

Shaw Environmental, Inc.

312 Directors Drive
Knoxville, TN 37923
865.690.3211
Fax 865.690.3626



December 20, 2004

U. S. Army Engineer District, Nashville
ATTN: CELRN-EP-R-M (Linda Ingram)
110 Ninth Avenue South
U.S. Court House Annex
Nashville, TN 37203

Submittal of Chemical Quality Assurance Report for the Groundwater Investigation,
Plum Brook Ordnance Works, Sandusky, Ohio,
Contract Number DACA62-00-D-0002

Dear Mrs. Ingram:

As required by the Scope of Work (SOW) for contract number DACA62-00-D-0002, enclosed is the Chemical Quality Assurance Report (CQAR) for the Plum Brook Ordnance Works (PBOW). DataChek prepared the CQAR. DataChek followed the requirements outlined in the USACE document EM-200-1-6 *Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects*. The report is based on an evaluation of the groundwater data collected in May 2004.

If you have any questions or require additional information regarding this submittal, please call me at (865) 560-5271.

Sincerely,

A handwritten signature in cursive script that reads "Maureen F. McMyler".

Maureen F. McMyler
Project Chemist

Enclosure

cc: Project file

Chemical Quality Assurance Report

**Quarterly Groundwater Monitoring
Downgradient Wells**

May 2004

Plum Brook Ordnance Works

Sandusky, Ohio

Prepared for the Shaw Group

By

DataChek



August 10, 2004

Table of Contents

	Page
1.0 Executive Summary	1
2.0 Review of Project Samples, Field QA Samples and Field QC Samples	3
2.1 Analysis-Specific Data Validation Summaries.....	3
2.1.1 Volatile Organics by SW846-8260B	3
2.1.2 Explosives by SW846-8330.....	4
2.1.3 Semivolatile Organics by SW846-8270C.....	5
2.1.4 Metals (Total and Dissolved) by SW846-6010B; Hg by Cold Vapor 7470A	6
3.0 Review of Sample Handling	7
4.0 Data Comparison Tables.....	7
 Attachment 1: Data Validation Summaries	
Attachment 2: Chain of Custody Forms	
Attachment 3: Project Data	

List of Tables

Table 1: Samples Used in Preparation of the CQAR.....	2
Table 2: Data Comparison: Volatiles	8
Table 3: Data Comparison: Explosives.....	8
Table 4: Data Comparison: Semivolatile Organics.....	9
Table 5: Data Comparison: Metals	9
Table 6: Criteria for Comparing Field QC and QA Sample Data.....	10
Table 7: Validation Qualifiers.....	11
Table 8: Data Validation Reason Codes	12

**Chemical Quality Assurance Report
Quarterly Groundwater Monitoring
Downgradient Wells - May 2004
Plum Brook Ordnance Works, Sandusky, Ohio**

1.0 Executive Summary

The purpose of the Chemical Quality Assurance Report (CQAR) is to provide a comprehensive review of the quality of the chemical data associated with the groundwater monitoring program, Downgradient Wells, May, 2003, for the Plum Brook Ordnance Works. The former PBOW site is currently owned by NASA and is operated as the Plum Brook Station (PBS) of the NASA John Glenn Research Center, which is located at Lewis Field based in Cleveland, Ohio. It is located approximately 4 miles south of Sandusky, Ohio, and 59 miles west of Cleveland. The areas surrounding PBOW are mostly agricultural and residential. Public access is restricted at PBOW except during the annual deer hunting season.

The PBOW site was built in early 1941 as a manufacturing plant for 2,4,6-TNT, dinitrotoluene (DNT), and pentolite. Production of explosives began on December 16, 1941 and continued until 1945. It is estimated that more than one billion pounds of explosives were manufactured during the 4-year operating period. Decontamination of TNT, acid, pentolite, and DNT processing lines was completed in late 1945.

Based on review of historical use of the site and findings of previous investigations, potential contaminants in the groundwater at PBOW may include nitroaromatic compounds, volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and metals. The analytical objective of the groundwater investigation is to produce data of known quality that can be used for several purposes. The data will be used to determine if hazardous substances are present at the site at concentrations that may constitute unacceptable risk to human health or the environment, determine the nature and extent of source areas, and determine whether contaminant distribution is consistent with DOD activities.

The CQAR for the Plum Brook Ordnance Works (PBOW) downgradient wells, May 2004, has been prepared using a single set of a project sample, field quality assurance (QA) sample (field duplicate) and quality control (QC) sample (field split). Samples used

in the preparation of the CQAR are listed in Table 1. The analyte groups and analytical methods are provided below:

Parameter (Method)
Volatile Organics by GC/MS SW846 8260B
Explosives by SW846, 8330
Semivolatile Organics by SW846 8270C
Metals by SW846 6010B, 7470A

Table 1: Samples Used in Preparation of the CQAR

LOCATION	SAMPLE NO	SAMPLE DATE	PURPOSE	SDG	ANALYTICAL LAB
PBOW	DF3002	5-May-04	REG	H4E060131	STL
	DF3005		FD	H4E060131	STL
	DF3006		FS	F23936	Accutest

Two laboratories provided the analysis of the project samples and the associated laboratory QA/QC used in arriving at the results. Severn Trent Services (STL), Knoxville, TN analyzed both the project sample and the field QA sample (field duplicate), and Accutest Laboratories, Orlando, Florida analyzed the field QC sample (field split).

Sensitivity: All samples were analyzed within the designated holding times and preservatives were added to the samples.

Precision: The variability between the project sample, field QA and field QC are summarized in Tables 2-5. The criteria for comparing the project samples and the QA/QC samples conforms to the levels defined in Table 6. A total of 72 comparisons for 16 different compounds or elements were made and four (5.6%) of the sample pairs were designated as disagreements and six (8.3%) as major disagreements. All of the sample results with major disagreement resulted from comparing samples with detects to samples with no detects.

Accuracy: Contamination in the metals method blank, resulted in thallium being qualified as “B” in both the total and dissolved fractions for the project and field QA samples.

Completeness: No data were rejected

Comparability: All of the analytical laboratories used the same method to analyze the samples. As a result all sample data can accurately be compared and analyzed.

2.0 Review of Project Samples, Field QA Samples, & Field QC Samples

The sample data were evaluated following the logic identified in *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February 1994) and *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (October 1999). Blank evaluation followed *USEPA Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (April 1993) and *Region III Modifications to National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration* (September 1994). Overall, the quality of the data was determined to be acceptable. Acceptable results were qualified as appropriate.

Several sample results for the organic compounds were assigned “J” qualifiers by the laboratory, which is standard practice for these methods, because they were quantitated between the method detection limit (MDL) and the reporting limit (RL). Due to the uncertainty associated with this region of quantitation, the validation reviewer retained the “J” qualifiers assigned by the laboratory to indicate an estimated quantity.

Data validation summaries (Attachment 1), which function as worksheets for the validation task, are included for each parameter in each data package. The following section highlights the key findings of the data validation for each analysis.

2.1 Analysis-Specific Data Validation Summaries

2.1.1 Volatile Organics by SW846 8260B

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times/Sample Condition. All samples were preserved correctly and analyzed within the QC holding time limit.

Initial Calibration (ICAL) and Continuing Calibration (CCAL). All initial and continuing calibrations associated with the project sample met QC criteria.

Blanks. Acetone was found in the method blank (MB) associated with samples DF3002 and DF3005. The compound was present in the samples at levels >10x the blank. No qualifiers were required. TCE was present in the MB associated with DF3006 but was not present in the sample.

Surrogate Recoveries. All surrogate recoveries were within the laboratory QC limits. No qualifiers were required.

Matrix Spike/Matrix Spike Duplicate (MS/MSD). The MS/MSD analyses for DF3002 and DF3005 were performed and all results were acceptable. Chloroform had a high MS recovery in the MS/MSD associated with DF3006 but the MSD was within limits and no qualifier was required. The same was true for benzene.

Laboratory Control Sample (LCS). LCS analyses were performed and QC criteria were met.

Internal Standards (IS). All internal standards area count recovery and retention times met the QC criteria

Field Duplicates (FD). All field duplicate results were within the QC limits.

Quantitation. All results were acceptable as reported.

2.1.2 Explosives by SW846-8330

Overall, the data are of good quality. Data were reviewed for the following:

Holding Times/Sample Condition. Technical holding time criteria were met for all samples. Samples were acceptable as received.

Initial and Continuing Calibration. All initial and continuing calibration relative response factors (RRFs) associated with the project sample met QC criteria. No qualifiers were required.

Blanks. No contaminants were found in the associated method blanks.

Surrogate Recoveries. All surrogate recoveries were within laboratory QC limits.

