Dup
- -Field Duplicates
- -Internal Standard Performance
- -Pesticide Inst. Performance
- -Compound Identification
- -Compound Quantitation

Overall comments _____

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Compound not detected.

Reviewer: Melissa Solari Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets

II. HOLDING TIMES — Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED	VOA DATE ANAL	BNA DATE EXTR	BNA DATE ANAL	PEST DATE EXTR	PEST DATE ANAL
FCRGWIT1A03	2/17/93	2/26/93 4				
FCRGWMW23D3	2/17/93	2/26/93 9				
FCRGWMW25D3	2/17/93	2/24/93 7				
FCRGWMW25D3	2/17/93	2/24/93 7				
FCRGWMW27D3	2/17/93	2/24/93 7				
FCRGWMW28D3	2/17/93	2/24/93 7				
FCRGWMW29D3	2/17/93	2/24/93 7				
FCRGWMW30D3	2/17/93	2/24/93 9				
FCRGWPGP0E3	2/17/93	2/24/93 7				
FCRGWPGP14D3	2/17/93	2/26/93 9				
FCRGWPGP14S03	2/17/93	2/26/93 9				
FCR-GW-03EB	2/17/93	2/26/93 9				
FCRGW105EB03	2/17/93	2/23/93 6				
RGW105EB03DL	2/17/93	3/16/93 27				
FCRGW11D3EB	2/17/93	2/26/93 6				

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

BNA & PEST - Extracted within 7 days, analyzed within 40 days, soils and water.

ACTION:
1. If holding times are exceeded all positive results are estimate (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

* ALL OK. THE DL SAMPLE WILL NOT BE QUALIFIED AS IT IS NOT A GROSS EXCEEDENCE OF HOLDING TIME.

REGION I
Data Review Worksheets

II. HOLDING TIMES

Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED	VOA DATE ANAL	BNA DATE EXTR	BNA DATE ANAL	PEST DATE EXTR	PEST DATE ANAL
FCRSW0003cb	2/17/93	2/26/93				
RSW4SW0203	2/17/93	2/26/93				
FCRSWSW0203d	2/17/93	2/26/93				

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

BNA & PEST - Extracted within 7 days, analyzed within 40 days, soils and water.

ACTION:

1. If holding times are exceeded all positive results are estimate (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

REGION I
Data Review Worksheets

III. GC/MS TUNING

___ The DFTPP performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

X The BFB performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

If mass calibration is in error refer to the Region guidelines for expanded criteria. If necessary, all associated data as unusable (R).

REGION I
Data Review Worksheets

IV A. VOLATILE CALIBRATION VERIFICATION

Date of Initial Calibration : 1/26, 2/23
Dates of Continuing Calibrations: 2/23, 2/24, 2/26
Instrument ID : L
Matrix/Level : LOW

DATE	CRITERIA OUT RF,%RSD,RF,%D	COMPOUND (VALUE)
2/23	%D	2-BUTANONE (25.9)
	Samples Affected: none	
2/24	%D	ACETONE (36.0)
	Samples Affected: FCRGNPGPOEB, FCR-GW03EB, FCRGW11003EB, FCRSW0003EB	
2/24	%D	2-BUTANONE (28.6)
	Samples Affected: none	
2/26	%D	1,2-DCA
	Samples Affected: none	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	
	Samples Affected:	

1. All $\overline{RF}$'s, and RF's must be >0.05
2. All %RSD's must be<30%
3. All %D's must be <25%

ACTION:
1. If any compound has an initial $\overline{RF}$ or a continuing RF of <0.05:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as unusable (R).

2. If any compound has a %RSD >30% or a %D >25%:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as estimated (UJ) if the %RSD or %D is >50%.

A separate worksheet should be filled out for each initial curve.

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks – all OK

Level: LOW

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS (ug/L)
2/24	FCRGWPGPDEB	VOC/WATER	ACETONE	15
2/24	FCRGWPGPDEB	VOC/WATER	CHLOROFORM	4
2/26	FCRGW03EB	VOC/WATER	ACETONE	12
2/26	FCRGW03EB	VOC/WATER	PCE	3
2/23	FCRGW10SEB03DL	VOC/WATER	ACETONE	300
2/23	FCRGW10SEB03DL	VOC/WATER	1,2-DICHLOROPROPANE	18
2/23	FCRGW10SEB03	VOC/WATER	BENZENE	4
	↓	↓	TOLUENE	8
			ETHYL BENZENE	2

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks

Level:_____

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS (UG/L)
2/23	FCRGW1105EB03	VOC/WATER	XYLENE	7
↓	↓	↓	1,2-DICHLOROPROPANE	18
			ACETONE	280
2/26	FCRGW1103eb	VOC/WATER	ACETONE	373
↓	↓	↓	1,2-DICHLOROPROPANE	23
			PCE	6
2		K	ACETONE	370
↓	↓	↓	1,2-DICHLOROPROPANE	24
			PCE	5

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: LOW

COMPOUND	MAX. CONC./ UNITS (ug/L)	ACTION LEVEL/ UNITS (ug/L)	CRQL
ACETONE	373	3730 x 2 = 7460	10
BENZENE	4	20	10
CHLOROFORM	4	20	10
ETHYLBENZENE	2	10	10
1,2-DICHLOROPROPANE	24	120 x 2 = 240	10
TETRACHLOROETHENE	12	60	10
TOLUENE	8	80	10
XYLENE	7	35	10

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

VI. SURROGATE SPIKE RECOVERIES -all OK

List the percent recoveries which do not meet the criteria for surrogate recovery.