Matrix Spike/Matrix Spike Duplicates (MS/MSD). The MS/MSD analyses results were within limits and no qualifiers were required.

Laboratory Control Sample (LCS). The explosives recoveries in the LCS analyses were within the QC limits and no qualifiers were required.

Quantitation. The sample results were acceptable as reported.

2.1.3 Semivolatile Organics by SW846 8270C

Overall, the data are of good quality with the exceptions noted below. Data were reviewed for the following:

Holding Times/Sample Condition. Technical holding time criteria were met for all samples.

Initial and Continuing Calibration. All initial and continuing calibration RRFs associated with the project sample met QC criteria. No compound results were rejected.

Blanks. No compounds were detected in the method blanks. No qualifiers were required.

Surrogate Recoveries. Sample DF3002 had three low surrogate recoveries. Since all compounds were nondetects the qualifiers would have been “UJ”. The addition of qualifiers to nondetects is not relevant to the evaluation

Matrix Spike/Matrix Spike Duplicate (MS/MSD). The MS/MSD analyses (DF3002/DF3005) were acceptable within QC limits except for the results for 1,2,4-trichlorobenzene and acenaphthene. Both compounds had recoveries below the lower QC limit for the MS but the MSD were acceptable and no qualifiers were required. Pentachlorophenol had low recoveries in both the MS/MSD but the LCS was acceptable and no qualifiers were added.

Laboratory Control Sample (LCS). LCS analyses were performed and all results were acceptable.

Internal Standards (IS). Internal standards analyses were within the +100, -50% laboratory criteria.

Quantitation. All results were nondetects.

2.1.4 Metals (Total and Dissolved) by SW846 6010B; Hg by Cold Vapor 7470A

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times/Sample Condition. Technical holding time criteria were met for all samples.

Initial and Continuing Calibrations. All initial and continuing calibrations associated with the project sample met QC criteria.

Blanks. Thallium was present in the method blanks for the total and dissolved fractions for DF3002 and DF3005. All results were qualified as “B”.

Matrix Spike/Matrix Spike Duplicate (MS/MSD). A high recovery in the MS/MSD for the project and field QA samples was noted for Al and Fe in the total fraction and were qualified as “J”. The MS/MSD recoveries for Zn in the field QC sample total fraction were low and the results qualified as “J”.

ICP Check Samples. The recoveries for the check samples were within the QC limits. No qualifiers were required.

Laboratory Control Sample (LCS). All the LCS had recoveries that met the QC limits. No qualifiers were required.

ICP Serial Dilutions. The serial dilution results were within the QC limits except for the following:

Sample Type	Samples Affected	Analyte / Analytes	Validation Qualifier
Field QC	DF3006T	zinc, calcium	J

Field Duplicate. Aluminum and iron had high RPDs in the field duplicate analysis and were qualified as “J” in DF3002 and DF3005.

Quantitation. Results quantified between the minimum detection limit (MDL) and the reporting limit (RL), which the lab qualified as “B”, were qualified as estimated “J” unless blank contamination was present.

3.0 Review of Sample Handling

All aspects of sample handling were reviewed as part of the sample data evaluation and recorded in each analysis-specific data validation summary. All chain of custody (COC) forms are available in Attachment 2. No major deficiencies were noted in the handling of the samples. All cooler temperatures were plainly identified as within the QC limit.

4.0 Data Comparison Tables

Attachment 3 contains the complete project data set used to create the Comparison Tables. The data set lists all the appropriate samples, concentration units, detection limits, quantitation limits, and in the case of the metals, whether or not the sample was filtered. The detected compounds or elements were used to compare the project sample with the field QA and field QC samples.

All the detected analyte results are shown in Tables 2 through 5. In order to compare the project sample with both the field QA and field QC, compounds or elements detected in the project sample were listed for the corresponding samples as well, whether or not detected. Comparisons of results were categorized by agreement, disagreement or major disagreement as defined in Table 6.

Data comparisons were appropriate in 72 cases for 16 different compounds or elements where at least one of the compounds or elements was present in one of the three samples. Application of the comparison criteria resulted in six major disagreements (MD) and four disagreements (D).

Methylene chloride and acetone were the only two volatile organic compounds detected in the samples. Both were present in the project and FD samples but not in the FS. The data comparisons resulted in two disagreements and two major disagreement designations, for methylene chloride and acetone, respectively.

The explosives had no comparisons. All compounds were nondetect in all three samples. In the semivolatiles, phenol was present in sample DF3006 but was not detected in either of the other two samples. However, the difference was less than the 3x criteria so all three sample results were acceptable.

Of the 24 instances where the comparison criteria was applied to the metals results, seven involved comparisons where one value was a nondetect, and 17 where all values were detects. Six cases were categorized as disagreements and three as major disagreements. The three Major disagreements involved nickel (1) and vanadium (2) where one sample contained the element at levels below the RL and the other two samples were nondetects. The disagreement designation was a result of iron being present in the project sample at levels greater than 2x those in the FD and the FS.

Table 2: Data Comparison: Volatiles

Location Code	Detected Analyte ¹	Project Sample Sample No/ Date Result/Qual/Code ²	Field Duplicate Sample No./Date Result/Qual/Code ²	Field Split Sample No./Date Result/Qual/Code ²	PS/FD ³	PS/FS ³	FD/FS ³
PBOW		DF3002 5-May-04	DF3005 5-May-04	DF3006 5-May-04			
	methylene chloride	5.8 J	6.1 J	1.0 U	A	D	D
	acetone	140 J	140 J	5.0 J	A	MD	MD

Table 3: Data Comparison: Explosives

Location Code	Detected Analyte ¹	Project Sample Sample No/ Date Result/Qual/Code ²	Field Duplicate Sample No./Date Result/Qual/Code ²	Field Split Sample No./Date Result/Qual/Code ²	PS/FD ³	PS/FS ³	FD/FS ³
PBOW		DF3002 5-May-04	DF3005 5-May-04	DF3006 5-May-04			
	No detected compounds						

Table 4: Data Comparison: Semivolatiles

Location Code	Detected Analyte ¹	Project Sample Sample No./ Date Result/Qual/Code ²	Field Duplicate Sample No./Date Result/Qual/Code ²	Field Split Sample No./Date Result/Qual/Code ²	PS/FD ³	PS/FS ³	FD/FS ³
PBOW		DF3002 5-May-04	DF3005 5-May-04	DF3006 5-May-04			
	phenol	10U	10 U	3.6 J	A	A	A

Table 5: Data Comparison: Metals

Location Code	Detected Analyte ¹	Project Sample Sample No./Date Result/Qual/Code ²	Field Duplicate Sample No./ Date Result/Qual/Code ²	Field Split Sample No./Date Result/Qual/Code ²	PS/FD ³	PS/FS ³	FD/FS ³
PBOW		DF3002 5-May-04	DF3005 5-May-04	DF3006 5-May-04			
	Aluminum T	1480 J 8a, 17	862 J 17	618	A	A	A
	Aluminum D	41.1 J	51.5 J	20 U	A	A	A
	Barium T	732 J	712 J	702	A	A	A
	Barium D	730 J	690	678	A	A	A
	Calcium T	134000	122000	121000 J, 13	A	A	A
	Calcium D	118000	114000	112000 J, 13	A	A	A
	Iron T	2220 J 8a, 17	1030 J 17	744	D	D	A
	Magnesium T	39500	37700	36700	A	A	A
	Magnesium D	37900	36700	35400	A	A	A
	Manganese T	91.8	65.0	63.6	A	A	A
	Manganese D	47.4	46.3	44.2	A	A	A
	Nickel T	2.8 J	40 U	0.8 U	MD	A	MD
	Potassium T	4780 J	4410 J	4380 J	A	A	A
	Potassium D	4300 J	4120 J	4170 J	A	A	A
	Selenium D	1.7 J	5.0 J	3.6 U	A	A	A
	Sodium T	20400	19700	17600	A	A	A
	Sodium D	20600	19800	17400	A	A	A
	Thallium T	4.5 B 6a	4.2 B 6a	2.9 U	A	A	A
	Thallium D	5.3 B 6a	5.3 B 6a	2.9 U	A	A	A
	Vanadium T	50 U	50 U	0.16 J	A	MD	MD
	Zinc T	22.0	13.2 J	16.1 J	A	A	A

Footnotes in Tables 2, 3, 4, and 5

- 1) Nondetected analyte results are provided in the Table for the purpose of establishing the basis for reporting the level of disagreement between the project and QA/QC samples. All results are reported in ug/l.
- 2) Result/Qual/Code: The Qual notation refers to the evaluator’s qualifier added to the analytical value resulting from a review of the lab QA/QC data. See **Table 7** for qualifier definitions. See **Table 8** for a listing of data validation codes.
- 3) Agreement (A)/Disagreement (D)/major disagreement (MD)-- the level of disagreement is based on comparison criteria from **Table 6**: PS=project sample; FD=field duplicate; FS=field split.

Table 6: Criteria for Comparing Field QC and QA Sample Data

Matrix	Parameter	Disagreement	Major Disagreement
All	All	>5x difference when one result is < DL	>10x difference when one result is < DL
All	All	>3x difference when one result is < RL	>5x difference when one result is < RL
Water	All except TPH	>2x difference	>3x difference

Reference: CRREL Special Report No. 96-9, “Comparison Criteria for Environmental Chemical Analyses of Split Samples Sent to Different Laboratories – Corps of Engineers Archived Data”, Grant, C.G., Jenkins, T.F., and Mudambi, A.R., USACE Cold Regions and Environmental Research Laboratory, Hanover NH, May 1996

Table 7: Validation Qualifiers

U	Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.
J	The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.
B	The concentration reported was detected significantly above the levels reported in the associated equipment rinse samples and/or laboratory method and trip blanks. (5X/10X Rule was applied).
R	The reported sample results are rejected due to the following: <ol style="list-style-type: none">1. Severe deficiencies in the supporting quality control data.2. Anomalies noted in the sampling and/or analysis process that could affect the validity of the reported data.3. The presence or absence of the constituent cannot be verified based on the data provided.4. To indicate not to use a particular result in the event of a reanalysis.
UJ	The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the “nondetect” may be inaccurate or imprecise. The nondetect result should be estimated.

Table 8: Data Validation Reason Codes

Reason Code	Definition
01	Sample received outside of 4+/-2 degrees Celsius
01A	Improper sample preservation
02	Holding time exceeded
02A	Extraction
02B	Analysis
03	Instrument performance – outside criteria
03A	BFB
03B	DFTPP
03C	DDT and/or Endrin % breakdown exceeds criteria
03D	Retention time windows
03E	Resolution
04	Initial calibration results outside specified criteria
04A	Compound mean RRF QC criteria not met
04B	Individual % RSD criteria not met
04C	Correlation coefficient >0.995
05	Continuing calibration results outside specified criteria
05A	Compound mean RRF QC criteria not met
05B	Compound % D QC criteria not met
06	Result qualified as a result of the 5x/10x blank correction
06A	Method or preparation blank
06B	ICB or CCB
06C	ER
06D	TB
06E	FB
07	Surrogate recoveries outside control limits
07A	Sample
07B	Associated method blank or LCS
08	MS/MSD/Duplicate results outside criteria
08A	MS and/or MSD recovery not within control limits (accuracy)
08B	% RPD outside acceptance criteria (precision)
09	Post digestion spike outside criteria (GFAA)
10	Internal standards outside specified control limits
10A	Recovery
10B	Retention time
11	Laboratory control sample recoveries outside specified limits
11A	Recovery
11B	% RPD (if run in duplicate)
12	Interference check standard
13	Serial dilution
14	Tentatively identified compounds
15	Quantitation
16	Multiple results available; alternate analysis preferred
17	Field duplicate RPD criteria is exceeded
18	Percent difference between original and second column exceeds QC criteria
19	Professional judgement was used to qualify the data
20	Pesticide clean-up checks
21	Target compound identification
22	Radiological calibration
23	Radiological quantitation
24	Reported result and/or lab qualifier revised to reflect validation findings

Attachment 1
Data Validation Summaries

FZ3936 - Accutest

Downgradient Wells - May 2004

SDG: H4E060131 - STL Project: Plum Brook Ordnance WorksMethod: Volatiles 8260 B Matrix/No. Samples: Water - 3Validation Samples: DF 3002DF 3005DF 3006

Data Validation Report Summary

	Status Code	Comments
1. Sample Preservation, Handling, and Transport	<u>A</u>	<u></u>
2. Chain of Custody	<u>A</u>	<u></u>
3. Holding Times	<u>A</u>	<u></u>
4. GC/MS Tune/Inst Perf	<u>A</u>	<u></u>
5. Calibrations	<u>A</u>	<u></u>
6. Blanks	<u>A</u>	<u></u>
7. Blank Spike/LCS	<u>A</u>	<u></u>
8. Matrix Spike	<u>A</u>	<u></u>
9. Surrogates	<u>A</u>	<u></u>
10. Internal Standards	<u>A</u>	<u></u>
11. Compound Identification	<u>N/A</u>	<u></u>
12. System Performance	<u>A</u>	<u></u>
13. Field QC Samples	<u>A</u>	<u></u>
14. Overall Assessment	<u>A</u>	<u></u>

Status Codes:

A = Acceptable

R = Data Rejected

X = Data acceptable but qualified due to problems

SHAW E & I INC

Client Sample ID: DF3002

GC/MS Volatiles

Lot-Sample #....: H4E060131-002 Work Order #....: GFL5R1CE Matrix.....: WATER
 Date Sampled....: 05/05/04 Date Received...: 05/06/04
 Prep Date.....: 05/10/04 Analysis Date...: 05/10/04
 Prep Batch #....: 4131038
 Dilution Factor: 20 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
Chloromethane	ND	40	ug/L	2.4	u
Bromomethane	ND	40	ug/L	7.6	
Vinyl chloride	ND	20	ug/L	4.8	
Chloroethane	ND	40	ug/L	4.8	
Methylene chloride	5.8 J	40	ug/L	4.6	J
Acetone	140 J,B	200	ug/L	28	J
Carbon disulfide	ND	20	ug/L	2.0	u
1,1-Dichloroethene	ND	20	ug/L	2.0	
1,1-Dichloroethane	ND	20	ug/L	2.0	
1,2-Dichloroethene (total)	ND	20	ug/L	4.0	
Chloroform	ND	20	ug/L	2.0	
1,2-Dichloroethane	ND	20	ug/L	2.0	
2-Butanone	ND	100	ug/L	15	
1,1,1-Trichloroethane	ND	20	ug/L	2.0	
Carbon tetrachloride	ND	20	ug/L	2.4	
Bromodichloromethane	ND	20	ug/L	2.0	
1,2-Dichloropropane	ND	20	ug/L	2.0	
cis-1,3-Dichloropropene	ND	20	ug/L	2.0	
Trichloroethene	ND	20	ug/L	2.0	
Dibromochloromethane	ND	20	ug/L	4.0	
1,1,2-Trichloroethane	ND	20	ug/L	5.0	
Benzene	ND	20	ug/L	2.0	
trans-1,3-Dichloropropene	ND	20	ug/L	2.2	
Bromoform	ND	20	ug/L	2.8	
4-Methyl-2-pentanone	ND	100	ug/L	8.0	
2-Hexanone	ND	100	ug/L	15	
Tetrachloroethene	ND	20	ug/L	2.0	
1,1,2,2-Tetrachloroethane	ND	20	ug/L	3.0	
Toluene	ND	20	ug/L	2.0	
Chlorobenzene	ND	20	ug/L	2.0	
Ethylbenzene	ND	20	ug/L	2.0	
Styrene	ND	20	ug/L	2.0	
Xylenes (total)	ND	20	ug/L	6.0	

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	90	(79 - 120)
1,2-Dichloroethane-d4	87	(71 - 127)
Toluene-d8	82	(80 - 120)
Bromofluorobenzene	93	(69 - 126)

(Continued on next page)

SHAW E & I INC

Client Sample ID: DF3005

GC/MS Volatiles

Lot-Sample #....: H4E060131-003
 Date Sampled....: 05/05/04
 Prep Date.....: 05/10/04
 Prep Batch #....: 4131038
 Dilution Factor: 20

Work Order #....: GFL501AN
 Date Received...: 05/06/04
 Analysis Date...: 05/10/04