Matrix: WATER

	VOA			B/N			A			PEST*
TR #'S	TOL	BFB	DCE	NBZ	FBP	TPH	PHL	2FP	TBP	DBC
QC Limits										
	to	to	to	to	to	to	to	to	to	to

Surrogate Actions:

*-Advisory only

	PERCENT RECOVERY		
	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
Non-detected results	R	UJ	A

CRR = Contract Required Recovery Range.
Surrogate action should be applied:

1. If at least two surrogates in a B/N or A fraction or one surrogate in the VOA fraction are out of specification, but have recoveries of >10%.
2. If any one surrogate in a fraction shows <10% recovery.

REGION I
Data Review Worksheets

VII A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - ALL CRITERIA WAS MET

1. Matrix Spike/Matrix Spike Duplicate Recoveries and Precision

TR Nos. RSWSW0203MS RSWSW0203MSD Level: LOW Matrix: WATER

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ MS OR MSD	COMPOUND	%REC/ RPD	QC LIMITS

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY		
	<10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).

A separate worksheet should be used for each MS/MSD pair.

REGION I
Data Review Worksheets

VII B. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (Section 2)

3. Matrix spike Duplicate - Unspiked Compounds - ALL CRITERIA WAS MET

TR Nos RSWSW0203MS RSWSW0203MSD

List the concentrations of the unspiked compounds and determine the percent RSD's of the unspiked sample, matrix spike, and matrix spike duplicate. No limits have been developed for the RSD values of the unspiked compounds. .

FRACTION	COMPOUND	SAMPLE, MS, MSD CONC			%RSD
VOC	ACETONE	11	11	9	0,20
VOC	1,1-DCA	3	2	2	40,40
VOC	1,1,1-TCA	33	32	31	3,6
VOC	PCE	84	79	79	6,6

The reviewer must use professional judgement to determine if there is a need to qualify any of the unspiked compounds in the sample.

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATE PRECISION

TR Nos. FCRGWMW2303 FCRGWMW2303d Matrix: WATER

List the concentrations of the compounds which do not meet the following RPD criteria:

1. An RPD of <30% for water duplicates.
2. An RPD of <50% for soil duplicates.

FRACTION	COMPOUND	SAMPLE CONC	DUP SAMPLE CONC	RPD
VOC	1,1,1-TCA	2	2	0
VOC	~~PCE~~ TCE	13	21	47

ACTIONS:

1. If the results for any componds do not meet the RPD criteria, flag the positive results for that compound as estimated.

2. If one value is non-detected, and one is above the CRQL:
   a. Flag the positive result as estimated (J).
   b. Flag the non-detected result as estimated (UJ).

NOTE: Professional judgement may be utilized to apply duplicate actions to all samples of a similar matrix.

A separate worksheet should be filled out for each field duplicate pair.

POSITIVE RESULTS FOR TCE ARE ESTIMATED (J) FOR THE DUPLICATE AND THE SAMPLE.

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATE PRECISION - all criteria was met.

TR Nos. RSW5W0203, RSW5W0203D Matrix: WATER

List the concentrations of the compounds which do not meet the following RPD criteria:

1. An RPD of <30% for water duplicates.
2. An RPD of <50% for soil duplicates.

FRACTION	COMPOUND	SAMPLE CONC	DUP SAMPLE CONC	RPD
VOC	1,1-DCA	3	3	0
VOC	1,1,1-TCA	33	35	6
VOC	TCE	65	66	2
VOC	PCE	84	86	2

ACTIONS:

1. If the results for any componds do not meet the RPD criteria, flag the positive results for that compound as estimated.

2. If one value is non-detected, and one is above the CRQL:
   a. Flag the positive result as estimated (J).
   b. Flag the non-detected result as estimated (UJ).

NOTE: Professional judgement may be utilized to apply duplicate actions to all samples of a similar matrix.

A separate worksheet should be filled out for each field duplicate pair.

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE - all criteria was met.

List the internal standard areas of samples which do not meet the criteria of +100% or -50% of the internal standard area in the associated continuing calibration standard.

SAMPLE ID	DATE	IS OUT	IS AREA/ RT	ACCEPTABLE RANGE	ACTION

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagged as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity is indicated. Non-detects should then be flagged as unusable (R).

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction.

REGION I
Data Review Worksheets

XII. SAMPLE QUANTITATION

In the space below, please show a minimum of one sample calculation per fraction:

VOA: SAMPLE FCRGWMW2303d 21ug/L TCE on FORM I

$$\frac{130405 \times 50}{519596 \times 0.449} \approx 26 \text{ug/L}$$

BNA: NOT APPLICABLE

PEST/PCB: NOT APPLICABLE

HMM Associates, Inc.
A Summit Company

6908/HAZ/12653O

April 16, 1993

Mr. James Keith
WW Engineering & Science, Inc.
5010 Stone Mill Road
Bloomington, IN 47408

RE: Franklin-Curtis RFI
Organic Data Validation Report
Southwest Laboratory of Oklahoma
VOCs: 4 low concentration samples

Dear Mr. Keith:

Data validation was performed on the organic analytical data from 4 low level water samples collected by WW Engineering & Science, Inc. (WWES) at the Franklin-Curtis site. The data were evaluated based on the following parameters according to the Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988:

- data completeness
* - holding times
* - GC/MS tuning
- calibration
- laboratory, field, and trip blanks
* - surrogate spike recoveries
* - matrix spike/matrix spike duplicates
* - field duplicates
* - internal standard performance
* - sample quantitation

196 Baker Avenue Concord, MA 01742 508/371-4000 Fax 508/371-2468
Three Executive Park Drive Bedford, NH 03110 603/647-1040 Fax 603/626-4642

* All criteria was met for this parameter

Data Completeness

A chain of custody was not provided with the data package. The laboratory forms were complete and legible.

Holding Times

Holding times was evaluated based upon date received by the laboratory. All volatile organic analyses were performed within the required holding time.

GC/MS Tuning

All reported bromofluorobenzene (BFB) tunes met the requirements.

Calibrations

The volatile calibration summaries were reviewed, and all calibration check compound (CCC) and system performance check compound (SPCC) requirements were met. The percent relative standard deviation (%RSD) for 2-hexanone was 33.6 in the inital calibration on 2/22/93. No action was taken as this compound was not detected in any samples. Four compounds had percent differences (%Ds) greater than 25%, but no action was taken as the compounds were not detected in the associated samples.

Blanks

The method blank VBLK4 had a reported concentration of 1 ug/L for chloroform. Positive results for chloroform less than five times the blank concentration will be qualified U and treated as non detects.

There were no field blanks collected.

Surrogate Spike Recoveries

All reported volatile surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate

All volatile MS/MSD recoveries were acceptable. The relative percent difference (RPD) for trichloroethene was outside of QC limits. The results for trichloroethene in sample RGWMW2203 will be estimated (J).

Field Duplicates

One field duplicate, FCRGW-IT3-03, was collected. The RPDs were reviewed and found to be acceptable.

Internal Standard Performance

The internal standard performance was acceptable in the volatile analyses.

Sample Quantitation

The reported sample results were reviewed and found to be reported accurately.

Data tables have been provided that display both the validated and unvalidated analytical results. Qualifiers have been added to the validated table. If you have any questions, please feel free to call me at (508) 371-4000.

Sincerely,

Melissa J. Solari

Melissa J. Solari
Data Reviewer

Cosmo Gallinaro

Cosmo Gallinaro
Project Manager

	IT-2	IT-3	IT-3 dupe	MW-12
EPA Sample No.	**FCRGW-IT2-03**	**FCRGW-IT3-03**	**FCRGWIT3-03d**	**FCRGWMW12-03**
Lab Sample ID:	**12653.05**	**12653.02**	**12653.03**	**12653.1**
Matrix	**Water**	**Water**	**Water**	**Water**
Date Collected *:	**2/18/93**	**2/18/93**	**2/18/93**	**2/18/93**
Date Analyzed:	**2/25/93**	**2/23/93**	**2/23/93**	**2/23/93**
Dilution Factor:	**1**	**1**	**1**	**100**
Units:	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Compound				
Chloromethane	10 U	10 U	10 U	1000 U
Bromomethane	10 U	10 U	10 U	1000 U
Vinyl Chloride	10 U	10 U	10 U	1000 U
Chloroethane	10 U	10 U	10 U	1000 U
Methylene Chloride	10 U	10 U	10 U	1000 U
Acetone	10 U	10 U	10 U	1000 U
Carbon Disulfide	10 U	10 U	10 U	1000 U
1,1-Dichloroethene	10 U	11	11	1000 U
1,1-Dichloroethane	18	5 J	5 J	136 J
1,2-Dichloroethene	51	10 U	10 U	1000 U
Chloroform	10 U	10 U	10 U	1000 U
1,2-Dichloroethane	10 U	10 U	10 U	1000 U
2-Butanone	10 U	10 U	10 U	1000 U
1,1,1-Trichloroethane	29	71	73	2221
Carbon Tetrachloride	10 U	10 U	10 U	1000 U
Bromodichloromethane	10 U	10 U	10 U	1000 U
1,2-Dichloropropane	10 U	10 U	10 U	1000 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	1000 U
Trichloroethene	29	29	23	4759
Dibromochloromethane	10 U	10 U	10 U	1000 U
1,1,2-Trichloroethane	10 U	10 U	10 U	1000 U
Benzene	10 U	10 U	10 U	1000 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	1000 U
Bromoform	10 U	10 U	10 U	1000 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	1000 U
2-Hexanone	10 U	10 U	10 U	1000 U
Tetrachloroethene	5 J	10 U	10 U	5695
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	1000 U
Toluene	10 U	10 U	10 U	1000 U
Chlorobenzene	10 U	10 U	10 U	1000 U
Ethylbenzene	10 U	10 U	10 U	1000 U
Styrene	10 U	10 U	10 U	1000 U
Xylene	10 U	10 U	10 U	1000 U

Notes:

* Indicates that the chain of custody was not provided, therefore the data is evaluated based upon date of sample receipt.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