Matrix.....: WATER

Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev 2nd
Chloromethane	ND	40	ug/L	2.4	u
Bromomethane	ND	40	ug/L	7.6	
Vinyl chloride	ND	20	ug/L	4.8	
Chloroethane	ND	40	ug/L	4.8	
Methylene chloride	6.1 J	40	ug/L	4.6	J
Acetone	140 J,B	200	ug/L	28	J
Carbon disulfide	ND	20	ug/L	2.0	u
1,1-Dichloroethene	ND	20	ug/L	2.0	
1,1-Dichloroethane	ND	20	ug/L	2.0	
1,2-Dichloroethene (total)	ND	20	ug/L	4.0	
Chloroform	ND	20	ug/L	2.0	
1,2-Dichloroethane	ND	20	ug/L	2.0	
2-Butanone	ND	100	ug/L	15	
1,1,1-Trichloroethane	ND	20	ug/L	2.0	
Carbon tetrachloride	ND	20	ug/L	2.4	
Bromodichloromethane	ND	20	ug/L	2.0	
1,2-Dichloropropane	ND	20	ug/L	2.0	
cis-1,3-Dichloropropene	ND	20	ug/L	2.0	
Trichloroethene	ND	20	ug/L	2.0	
Dibromochloromethane	ND	20	ug/L	4.0	
1,1,2-Trichloroethane	ND	20	ug/L	5.0	
Benzene	ND	20	ug/L	2.0	
trans-1,3-Dichloropropene	ND	20	ug/L	2.2	
Bromoform	ND	20	ug/L	2.8	
4-Methyl-2-pentanone	ND	100	ug/L	8.0	
2-Hexanone	ND	100	ug/L	15	
Tetrachloroethene	ND	20	ug/L	2.0	
1,1,2,2-Tetrachloroethane	ND	20	ug/L	3.0	
Toluene	ND	20	ug/L	2.0	
Chlorobenzene	ND	20	ug/L	2.0	
Ethylbenzene	ND	20	ug/L	2.0	
Styrene	ND	20	ug/L	2.0	
Xylenes (total)	ND	20	ug/L	6.0	

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	98	(79 - 120)
1,2-Dichloroethane-d4	94	(71 - 127)
Toluene-d8	82	(80 - 120)
Bromofluorobenzene	92	(69 - 126)

(Continued on next page)

Report of Analysis



Client Sample ID: DF3006 Lab Sample ID: F23936-1 Matrix: AQ - Water Method: SW846 8260B Project: PBOW	Date Sampled: 05/05/04 Date Received: 05/06/04 Percent Solids: n/a
---	--

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0028469.D	1	05/18/04	KW	n/a	n/a	VG1057
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	Raw	Quel
67-64-1	Acetone	ND	50	5.0	ug/l			u
71-43-2	Benzene	ND	1.0	0.50	ug/l			
75-27-4	Bromodichloromethane	ND	2.0	0.50	ug/l			
75-25-2	Bromoform	ND	2.0	0.50	ug/l			
108-90-7	Chlorobenzene	ND	2.0	0.50	ug/l			
75-00-3	Chloroethane	ND	2.0	1.0	ug/l			
67-66-3	Chloroform	ND	2.0	0.50	ug/l			
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l			
56-23-5	Carbon tetrachloride	ND	2.0	0.50	ug/l			
75-34-3	1,1-Dichloroethane	ND	2.0	0.50	ug/l			
75-35-4	1,1-Dichloroethylene	ND	2.0	0.50	ug/l			
107-06-2	1,2-Dichloroethane	ND	2.0	0.50	ug/l			
78-87-5	1,2-Dichloropropane	ND	2.0	0.50	ug/l			
124-48-1	Dibromochloromethane	ND	2.0	0.40	ug/l			
156-59-2	cis-1,2-Dichloroethylene	ND	2.0	0.50	ug/l			
10061-01-5	cis-1,3-Dichloropropene	ND	2.0	0.30	ug/l			
156-60-5	trans-1,2-Dichloroethylene	ND	2.0	0.50	ug/l			
10061-02-6	trans-1,3-Dichloropropene	ND	2.0	0.30	ug/l			
100-41-4	Ethylbenzene	ND	2.0	0.50	ug/l			
591-78-6	2-Hexanone	ND	10	2.5	ug/l			
108-10-1	4-Methyl-2-pentanone	ND	10	2.5	ug/l			
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l			
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l			
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l			
78-93-3	Methyl ethyl ketone	ND	10	2.5	ug/l			
100-42-5	Styrene	ND	2.0	0.50	ug/l			
71-55-6	1,1,1-Trichloroethane	ND	2.0	0.50	ug/l			
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	0.30	ug/l			
79-00-5	1,1,2-Trichloroethane	ND	2.0	0.50	ug/l			
127-18-4	Tetrachloroethylene	ND	2.0	0.50	ug/l			
108-88-3	Toluene	ND	2.0	0.50	ug/l			
79-01-6	Trichloroethylene	ND	2.0	0.50	ug/l			

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: DF3006	Date Sampled: 05/05/04
Lab Sample ID: F23936-1	Date Received: 05/06/04
Matrix: AQ - Water	Percent Solids: n/a
Method: SW846 8260B	
Project: PBOW	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	<i>Req Qucl</i>
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l		<i>u</i>
1330-20-7	Xylene (total)	ND	6.0	1.0	ug/l		<i>u</i>

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		86-115%
17060-07-0	1,2-Dichloroethane-D4	108%		73-126%
2037-26-5	Toluene-D8	97%		86-112%
460-00-4	4-Bromofluorobenzene	94%		83-119%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

**DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11

Project: Plumbrook SDG: F23936
H4E060131 Matrix/No. Samples: W-3

I. Technical Holding Times									
A. Sample Preservation, Handling and Transport									
1. Have all samples been preserved correctly?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A						
2. Have sample temperatures been kept at 4° C (+ or - 2 °)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A						
3. Were all samples received in proper condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A						
4. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A						
Coolers @ ^{3002, 3005} 3.2°C, ³⁰⁰⁶ 3.6°C									
B. Chain of Custody									
1. Were all samples properly recorded on COCs?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A						
2. Were correct analyses performed on samples?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A						
C. Holding Times									
1. Were samples extracted and analyzed within acceptable holding times?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A						
2. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A						
<table border="0" style="width:100%"> <tr> <td style="text-align:center">SAMPLED</td> <td style="text-align:center">PREPPED</td> <td style="text-align:center">ANALYZED</td> </tr> <tr> <td> ³⁰⁰² ³⁰⁰⁵ 5/5 ³⁰⁰⁶ 5/5 </td> <td>5/10</td> <td> ³⁰⁰² ³⁰⁰⁵ 5/10 ³⁰⁰⁶ 5/18 </td> </tr> </table>				SAMPLED	PREPPED	ANALYZED	³⁰⁰² ³⁰⁰⁵ 5/5 ³⁰⁰⁶ 5/5	5/10	³⁰⁰² ³⁰⁰⁵ 5/10 ³⁰⁰⁶ 5/18
SAMPLED	PREPPED	ANALYZED							
³⁰⁰² ³⁰⁰⁵ 5/5 ³⁰⁰⁶ 5/5	5/10	³⁰⁰² ³⁰⁰⁵ 5/10 ³⁰⁰⁶ 5/18							
II. GC/MS Instrument Performance Check									
1. Were instrument performance check samples run for each analysis period?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A						
2. Were ion abundance criteria met for bromofluorobenzene (BFB) analysis?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A						
3. Do laboratory forms match raw data?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A						
4. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A						
Comments/Qualifications:									
³⁰⁰² } none ³⁰⁰⁵ } ³⁰⁰⁶ ICAL 4/28 95 base criteria met. → CCAL 5/18									

**DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11
 Project: Plumbrook SDG: F23936 H4E060131 Matrix/No. Samples: W-3

III. Initial Calibration			
1. Were correct concentrations of standards used for initial calibration? Were samples analyzed within 12 hours of associated instrument performance check?	<input checked="" type="radio"/> Yes	No	N/A
2. Were initial calibration RRFs for all volatile target compounds and system monitoring compounds ≥ 0.05 ? Do recalculations for RRFs agree with reported values?	<input checked="" type="radio"/> Yes	No	N/A
3. Were %RSDs $\leq 30\%$ for all volatile target compounds? Do recalculations for RSDs agree with reported values?	<input checked="" type="radio"/> Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: 3006 4/28 @ 18:57 3002 } none RRFs ≥ 0.05 3005 } RSDs, all target cpds $< 15\%$			
IV. Continuing Calibration			
1. Were continuing calibration samples run at the required frequency, and compared to the correct initial calibration?	<input checked="" type="radio"/> Yes	No	N/A
2. Did calculations from raw data agree with laboratory reported values for RRF and %D?	Yes	No	<input checked="" type="radio"/> N/A
3. Were continuing calibration RRFs for volatile organic compounds and system monitoring compounds (surrogates) ≥ 0.05 ?	<input checked="" type="radio"/> Yes	No	N/A
4. Were %D between initial calibration RRF and the continuing calibration RRFs within $\pm 25\%$?	<input checked="" type="radio"/> Yes	No	N/A
5. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: 5/18 @ 10:11 3002 } none 3006 3005 } all target cpds @ RRF ≥ 0.05 %Ds $< 25\%$			

**DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11

Project: Plumbrook SDG: F23936
H4E060131 Matrix/No. Samples: W-3

VIII. Laboratory Control Sample (LCS)			
1. Were LCS samples run at correct frequency for each matrix samples?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were LCS calculations performed correctly, and did laboratory reported values match raw data? Were recoveries within laboratory QC limits?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were any qualifications required based on LCS data in conjunction with other QC information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: $\frac{3002}{3005} \times 31AC = 5/7$ $84-103$ $TCE \frac{10.3}{10} = 103\%$ $\frac{G21AC}{5/10}$ $87-109$ $Toluene \frac{8.7}{10} = 87\%$ $\frac{28446.D1}{5/18}$ $76-118$ $Ethylb. \frac{26.3}{25} = 105.2\%$			
IX. Internal Standards			
1. Were standard area counts within a factor of two (-50% to +100%) from associated calibration standard?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were retention times of internal standard within + or - 30 seconds of retention time of associated calibration check?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
3. Were any qualifications required based on internal standard results?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: $\frac{30027 \text{ none}}{3005}$ $\frac{3006 \text{ IS 2 } 277570}{34298} = 70.4\%$ $\frac{RTs \ 17.40}{17.40}$			
X. Target Compound Identification			
1. Are relative retention times (RRTs) within + or - 0.06 RRT units of standard RRT?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
2. Do sample compound spectra meet specified criteria in relation to laboratory standard spectra?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
3. Were all compounds accounted for on chromatogram?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Comments/Qualifications: $No \ raw \ data$			

**DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11

Project: Plumbrook SDG: F23936
H4EQ60131 Matrix/No. Samples: w-3

XI. Compound Quantitation and Reported Contract Required Quantitation Limits (CRQLs)			
1. Were sample results correctly calculated and reported by laboratory?	Yes	No	N/A
2. Were correct internal standard quantitation ion and RRF used to quantify all compounds for all samples?	Yes	No	N/A
3. Were CRQLs adjusted to reflect sample dilutions and dry weight factors not accounted for by the method?	Yes	No	N/A
4. Were any laboratory QA/QC sample results calculated from peaks derived using manual integration?	Yes	No	N/A
5. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications: <i>No raw data</i>			
XII. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (³⁰ 50% for water samples, ⁵⁰ 100% for soil samples)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any compounds reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications: <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">3002</div> <div style="text-align: center;">3005</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">5.8</div> <div style="text-align: center;">MC</div> <div style="text-align: center;">6.1</div> <div style="text-align: center;">✓</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">140</div> <div style="text-align: center;">Act.</div> <div style="text-align: center;">140</div> <div style="text-align: center;">✓</div> </div>			
XIII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
Comments/Qualifications:			

F23936 - Accutest

Downgradient Wells - May 2004

SDG: H4E060131 - STL Project: Plum Brook

Method: Explosives 8330 Matrix/No. of Samples: Water - 3

Validation Samples: DF3002
DF3005
DF3006

Data Validation Report Summary

	Status Code	Comments
1. Sample Preservation, Handling, and Transport	<u>A</u>	<u></u>
2. Chain of Custody	<u>A</u>	<u></u>
3. Holding Times	<u>A</u>	<u></u>
4. GC/MS Tune/Inst Perf	<u>N/A</u>	<u></u>
5. Calibrations	<u>A</u>	<u></u>
6. Blanks	<u>A</u>	<u></u>
7. Blank Spike/LCS	<u>A</u>	<u></u>
8. Matrix Spike	<u>A</u>	<u></u>
9. Surrogates	<u>A</u>	<u></u>
10. Internal Standards	<u>N/A</u>	<u></u>
11. Compound Identification	<u>N/A</u>	<u></u>
12. System Performance	<u>A</u>	<u></u>
13. Field QC Samples	<u>A</u>	<u></u>
14. Overall Assessment	<u>A</u>	<u></u>

Status Codes:

A = Acceptable

R = Data Rejected

X = Data acceptable but qualified due to problems

SDG: F23936
H4E060131

Method: Explosives

Page 2

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Validator's Signature:

J. Thomas Kibler

Date: 8/11/2004

Peer Reviewer:

Date:

SHAW E & I INC

Client Sample ID: DF3005

HPLC

Lot-Sample #....: H4E060131-003 Work Order #....: GFL501AM Matrix.....: WATER
 Date Sampled....: 05/05/04 Date Received...: 05/06/04
 Prep Date.....: 05/11/04 Analysis Date...: 05/11/04
 Prep Batch #....: 4131219
 Dilution Factor: 1 Method.....: SW846 8330

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>	<i>Req'd</i>
HMX	ND	0.50	ug/L	0.082	u
RDX	ND	0.50	ug/L	0.067	
1,3,5-Trinitrobenzene	ND	0.20	ug/L	0.049	
1,3-Dinitrobenzene	ND	0.20	ug/L	0.040	
Tetryl	ND	0.20	ug/L	0.060	
Nitrobenzene	ND	0.20	ug/L	0.049	
2,4,6-Trinitrotoluene	ND	0.20	ug/L	0.13	
4-Amino-2,6- dinitrotoluene	ND	0.20	ug/L	0.10	
2-Amino-4,6- dinitrotoluene	ND	0.20	ug/L	0.077	
2,6-Dinitrotoluene	ND	0.20	ug/L	0.073	
2,4-Dinitrotoluene	ND	0.20	ug/L	0.090	
2-Nitrotoluene	ND	0.20	ug/L	0.12	
4-Nitrotoluene	ND	0.20	ug/L	0.12	
3-Nitrotoluene	ND	0.20	ug/L	0.13	
					↓
	<u>PERCENT</u>	<u>RECOVERY</u>			
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>			
1-Chloro-3-nitrobenzene	69	(52 - 139)			

Report of Analysis

3.1
3

Client Sample ID: DF3006	Date Sampled: 05/05/04
Lab Sample ID: F23936-1	Date Received: 05/06/04
Matrix: AQ - Water	Percent Solids: n/a
Method: SW846 8330A SW846 3535A	
Project: PBOW	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG009532.D	1	05/13/04	MRE	05/12/04	OP10411	GGG447
Run #2							

Run #	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q	REV Rev Qual
2691-41-0	HMX	ND	0.20	0.075	ug/l		u ↓
121-82-4	RDX	ND	0.20	0.075	ug/l		
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.050	ug/l		
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.050	ug/l		
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.050	ug/l		
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.050	ug/l		
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.050	ug/l		
98-95-3	Nitrobenzene	ND	0.20	0.050	ug/l		
88-72-2	o-Nitrotoluene	ND	0.20	0.050	ug/l		
99-08-1	m-Nitrotoluene	ND	0.20	0.050	ug/l		
99-99-0	p-Nitrotoluene	ND	0.20	0.075	ug/l		
479-45-8	Tetryl	ND	0.20	0.075	ug/l		
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.050	ug/l		
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.050	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	82%		61-124%

ND = Not detected MDL - Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

**DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC**

Reviewer: Kitchings

Date: 8/11

Project: Plum Brook SDG: F 23936
H 4E060131

Matrix/No. Samples: W-3

III. Continuing Calibration			
1. Were continuing calibration samples run at the required frequency, and compared to the correct initial calibration?	<input checked="" type="radio"/> Yes	No	N/A
2. Were RTs for all standard compounds in continuing calibration samples within acceptable RT window?	<input checked="" type="radio"/> Yes	No	N/A
3. Were continuing calibration recoveries within control limit of 75-125%?	<input checked="" type="radio"/> Yes	No	N/A
4. Did laboratory reported calculations and data match raw data?	Yes	No	<input checked="" type="radio"/> N/A
5. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>3002 } none 3005 }</p> </div> <div style="width: 45%;"> <p>3006 5/13 @ 11:10 @ 14:57 1- %Ds < 11% < 11% 2- %Ds < 9% < 12%</p> </div> </div>			
IV. Blanks			
1. Does data package include summary of method blank results?	<input checked="" type="radio"/> Yes	No	N/A
2. Were any compounds reported in laboratory method blanks?	Yes	<input checked="" type="radio"/> No	N/A
3. Were method blank analyses performed at required frequency?	<input checked="" type="radio"/> Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>J 1 AA 5/11 3002 u's 3005</p> </div> <div style="width: 45%;"> <p>3006 9/31.0. 5/13 all u's.</p> </div> </div>			
V. System Monitoring Compounds (Surrogate Spikes)			
1. Were all samples spiked with correct surrogate compounds?	<input checked="" type="radio"/> Yes	No	N/A
2. Were laboratory surrogate recoveries calculated and reported correctly on data forms?	<input checked="" type="radio"/> Yes	No	<input checked="" type="radio"/> N/A
3. Were surrogate recoveries within laboratory established limits?	<input checked="" type="radio"/> Yes	No	N/A
4. Were any qualifications required based on surrogate spike QC information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><u>51</u> 3002 78 3005 69 3006 — 82</p> </div> <div style="width: 45%;"> <p>RT ~</p> </div> </div>			

**DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC**

Reviewer: Kitchings Date: 8/11

Project: Plum Brook SDG: P23936
H4E060131 Matrix/No. Samples: W-3

VI. Matrix Spikes/ Matrix Spike Duplicates			
1. Were MS/MSD samples analyzed at required frequency for each ample matrix (at least 5%)?	<input checked="" type="radio"/> Yes	No	N/A
2. Were MS/MSD results for recovery (+or- 40%) RPD (<30) within laboratory QC limits?	<input checked="" type="radio"/> Yes	No	N/A
3. Were Samples used for MS/MSD field blanks?	Yes	<input checked="" type="radio"/> No	N/A
4. Were matrix spike recoveries and RPDs calculated and reported correctly?	Yes	No	<input checked="" type="radio"/> N/A
5. Were any qualifications required, based on results of MS/MSD samples in conjunction with other QC information?	Yes	<input checked="" type="radio"/> No	N/A
<p>Comments/Qualifications:</p> <p>5 RICC MS/MSD tetryl @ zero → LCS ok no qual's</p> <p>3002 3005 → MS 69-99 MSD 61-92</p> <p style="text-align: center;">RPD - 0-13</p>			
VII. Laboratory Control Sample (LCS)			
1. Were LCS samples run?	<input checked="" type="radio"/> Yes	No	N/A
2. If performed, were LCS recoveries within the QC limits?	<input checked="" type="radio"/> Yes	No	N/A
3. If performed, were LCS calculations performed correctly, and did laboratory reported values match raw data?	Yes	No	<input checked="" type="radio"/> N/A
4. Were any qualifications required based on LCS data in conjunction with other QC information?	Yes	<input checked="" type="radio"/> No	N/A
<p>Comments/Qualifications:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>3002 5/11 3005</p> <p>77-99 ✓</p> <p>HMX $\frac{2.81}{3.00} = 93.7\% \checkmark$</p> </div> <div style="width: 45%;"> <p>3006 9530.D.</p> <p>88-112</p> <p>tetryl $\frac{2.2}{2.5} = 88\% \checkmark$</p> </div> </div>			

**DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC**

Reviewer: Kitchings Date: 8/1

Project: Plum Brook ^{F23936}
SDG: H4E060131 Matrix/No. Samples: W-3

VIII. Field QC Samples			
1. Were field blank or equipment rinsate samples associated with this SDG?	Yes	<input checked="" type="radio"/> No	N/A
2. Were any compounds present in any associated field blank samples?	Yes	<input type="radio"/> No	N/A
3. Were any field duplicate pairs analyzed in this SDG?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
4. Were RPDs field duplicate pairs within acceptable limits (+ or -20%)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
5. Were any qualifications required based on field QC information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: 3002 3005 ↳ u's ↵			
IX. Compound Identification			
1. Are relative retention times (RRTs) within acceptable RRT windows?	Yes	No	<input checked="" type="radio"/> N/A
2. Were identified compounds confirmed on second column?	Yes	No	<input type="radio"/> N/A
3. Were any qualification required based on this information?	Yes	No	<input type="radio"/> N/A
Comments/Qualifications: No raw data <div style="text-align: right;">↓</div>			
X. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications:			

F23936- Accutest

Downgradient Wells - May 2004

SDG: H4E060131 - STL Project: Plum Brook Ordnance WorksMethod: Semivolatiles 8270 C Matrix/No. Samples: Water-3Validation Samples: DF3002
DF3005
DF3006

Data Validation Report Summary

	Status Code	Comments
1. Sample Preservation, Handling, and Transport	<u>A</u>	<u></u>
2. Chain of Custody	<u>A</u>	<u></u>
3. Holding Times	<u>A</u>	<u></u>
4. GC/MS Tune/Inst Perf	<u>A</u>	<u></u>
5. Calibrations	<u>A</u>	<u></u>
6. Blanks	<u>A</u>	<u></u>
7. Blank Spike/LCS	<u>A</u>	<u></u>
8. Matrix Spike	<u>A</u>	<u></u>
9. Surrogates	<u>A</u>	<u>see comment # 1</u>
10. Internal Standards	<u>A</u>	<u></u>
11. Compound Identification	<u>N/A</u>	<u></u>
12. System Performance	<u>A</u>	<u></u>
13. Field QC Samples	<u>A</u>	<u></u>
14. Overall Assessment	<u>A</u>	<u></u>

Status Codes:

A = Acceptable

R = Data Rejected

X = Data acceptable but qualified due to problems

SHAW B & I INC

Client Sample ID: DF3002

GC/MS Semivolatiles

Lot-Sample #...: H4E060131-002 Work Order #...: GFL5R1CH Matrix.....: WATER
 Date Sampled...: 05/05/04 Date Received...: 05/06/04
 Prep Date.....: 05/06/04 Analysis Date...: 05/13/04
 Prep Batch #...: 4127250
 Dilution Factor: 1 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING			MDL	Rev Qual
		LIMIT	UNITS			
Phenol	ND	10	ug/L	1.8	u	
bis(2-Chloroethyl)- ether	ND	10	ug/L	1.6		
2-Chlorophenol	ND	10	ug/L	1.2		
1,3-Dichlorobenzene	ND	10	ug/L	1.6		
1,4-Dichlorobenzene	ND	10	ug/L	1.4		
1,2-Dichlorobenzene	ND	10	ug/L	1.7		
2-Methylphenol	ND	10	ug/L	2.0		
2,2'-oxybis(1-Chloro- propane)	ND	10	ug/L	1.4		
4-Methylphenol	ND	10	ug/L	3.6		
N-Nitrosodi-n-propyl- amine	ND	10	ug/L	2.1		
Hexachloroethane	ND	10	ug/L	1.9		
Nitrobenzene	ND	10	ug/L	1.8		
Isophorone	ND	10	ug/L	1.6		
2-Nitrophenol	ND	10	ug/L	2.4		
2,4-Dimethylphenol	ND	10	ug/L	3.7		
bis(2-Chloroethoxy) methane	ND	10	ug/L	1.5		
2,4-Dichlorophenol	ND	10	ug/L	2.0		
1,2,4-Trichloro- benzene	ND	10	ug/L	1.5		
Naphthalene	ND	10	ug/L	1.7		
4-Chloroaniline	ND	10	ug/L	1.8		
Hexachlorobutadiene	ND	10	ug/L	1.4		
4-Chloro-3-methylphenol	ND	10	ug/L	2.2		
2-Methylnaphthalene	ND	10	ug/L	1.6		
Hexachlorocyclopenta- diene	ND	50	ug/L	7.9		
2,4,6-Trichloro- phenol	ND	10	ug/L	2.0		
2,4,5-Trichloro- phenol	ND	10	ug/L	1.6		
2-Chloronaphthalene	ND	10	ug/L	1.6		
2-Nitroaniline	ND	50	ug/L	1.4		
Dimethyl phthalate	ND	10	ug/L	1.1		
Acenaphthylene	ND	10	ug/L	1.7		
2,6-Dinitrotoluene	ND	10	ug/L	1.7		

(Continued on next page)

SHAW E & I INC

Client Sample ID: DF3002

GC/MS Semivolatiles

Lot-Sample #....: H4E060131-002 Work Order #....: GFL5R1CH Matrix.....: WATER

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>	<i>Rev Qual</i>
3-Nitroaniline	ND	50	ug/L	1.3	4
Acenaphthene	ND	10	ug/L	1.5	
2,4-Dinitrophenol	ND	50	ug/L	15	
4-Nitrophenol	ND	50	ug/L	15	
Dibenzofuran	ND	10	ug/L	1.6	
2,4-Dinitrotoluene	ND	10	ug/L	1.6	
Diethyl phthalate	ND	10	ug/L	1.3	
4-Chlorophenyl phenyl ether	ND	10	ug/L	1.6	
Fluorene	ND	10	ug/L	1.3	
4-Nitroaniline	ND	50	ug/L	1.3	
4,6-Dinitro- 2-methylphenol	ND	50	ug/L	11	
N-Nitrosodiphenylamine	ND	10	ug/L	1.6	
4-Bromophenyl phenyl ether	ND	10	ug/L	1.4	
Hexachlorobenzene	ND	10	ug/L	0.90	
Pentachlorophenol	ND	50	ug/L	8.6	
Phenanthrene	ND	10	ug/L	0.84	
Anthracene	ND	10	ug/L	0.83	
Carbazole	ND	10	ug/L	1.2	
Di-n-butyl phthalate	ND	10	ug/L	1.4	
Fluoranthene	ND	10	ug/L	1.3	
Pyrene	ND	10	ug/L	0.96	
Butyl benzyl phthalate	ND	10	ug/L	1.3	
3,3'-Dichlorobenzidine	ND	50	ug/L	1.2	
Benzo(a)anthracene	ND	10	ug/L	1.2	
Chrysene	ND	10	ug/L	0.98	
bis(2-Ethylhexyl) phthalate	ND	10	ug/L	2.2	
Di-n-octyl phthalate	ND	10	ug/L	2.4	
Benzo(b)fluoranthene	ND	10	ug/L	2.1	
Benzo(k)fluoranthene	ND	10	ug/L	1.7	
Benzo(a)pyrene	ND	10	ug/L	1.6	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	2.1	
Dibenz(a,h)anthracene	ND	10	ug/L	2.5	
Benzo(ghi)perylene	ND	10	ug/L	2.1	
<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>			
2-Fluorophenol	44	(36 - 98)			
Phenol-d5	49	(49 - 109)			
Nitrobenzene-d5	53 *	(57 - 120)			
2-Fluorobiphenyl	51 *	(56 - 118)			
2,4,6-Tribromophenol	33 *	(55 - 134)			
Terphenyl-d14	55	(33 - 142)			