CASE No. 12653 SUMMARY OF VOLATILE ORGANIC ANALYSES - WATER JK VALIDATED

	HW 22	HW-24	PGP-1	PGP-2
EPA Sample No.	**RGWMW2203**	**FCRGWMW24-03**	**FCRGWPGP1-03**	**FCRGWPGP2-03**
Lab Sample ID:	**12653.07**	**12653.01**	**12653.04**	**12653.06**
Matrix	**Water**	**Water**	**Water**	**Water**
Date Collected *:	**2/18/93**	**2/18/93**	**2/18/93**	**2/18/93**
Date Analyzed:	**2/26/93**	**2/26/93**	**2/27/93**	**2/25/93**
Dilution Factor:	**100**	**1**	**1**	**1**
Units:	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Compound				
Chloromethane	1000 U	10 U	10 U	10 U
Bromomethane	1000 U	10 U	10 U	10 U
Vinyl Chloride	1000 U	10 U	10 U	10 U
Chloroethane	1000 U	10 U	10 U	10 U
Methylene Chloride	1000 U	10 U	10 U	10 U
Acetone	1000 U	5 J	7 J	9 J
Carbon Disulfide	1000 U	10 U	10 U	10 U
1,1-Dichloroethene	1000 U	10 U	10 U	10 U
1,1-Dichloroethane	1000 U	10 U	10 U	10 U
1,2-Dichloroethene	1000 U	10 U	10 U	10 U
Chloroform	1000 U	10 U	10 U	10 U
1,2-Dichloroethane	1000 U	10 U	10 U	10 U
2-Butanone	1000 U	10 U	10 U	10 U
1,1,1-Trichloroethane	1000 U	53	10 U	10 U
Carbon Tetrachloride	1000 U	10 U	10 U	10 U
Bromodichloromethane	1000 U	10 U	10 U	10 U
1,2-Dichloropropane	1000 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	1000 U	10 U	10 U	10 U
Trichloroethene	1956 J	189	10 U	10 U
Dibromochloromethane	1000 U	10 U	10 U	10 U
1,1,2-Trichloroethane	1000 U	10 U	10 U	10 U
Benzene	1000 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	1000 U	10 U	10 U	10 U
Bromoform	1000 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	1000 U	10 U	10 U	10 U
2-Hexanone	1000 U	10 U	10 U	10 U
Tetrachloroethene	19499	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	1000 U	10 U	10 U	10 U
Toluene	1000 U	10 U	10 U	10 U
Chlorobenzene	1000 U	10 U	10 U	10 U
Ethylbenzene	1000 U	10 U	10 U	10 U
Styrene	1000 U	10 U	10 U	10 U
Xylene	1000 U	10 U	10 U	10 U

Notes:

* Indicates that the chain of custody was not provided, therefore the data is evaluated based upon date of sample receipt.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

EPA Sample No.	FCRGW-IT2-03	FCRGW-IT3-03	FCRGWIT3-03d	FCRGWMW12-03
Lab Sample ID:	12653.05	12653.02	12653.03	12653.1
Matrix	Water	Water	Water	Water
Date Collected * :	2/18/93	2/18/93	2/18/93	2/18/93
Date Analyzed:	2/25/93	2/23/93	2/23/93	2/23/93
Dilution Factor:	1	1	1	100
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	10 U	10 U	10 U	1000 U
Bromomethane	10 U	10 U	10 U	1000 U
Vinyl Chloride	10 U	10 U	10 U	1000 U
Chloroethane	10 U	10 U	10 U	1000 U
Methylene Chloride	10 U	10 U	10 U	1000 U
Acetone	10 U	10 U	10 U	1000 U
Carbon Disulfide	10 U	10 U	10 U	1000 U
1,1-Dichloroethene	10 U	11	11	1000 U
1,1-Dichloroethane	18	5 J	5 J	136 J
1,2-Dichloroethene	51	10 U	10 U	1000 U
Chloroform	10 U	10 U	10 U	1000 U
1,2-Dichloroethane	10 U	10 U	10 U	1000 U
2-Butanone	10 U	10 U	10 U	1000 U
1,1,1-Trichloroethane	29	71	73	2221
Carbon Tetrachloride	10 U	10 U	10 U	1000 U
Bromodichloromethane	10 U	10 U	10 U	1000 U
1,2-Dichloropropane	10 U	10 U	10 U	1000 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	1000 U
Trichloroethene	29	29	23	4759
Dibromochloromethane	10 U	10 U	10 U	1000 U
1,1,2-Trichloroethane	10 U	10 U	10 U	1000 U
Benzene	10 U	10 U	10 U	1000 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	1000 U
Bromoform	10 U	10 U	10 U	1000 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	1000 U
2-Hexanone	10 U	10 U	10 U	1000 U
Tetrachloroethene	5 J	10 U	10 U	5695
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	1000 U
Toluene	10 U	10 U	10 U	1000 U
Chlorobenzene	10 U	10 U	10 U	1000 U
Ethylbenzene	10 U	10 U	10 U	1000 U
Styrene	10 U	10 U	10 U	1000 U
Xylene	10 U	10 U	10 U	1000 U

Notes:

* Indicates that the chain of custody was not provided, therefore the data is evaluated based upon date of sample receipt.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

EPA Sample No.	RGWMW2203	FCRGWMW24-03	FCRGWPGP1-03	FCRGWPGP2-03
Lab Sample ID:	12653.07	12653.01	12653.04	12653.06
Matrix	Water	Water	Water	Water
Date Collected * :	2/18/93	2/18/93	2/18/93	2/18/93
Date Analyzed:	2/26/93	2/26/93	2/27/93	2/25/93
Dilution Factor:	100	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L
Compound				
Chloromethane	1000 U	10 U	10 U	10 U
Bromomethane	1000 U	10 U	10 U	10 U
Vinyl Chloride	1000 U	10 U	10 U	10 U
Chloroethane	1000 U	10 U	10 U	10 U
Methylene Chloride	1000 U	10 U	10 U	10 U
Acetone	1000 U	5 J	7 J	9 J
Carbon Disulfide	1000 U	10 U	10 U	10 U
1,1-Dichloroethene	1000 U	10 U	10 U	10 U
1,1-Dichloroethane	1000 U	10 U	10 U	10 U
1,2-Dichloroethene	1000 U	10 U	10 U	10 U
Chloroform	1000 U	10 U	10 U	10 U
1,2-Dichloroethane	1000 U	10 U	10 U	10 U
2-Butanone	1000 U	10 U	10 U	10 U
1,1,1-Trichloroethane	1000 U	53	10 U	10 U
Carbon Tetrachloride	1000 U	10 U	10 U	10 U
Bromodichloromethane	1000 U	10 U	10 U	10 U
1,2-Dichloropropane	1000 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	1000 U	10 U	10 U	10 U
Trichloroethene	1956	189	10 U	10 U
Dibromochloromethane	1000 U	10 U	10 U	10 U
1,1,2-Trichloroethane	1000 U	10 U	10 U	10 U
Benzene	1000 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	1000 U	10 U	10 U	10 U
Bromoform	1000 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	1000 U	10 U	10 U	10 U
2-Hexanone	1000 U	10 U	10 U	10 U
Tetrachloroethene	19499	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	1000 U	10 U	10 U	10 U
Toluene	1000 U	10 U	10 U	10 U
Chlorobenzene	1000 U	10 U	10 U	10 U
Ethylbenzene	1000 U	10 U	10 U	10 U
Styrene	1000 U	10 U	10 U	10 U
Xylene	1000 U	10 U	10 U	10 U

Notes:

* Indicates that the chain of custody was not provided, therefore the data is evaluated based upon date of sample receipt.

J = The reported value is an estimated quanitity.

U = The analyte was analyzed for, but not detected.

ug/L = micrograms per liter

FIGURE 8

REGION I
Data Review Worksheets

Site Name FRANKLIN-CURTIS RFI
Reference Number

REGION I REVIEW OF ORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SOUTHWEST LABORATORY OF OKLAHOMA data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. WWEN G SAS No. Sampling Date(s) 2/18/93*
SDG No. 12653 Matrix WATER Shipping Date(s) —
No. of Samples 8 Date Rec'd by Lab 2/18/93

Traffic Report Nos: FCRGW-1T2-03, FCRGW-1T3-03, FCRGWMW12-03, RGWMW2203, FCRGWMW24-03, FCRGWPGP1-03, FCRGWPGP2-03
Trip Blank No.:
Equipment Blank No.: —
Field Dup Nos: FCRGW-1T3-03d

SOW No. 3/90 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -GC/MS Tuning
- -Calibrations
- -Blanks
- -Surrogate Recoveries
- -Matrix Spike/Matrix Spike Dup
- -Field Duplicates
- -Internal Standard Performance
- -Pesticide Inst. Performance
- -Compound Identification
- -Compound Quantitation

Overall comments

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Compound not detected.

Reviewer: [signature] Date: 4/14/93

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D

REGION I
Data Review Worksheets - all ok

II. HOLDING TIMES

Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED*	VOA DATE ANAL	BNA DATE EXTR	BNA DATE ANAL	PEST DATE EXTR	PEST DATE ANAL
FCRGW-IT2-03	2/18/93	2/25/93				
FCRGW-IT3-03	2/18/93	2/23/93				
FCRGW IT3-03d	2/18/93	2/23/93				
FCRGWMW12-03	2/18/93	2/27/93				
RGWMW22 03	2/18/93	2/26/93				
FCRGWMW24-03	2/18/93	2/26/93				
FCRGWPGP1-03	2/18/93	2/27/93				
FCRGWPGP2-03	2/18/93	2/25/93				

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

BNA & PEST - Extracted within 7 days, analyzed within 40 days, soils and water.

ACTION:
1. If holding times are exceeded all positive results are estimate (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

* NOTE: HOLDING TIMES HAVE BEEN EVALUATED BASED UPON LABORATORY DATE OF RECEIPT. A COC WAS NOT PROVIDED WITH THE DATA PACKAGE.

REGION I
Data Review Worksheets

III. GC/MS TUNING

___ The DFTPP performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

X The BFB performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected:_____

If mass calibration is in error refer to the Region guidelines for expanded criteria. If necessary, all associated data as unusable (R).

REGION I
Data Review Worksheet

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks

Level: LOW

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS
2/27	VBLK4	WATER	CHLOROFORM	1 ug/L

2. Equipment and Trip Blanks

DATE	TR #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS
2/27	~~VBLK~~			

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: LOW

COMPOUND	MAX. CONC./ UNITS (ug/L)	ACTION LEVEL/ UNITS (ug/L)	CRQL
CHLOROFORM	1	5	10

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

VI. SURROGATE SPIKE RECOVERIES - ALL CRITERIA WAS MET.

List the percent recoveries which do not meet the criteria for surrogate recovery.

Matrix: WATER

	VOA			B/N			A			PEST*
TR #'S	TOL	BFB	DCF	NBZ	FBP	TPH	PHL	2FP	TBP	DBC
QC Limits										
	to	to	to	to	to	to	to	to	to	to

Surrogate Actions: *-Advisory only

PERCENT RECOVERY

	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
Non-detected results	R	UJ	A

CRR = Contract Required Recovery Range.
Surrogate action should be applied:

1. If at least two surrogates in a B/N or A fraction or one surrogate in the VOA fraction are out of specification, but have recoveries of >10%.
2. If any one surrogate in a fraction shows <10% recovery.

REGION I
Data Review Worksheets

VII A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

1. Matrix Spike/Matrix Spike Duplicate Recoveries and Precision

TR Nos. RGWMW2203H5, RGWMW2203H5D Level: LOW Matrix: WATER

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ MS OR MSD	COMPOUND	%REC/ RPD	QC LIMITS
WATER/MSD	TRICHLOROETHENE	22	14

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY		
	<10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).

A separate worksheet should be used for each MS/MSD pair.

* RESULTS FOR THE UNSPIKED SAMPLE WILL BE QUALIFIED (J) DUE TO MATRIX EFFECTS

REGION I
Data Review Worksheets

VII B. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (Section 2)

3. Matrix Spike Duplicate - Unspiked Compounds - ALL CRITERIA WAS MET

TR Nos. RGWMW2203015 RGW2203MSD

List the concentrations of the unspiked compounds and determine the percent RSD's of the unspiked sample, matrix spike, and matrix spike duplicate. No limits have been developed for the RSD values of the unspiked compounds. .