(Continued on next page)

SHAW E & I INC

Client Sample ID: DF3005

GC/MS Semivolatiles

Lot-Sample #....: H4E060131-003 Work Order #....: GFL501AP Matrix.....: WATER
 Date Sampled....: 05/05/04 Date Received...: 05/06/04
 Prep Date.....: 05/06/04 Analysis Date...: 05/13/04
 Prep Batch #....: 4127250
 Dilution Factor: 1 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
Phenol	ND	10	ug/L	1.8	u ↓
bis(2-Chloroethyl)- ether	ND	10	ug/L	1.6	
2-Chlorophenol	ND	10	ug/L	1.2	
1,3-Dichlorobenzene	ND	10	ug/L	1.6	
1,4-Dichlorobenzene	ND	10	ug/L	1.4	
1,2-Dichlorobenzene	ND	10	ug/L	1.7	
2-Methylphenol	ND	10	ug/L	2.0	
2,2'-oxybis(1-Chloro- propane)	ND	10	ug/L	1.4	
4-Methylphenol	ND	10	ug/L	3.6	
N-Nitrosodi-n-propyl- amine	ND	10	ug/L	2.1	
Hexachloroethane	ND	10	ug/L	1.9	
Nitrobenzene	ND	10	ug/L	1.8	
Isophorone	ND	10	ug/L	1.6	
2-Nitrophenol	ND	10	ug/L	2.4	
2,4-Dimethylphenol	ND	10	ug/L	3.7	
bis(2-Chloroethoxy) methane	ND	10	ug/L	1.5	
2,4-Dichlorophenol	ND	10	ug/L	2.0	
1,2,4-Trichloro- benzene	ND	10	ug/L	1.5	
Naphthalene	ND	10	ug/L	1.7	
4-Chloroaniline	ND	10	ug/L	1.8	
Hexachlorobutadiene	ND	10	ug/L	1.4	
4-Chloro-3-methylphenol	ND	10	ug/L	2.2	
2-Methylnaphthalene	ND	10	ug/L	1.6	
Hexachlorocyclopenta- diene	ND	50	ug/L	7.9	
2,4,6-Trichloro- phenol	ND	10	ug/L	2.0	
2,4,5-Trichloro- phenol	ND	10	ug/L	1.6	
2-Chloronaphthalene	ND	10	ug/L	1.6	
2-Nitroaniline	ND	50	ug/L	1.4	
Dimethyl phthalate	ND	10	ug/L	1.1	
Acenaphthylene	ND	10	ug/L	1.7	
2,6-Dinitrotoluene	ND	10	ug/L	1.7	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DF3005

GC/MS Semivolatiles

Lot-Sample #...: H4E060131-003 Work Order #...: GFL501AP Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
3-Nitroaniline	ND	50	ug/L	1.3	u
Acenaphthene	ND	10	ug/L	1.5	
2,4-Dinitrophenol	ND	50	ug/L	15	
4-Nitrophenol	ND	50	ug/L	15	
Dibenzofuran	ND	10	ug/L	1.6	
2,4-Dinitrotoluene	ND	10	ug/L	1.6	
Diethyl phthalate	ND	10	ug/L	1.3	
4-Chlorophenyl phenyl ether	ND	10	ug/L	1.6	
Fluorene	ND	10	ug/L	1.3	
4-Nitroaniline	ND	50	ug/L	1.3	
4,6-Dinitro-2-methylphenol	ND	50	ug/L	11	
N-Nitrosodiphenylamine	ND	10	ug/L	1.6	
4-Bromophenyl phenyl ether	ND	10	ug/L	1.4	
Hexachlorobenzene	ND	10	ug/L	0.90	
Pentachlorophenol	ND	50	ug/L	8.6	
Phenanthrene	ND	10	ug/L	0.84	
Anthracene	ND	10	ug/L	0.83	
Carbazole	ND	10	ug/L	1.2	
Di-n-butyl phthalate	ND	10	ug/L	1.4	
Fluoranthene	ND	10	ug/L	1.3	
Pyrene	ND	10	ug/L	0.96	
Butyl benzyl phthalate	ND	10	ug/L	1.3	
3,3'-Dichlorobenzidine	ND	50	ug/L	1.2	
Benzo(a)anthracene	ND	10	ug/L	1.2	
Chrysene	ND	10	ug/L	0.98	
bis(2-Ethylhexyl) phthalate	ND	10	ug/L	2.2	
Di-n-octyl phthalate	ND	10	ug/L	2.4	
Benzo(b)fluoranthene	ND	10	ug/L	2.1	
Benzo(k)fluoranthene	ND	10	ug/L	1.7	
Benzo(a)pyrene	ND	10	ug/L	1.6	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	2.1	
Dibenz(a,h)anthracene	ND	10	ug/L	2.5	
Benzo(ghi)perylene	ND	10	ug/L	2.1	

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorophenol	49	(36 - 98)
Phenol-d5	55	(49 - 109)
Nitrobenzene-d5	61	(57 - 120)
2-Fluorobiphenyl	60	(56 - 118)
2,4,6-Tribromophenol	16 *	(55 - 134)
Terphenyl-d14	69	(33 - 142)

(Continued on next page)

Report of Analysis

3.1
3

Client Sample ID: DF3006	Date Sampled: 05/05/04
Lab Sample ID: F23936-1	Date Received: 05/06/04
Matrix: AQ - Water	Percent Solids: n/a
Method: SW846 8270C SW846 3510C	
Project: PBOW	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L021487.D	1	05/13/04	ME	05/12/04	OP10412	SL1156
Run #2							

Run #	Initial Volume	Final Volume
Run #1	1010 ml	1.0 ml
Run #2		

ABN TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	Rev	Qual
65-85-0	Benzoic Acid	ND	25	15	ug/l			u
95-57-8	2-Chlorophenol	ND	5.0	2.0	ug/l			
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l			
120-83-2	2,4-Dichlorophenol	ND	5.0	2.0	ug/l			
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l			
51-28-5	2,4-Dinitrophenol	ND	25	9.9	ug/l			
534-52-1	4,6-Dinitro-o-cresol	ND	9.9	5.0	ug/l			
95-48-7	2-Methylphenol	ND	5.0	2.0	ug/l			
	3&4-Methylphenol	ND	5.0	2.0	ug/l			
88-75-5	2-Nitrophenol	ND	5.0	2.0	ug/l			
100-02-7	4-Nitrophenol	ND	25	9.9	ug/l			
87-86-5	Pentachlorophenol	ND	25	9.9	ug/l			
108-95-2	Phenol	3.6	5.0	2.0	ug/l	J		J
95-95-4	2,4,5-Trichlorophenol	ND	5.0	2.0	ug/l			
88-06-2	2,4,6-Trichlorophenol	ND	5.0	2.0	ug/l			
83-32-9	Acenaphthene	ND	5.0	0.99	ug/l			
208-96-8	Acenaphthylene	ND	5.0	0.99	ug/l			
120-12-7	Anthracene	ND	5.0	0.99	ug/l			
56-55-3	Benzo(a)anthracene	ND	5.0	0.99	ug/l			
50-32-8	Benzo(a)pyrene	ND	5.0	0.99	ug/l			
205-99-2	Benzo(b)fluoranthene	ND	5.0	0.99	ug/l			
191-24-2	Benzo(g,h,i)perylene	ND	5.0	2.0	ug/l			
207-08-9	Benzo(k)fluoranthene	ND	5.0	0.99	ug/l			
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	0.99	ug/l			
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l			
100-51-6	Benzyl Alcohol	ND	5.0	0.99	ug/l			
91-58-7	2-Chloronaphthalene	ND	5.0	0.99	ug/l			
106-47-8	4-Chloroaniline	ND	9.9	3.0	ug/l			
86-74-8	Carbazole	ND	5.0	0.99	ug/l			
218-01-9	Chrysene	ND	5.0	0.99	ug/l			
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	0.99	ug/l			
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	2.0	ug/l			