FRACTION	COMPOUND	SAMPLE, MS, MSD CONC	%RSD
VOC	TETRACHLOROETHENE	19499 19746 18110	1,7

The reviewer must use professional judgement to determine if there is a need to qualify any of the unspiked compounds in the sample.

REGION I
Data Review Worksheets

VIII. FIELD DUPLICATE PRECISION - ~~not applicable~~ all ok

TR Nos. FCRGW-113-03, FCRGW1T3-03d Matrix: WATER

List the concentrations of the compounds which do not meet the following RPD criteria:

1. An RPD of <30% for water duplicates.
2. An RPD of <50% for soil duplicates.

FRACTION	COMPOUND	SAMPLE CONC	DUP SAMPLE CONC	RPD
WATER	1,1-DICHLOROETHENE	11	11	0
	1,1-DICHLOROETHANE	5	5	0
	1,1,1-TRICHLOROETHANE	71	73	3
	TRICHLOROETHENE	29	23	23

ACTIONS:

1. If the results for any componds do not meet the RPD criteria, flag the positive results for that compound as estimated.

2. If one value is non-detected, and one is above the CRQL:
   a. Flag the positive result as estimated (J).
   b. Flag the non-detected result as estimated (UJ).

NOTE: Professional judgement may be utilized to apply duplicate actions to all samples of a similar matrix.

A separate worksheet should be filled out for each field duplicate pair.

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE - ALL CRITERIA WAS MET.

List the internal standard areas of samples which do not meet the criteria of +100% or -50% of the internal standard area in the associated continuing calibration standard.

SAMPLE ID	DATE	IS OUT	IS AREA/ RT	ACCEPTABLE RANGE	ACTION

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagged as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity is indicated. Non-detects should then be flagged as unusable (R).

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction.

REGION I
Data Review Worksheets

XII. SAMPLE QUANTITATION

In the space below, please show a minimum of one sample calculation per fraction: sample FCRGW-1T2-03

VOA:

$$\frac{(127822)(50\,ppb)(1.0)}{(128284)(2.763)} = 18\ ug/L$$

Reported Result 1,1-Dichloroethane = 18 ug/L

BNA:

Not applicable

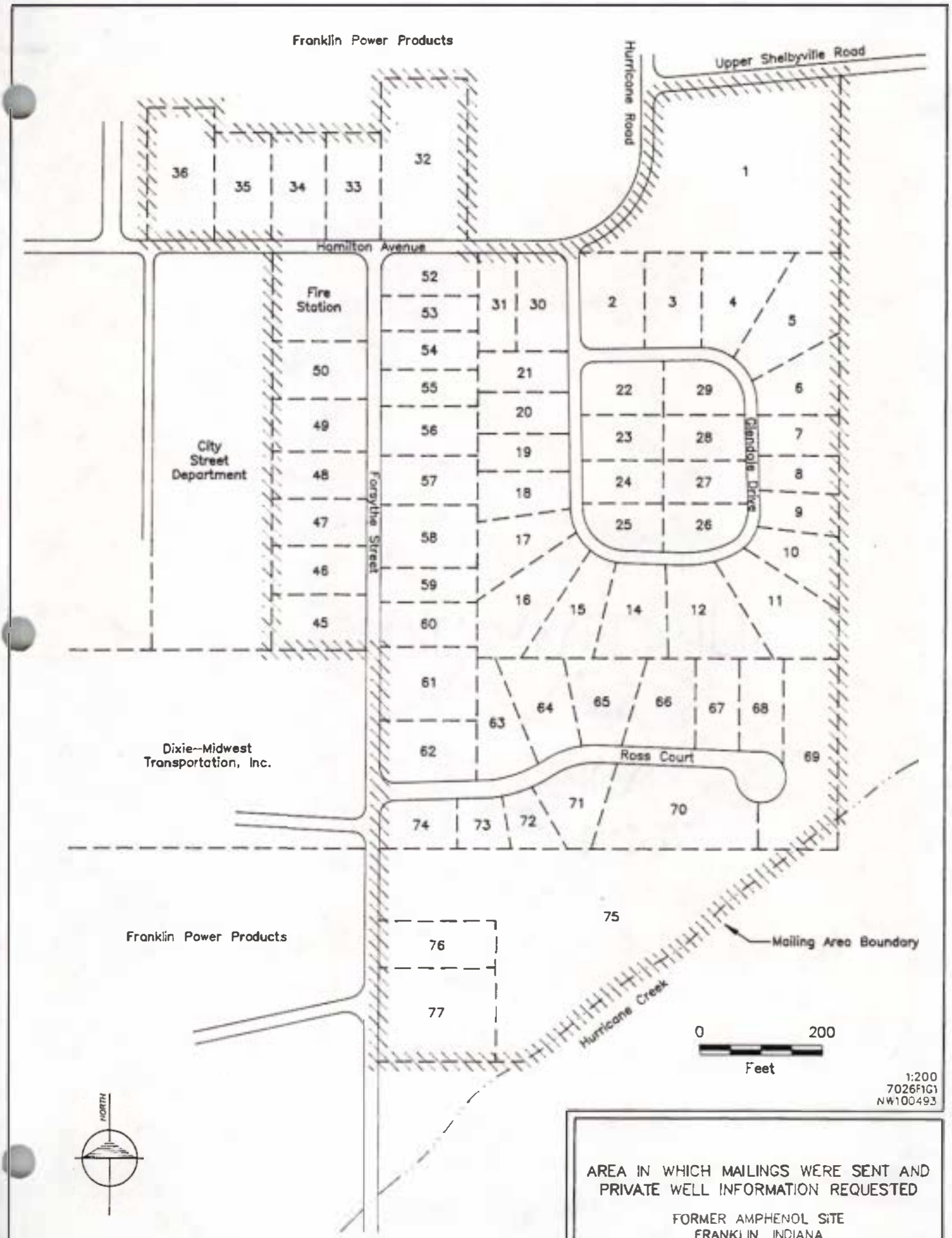
PEST/PCB:

Not applicable

APPENDIX L

to RFI Report

Requests for water well information in the vicinity of the former Amphenol site.



AREA IN WHICH MAILINGS WERE SENT AND PRIVATE WELL INFORMATION REQUESTED

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

OCT. 1993

07026.00

WW Engineering & Science

LIST OF HOME OWNERS/RESIDENTS TO WHOM LETTERS WERE SENT

Map No.	
1	Apostolic Gospel Church RR 2 Franklin, IN 46131
2	William T. & Audrey V. Brockman 899 Glendale Dr. Franklin, IN 46131
3	David L. & F. Elaine Sinclair 860 Glendale Dr. Franklin, IN 46131
4	Steven & Suzanne Yantes 862 Glendale Dr. Franklin, IN 46131
5	Arlo A. & Bette Jane Gosser 864 Glendale Dr. Franklin, IN 46131
6	Harry F. & Geraldine Burbrink 866 Glendale Dr. Franklin, IN 46131
7	Phillip D. & Julia L. Spalding 868 Glendale Dr. Franklin, IN 46131
8	Federick Lee & Dianna Faye Fitzpatrick 870 Glendale Dr. Franklin, IN 46131
9	D. Dale & Jill Dunbar 872 Glendale Dr. Franklin, IN 46131
10	Kenneth D. & Sharon Breedlove 874 Glendale Dr. Franklin, IN 46131

LIST OF HOME OWNERS/RESIDENTS
TO WHOM LETTERS WERE SENT

Map No.	
11	James R. & Janet Rae Rynerson 876 Glendale Dr. Franklin, IN 46131
12	Rosemarie Hepler 878 Glendale Dr. Franklin, IN 46131
14	William R. & Margaret A. Brinkman 882 Glendale Dr. Franklin, IN 46131
15	Joseph R. & Lona Agnes Gunter 884 Glendale Dr. Franklin, IN 46131
16	Ethel Gunter 886 Glendale Dr. Franklin, IN 46131
17	Glenn R. Whitham & Daisy M. Fitzpatrick 888 Glendale Dr. Franklin, IN 46131
18	Donald & Alice McMillan 890 Glendale Dr. Franklin, IN 46131
19	Ruth L. Callam 892 Glendale Dr. Franklin, IN 46131
20	Jesse L. Estes 894 Glendale Dr. Franklin, IN 46131
21	Jeanetta Bridges & Lois Raufeisen 896 Glendale Dr. Franklin, IN 46131

LIST OF HOME OWNERS/RESIDENTS TO WHOM LETTERS WERE SENT

Map No.	
21	Jeannetta Bridges & Lois Raufeisen RR 3, Box 214 Franklin, IN 46131
22	Barbara J. Bryant 897 Glendale Dr. Franklin, IN 46131
22	Barbara J. Bryant 420 Glenn Dr. Greenwood, IN 46142
23	Randolph C. Harper 895 Glendale Dr. Franklin, IN 46131
23	Randolph C. Harper RR 1, Box 131 Morgantown, IN 46160
24	Paul C. & Glendie Mae Baker 893 Glendale Dr. Franklin, IN 46131
24	Paul C. & Glendie Mae Baker P.O. Box 244 Franklin, IN 46131
25	William L. & Audrey V. Andrews 891 Glendale Dr. Franklin, IN 46131
26	Carl R. & Margaret B. Dennis 889 Glendale Dr. Franklin, IN 46131
26	Carl R. & Margaret D. Dennis 955 Graham St. Franklin, IN 46131

LIST OF HOME OWNERS/RESIDENTS TO WHOM LETTERS WERE SENT

Map No.	
27	William B. & Joyce L. Green 887 Glendale Dr. Franklin, IN 46131
27	William B. & Joyce L. Green 1131 E. Adams Franklin, IN 46131
28	Dwight C. & Joann Risk 885 Glendale Dr. Franklin, IN 46131
29	Steve & Jennie Edwards 883 Glendale Dr. Franklin, IN 46131
30	Phillip L. & Jo K. Watkins 898 Glendale Dr. Franklin, IN 46131
31	B. Riggs, L. Scarlett, et al. 1021 Hamilton Ave. Franklin, IN 46131
31	Lyman A. & Carbalou Snyder 1004 E. King St. Franklin, IN 46131
32	Kenneth A. Blackwell 990 Hamilton Ave. Franklin, IN 46131
32	Kenneth A. Blackwell RR 2, Box 26 Franklin, IN 46131
33	Danny & Bonnie Weddle 980 Hamilton Ave. Franklin, IN 46131

LIST OF HOME OWNERS/RESIDENTS TO WHOM LETTERS WERE SENT

Map No.	
34	Max & Mary Alice Rainey 960 Hamilton Ave. Franklin, IN 46131
35	Charles & Bonnie Blackwell 770 Hamilton Ave. Franklin, IN 46131
36	Michael & Michelle Harris 760 Hamilton Ave. Franklin, IN 46131
36	Lloyd L. Duncan Jr. 760 Hamilton Ave. Franklin, IN 46131
45	Peal M. & Mildred A. Royse 715 Forsythe St. Franklin, IN 46131
46,47	Robert L. & Evelyn J. Clawson RR 3, Box 117C Franklin, IN 46131
48	Jackie L. & Mary Ann Wilkins 798 N. Forysthe St. Franklin, IN 46131
49	Andrew & Rosemary Brunic 800 N. Forsythe St. Franklin, IN 46131
50	Mr. Clotha C. Isaacs 850 N. Forsythe St. Franklin, IN 46131
52	James E. & Mary K. Mink 1001 Hamilton Avenue Franklin, IN 46131

LIST OF HOME OWNERS/RESIDENTS TO WHOM LETTERS WERE SENT

Map No.	
53	Mary L. Essex 835 N. Forsythe St. Franklin, IN 46131
53	Mary L. Essex RR 7, Box 54E Franklin, IN 46131
54	Alta M. Canary 833 N. Forsythe St. Franklin, IN 46131
55	Mary L. Essex 831 N. Forsythe St. Franklin, IN 46131
56	Steven Lee Cox 820 N. Forsythe St. Franklin, IN 46131
57	Clifford & Ruth Blackwell 732 N. Forsythe St. Franklin, IN 46131
58	Earl W. & Audrey L. Clark 780 N. Forsythe St. Franklin, IN 46131
59	James F. & Joan C. Shaw 721 N. Forsythe St. Franklin, IN 46131
60	Glendal & Maryrose Bray 720 N. Forsythe St. Franklin, IN 46131
61	Henry David & Oda Jane Thompson 690 N. Forsythe St. Franklin, IN 46131

LIST OF HOME OWNERS/RESIDENTS
TO WHOM LETTERS WERE SENT

Map No.	
62	Jeffrey G. & Rhonda L. Black 1000 Ross Ct. Franklin, IN 46131
63	Ricky A. & Cathryn C. Smith 1020 Ross Ct. Franklin, IN 46131
64	Joseph P. & Judy L.. Bailey 1030 Ross Ct. Franklin, IN 46131
65	Larry D. & Paulette K. Larson 1040 Ross Ct. Franklin, IN 46131
66	Daniel L. & Terri L. Mason 1050 Ross Ct. Franklin, IN 46131
67	Kirby Cochran, Sr. & Brenda J. Williams 1060 Ross Ct. Franklin, IN 46131
68	Timothy W. & Christy L. Mann 1070 Ross Ct. Franklin, IN 46131
69	Demaree & Myra Smiley 1080 Ross Ct. Franklin, In 46131
70	Eddie P. & Brenda B. Kelley 1045 Ross Ct. Franklin, IN 46131
71	Robert & Connie Johnson 1035 Ross Ct. Franklin, IN 46131

LIST OF HOME OWNERS/RESIDENTS TO WHOM LETTERS WERE SENT

Map No.	
72	David & Martha Bagwell 1025 Ross Ct. Franklin, In 46131
73	Steve C. & Rebecca L. Navarro 1015 Ross Ct. Franklin, IN 46131
74	Michael & Grace Boston 1005 Ross Ct. Franklin, IN 46131
75	Lenial & Evelyn Blackwell 481 N. Forsythe St. Franklin, IN 46131
76	Elmer & Leona Cox 451 N. Forsythe St. Franklin, IN 46131
77	Donnal L. Shank 441 N. Forsythe St. Franklin, In 46131

JOHNSON COUNTY HEALTH DEPARTMENT

86 West Court Street — Court House Annex
Franklin, Indiana 46131
736-3770

October 28, 1992

William T. & Audrey V. Brockman
899 Glendale Drive
Franklin, IN 46131

Dear Mr & Mrs Brockman,

During the first week of November, 1992, GeoTrace, Inc. and WW Engineering & Science, Inc. will be collecting groundwater samples in the vicinity of the Glendale subdivision. This work will be conducted within the municipal right-of-way.

The work will consist of the insertion of a metal probe into the ground for the purpose of collecting a water sample, and will cause little, if any, disturbance to the right-of-way property. Utilities will be notified in advance of the sampling, and will mark the location of their underground installations with colored paint. The purpose of this sampling is to determine the presence of any volatile organic compounds. Each sampling location will be promptly restored as closely as possible to its original condition.

Our records show that all water in the area is supplied by Indiana Cities Water Corporation. If you have and are using a well, please let us know.

We are most appreciative of your consideration during this activity, and anticipate that you will be caused no inconvenience. If you have any questions prior to work starting, during the sampling, or after it is completed, please do not hesitate to contact us. In addition, representatives of WW Engineering & Science will be present during the testing and will answer any questions you may have at that time.

Very truly yours,

Dr. Craig Moorman
Commissioner of Health

John Bonsett
Director of Environmental Health

SAMPLE LETTER

JOHNSON COUNTY HEALTH DEPARTMENT

86 West Court Street — Court House Annex
Franklin, Indiana 46131
736-3770

September 29, 1993

Mr. Jim Keith
W W Engineering & Science
5010 Stone Mill Road
Bloomington, In. 47408

Jim:

On October 28, 1992, the Johnson County Health Department sent notification to sixty (60) property owners located near the Franklin Power Products Inc./Amphenol Facility located in Franklin, Indiana. The purpose of this notification was to advise area homeowners of a groundwater monitoring project that was being scheduled as part of the environmental assessment of the former Bendix property.

Eight (8) of the letters mailed were returned due to various reasons. Of the letters received, only one property owner contacted the Johnson County Health Department. His concern in contacting our office was related to the proper spelling of his name. During the course of this groundwater investigation there were no responses from area homeowners.

Prior to this groundwater investigation there was also public notice of this study as it was on the agenda of the Franking City Board of Works.

Sincerely,

John Bonsett
Dir. of Environmental Health

JB/rw

APPENDIX M

Letter from U.S. Fish & Wildlife Service
Bloomington, Indiana Field Office

DRAFT