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

3.1
3

Client Sample ID: DF3006	Date Sampled: 05/05/04
Lab Sample ID: F23936-1	Date Received: 05/06/04
Matrix: AQ - Water	Percent Solids: n/a
Method: SW846 8270C SW846 3510C	
Project: PBOW	

ABN TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	Requed
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	0.99	ug/l		u
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	0.99	ug/l		
95-50-1	1,2-Dichlorobenzene	ND	5.0	0.99	ug/l		
541-73-1	1,3-Dichlorobenzene	ND	5.0	0.99	ug/l		
106-46-7	1,4-Dichlorobenzene	ND	5.0	0.99	ug/l		
121-14-2	2,4-Dinitrotoluene	ND	5.0	2.0	ug/l		
606-20-2	2,6-Dinitrotoluene	ND	5.0	2.0	ug/l		
91-94-1	3,3'-Dichlorobenzidine	ND	9.9	5.0	ug/l		
53-70-3	Dibenzo(a,h)anthracene	ND	5.0	2.0	ug/l		
132-64-9	Dibenzofuran	ND	5.0	0.99	ug/l		
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l		
117-84-0	Di-n-octyl phthalate	ND	5.0	2.5	ug/l		
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l		
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l		
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.5	ug/l		
206-44-0	Fluoranthene	ND	5.0	0.99	ug/l		
86-73-7	Fluorene	ND	5.0	0.99	ug/l		
118-74-1	Hexachlorobenzene	ND	5.0	0.99	ug/l		
87-68-3	Hexachlorobutadiene	ND	5.0	2.0	ug/l		
77-47-4	Hexachlorocyclopentadiene	ND	5.0	2.0	ug/l		
67-72-1	Hexachloroethane	ND	5.0	2.0	ug/l		
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.0	2.0	ug/l		
78-59-1	Isophorone	ND	5.0	0.99	ug/l		
91-57-6	2-Methylnaphthalene	ND	5.0	0.99	ug/l		
88-74-4	2-Nitroaniline	ND	5.0	2.0	ug/l		
99-09-2	3-Nitroaniline	ND	5.0	2.0	ug/l		
100-01-6	4-Nitroaniline	ND	5.0	2.0	ug/l		
91-20-3	Naphthalene	ND	5.0	0.99	ug/l		
98-95-3	Nitrobenzene	ND	5.0	0.99	ug/l		
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	2.0	ug/l		
86-30-6	N-Nitrosodiphenylamine	ND	5.0	2.0	ug/l		
85-01-8	Phenanthrene	ND	5.0	0.99	ug/l		
129-00-0	Pyrene	ND	5.0	0.99	ug/l		
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.99	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	42%		19-90%
4165-62-2	Phenol-d5	30%		10-68%
118-79-6	2,4,6-Tribromophenol	79%		36-137%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

**DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11

Project: Plum Brook SDG: F23936
H4E060131 Matrix/No. Samples: W-3

I. Technical Holding Times												
A. Sample Preservation, Handling and Transport												
1. Have all samples been preserved correctly?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
2. Have sample temperatures been kept at 4° C (+ or - 2°)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
3. Were all samples received in proper condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
4. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A									
Coolers @ ^{3002, 3005} 3.2°C. ³⁰⁰⁶ 3.6°C.												
B. Chain of Custody												
1. Were all samples properly recorded on COCs?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
2. Were correct analyses performed on samples?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
C. Holding Times												
1. Were samples extracted and analyzed within acceptable holding times?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
2. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A									
<table border="0" style="width:100%"> <tr> <td style="text-align:center">SAMPLED</td> <td style="text-align:center">PREPPED</td> <td style="text-align:center">ANALYZED</td> </tr> <tr> <td>3002 5/5 3005 5/5</td> <td>5/6</td> <td>5/13</td> </tr> <tr> <td>3006 5/5</td> <td>5/12</td> <td>5/13</td> </tr> </table>				SAMPLED	PREPPED	ANALYZED	3002 5/5 3005 5/5	5/6	5/13	3006 5/5	5/12	5/13
SAMPLED	PREPPED	ANALYZED										
3002 5/5 3005 5/5	5/6	5/13										
3006 5/5	5/12	5/13										
II. GC/MS Instrument Performance Check												
1. Were instrument performance check samples run for each analysis period?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
2. Were ion abundance criteria met for DTFPP analysis?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
3. Do laboratory forms match raw data?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A									
4. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A									
Comments/Qualifications:												
<p>3002 } none 3005 } none</p> <p>3006 ICAL 3/22 198 base criteria met. →</p> <p>5/13 @ 10:17</p>												

**DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11

Project: Plum Brook F 23936
SDG: H4E060131 Matrix/No. Samples: W-3

III. Initial Calibration			
1. Were correct concentrations of standards used for initial calibration? Were samples analyzed within 12 hours of associated instrument performance check?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were initial calibration RRFs for all volatile target compounds and system monitoring compounds ≥ 0.05 ? Do recalculations for RRFs agree with reported values?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
3. Were %RSDs $\leq 30\%$ for all volatile target compounds? Do recalculations for RSDs agree with reported values?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: 3006 3/23 RRFs @ > 0.05 RSDs target cpts. $< 18\%$			
IV. Continuing Calibration			
1. Were continuing calibration samples run at the required frequency, and compared to the correct initial calibration?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Did calculations from raw data agree with laboratory reported values for RRF and %D?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
3. Were continuing calibration RRFs for volatile organic compounds and system monitoring compounds (surrogates) ≥ 0.05 ?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were %D between initial calibration RRF and the continuing calibration RRFs within $\pm 25\%$?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
5. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: 3006 5/13 @ 10:46 RRFs @ > 0.05 %D $< 14\%$			

**DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11

Project: Plum Brook F23936
SDG: 44E060131 Matrix/No. Samples: w-3

V. Blanks																															
1. Were any target or non-target compounds reported in laboratory prep or calibration blanks?	Yes	<input checked="" type="radio"/> No	N/A																												
2. Were method blank analyses performed at required frequency, and for each GC/MS system used to analyze samples for each type of analysis (i.e., matrix)?	<input checked="" type="radio"/> Yes	No	N/A																												
3. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A																												
Comments/Qualifications: 3002 3005 PPIAA 5/12 - U 5/13 21480.D - U's.																															
VI. System Monitoring Compounds (Surrogate Spikes)																															
1. Were laboratory surrogate recoveries calculated and reported correctly?	<input checked="" type="radio"/> Yes	No	N/A																												
2. Were surrogate recoveries within acceptable limits?	<input checked="" type="radio"/> Yes	No	N/A																												
3. Were any qualifications required based on surrogate spike QC information?	Yes	<input checked="" type="radio"/> No	N/A																												
Comments/Qualifications: <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>3002</td> <td>44</td> <td>49</td> <td>53-L</td> <td>51-L</td> <td>33-L</td> <td>55</td> </tr> <tr> <td>3005</td> <td>49</td> <td>55</td> <td>41</td> <td>60</td> <td>16</td> <td>69</td> </tr> <tr> <td>3006</td> <td>42</td> <td>30</td> <td>79</td> <td>65</td> <td>69</td> <td>74</td> </tr> </tbody> </table> would be qualified as "U's" - not relevant to analysis.					1	2	3	4	5	6	3002	44	49	53-L	51-L	33-L	55	3005	49	55	41	60	16	69	3006	42	30	79	65	69	74
	1	2	3	4	5	6																									
3002	44	49	53-L	51-L	33-L	55																									
3005	49	55	41	60	16	69																									
3006	42	30	79	65	69	74																									
VII. Matrix Spikes/Matrix Spike Duplicates																															
1. Were MS/MSD samples analyzed at required frequency for each sample matrix?	<input checked="" type="radio"/> Yes	No	N/A																												
2. Were MS/MSD results for recovery and RPD within advisory limits?	<input checked="" type="radio"/> Yes	No	N/A																												
3. Were Samples used for MS/MSD field blanks?	Yes	<input checked="" type="radio"/> No	N/A																												
4. Were laboratory reported results correctly calculated from raw data?	Yes	No	<input checked="" type="radio"/> N/A																												
5. Were any qualifications required, based on results of MS/MSD samples in conjunction with other QC information?	Yes	<input checked="" type="radio"/> No	N/A																												
Comments/Qualifications: <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">3002 3005</td> <td style="width: 30%;">RICT-MS 69-90 MSD 59-89 RPD 1.0-14.0</td> <td style="width: 40%;">21485dff. Benzoic acid @ zero MSD RPD - high ✓ 3,3'-dcb - high RPD</td> </tr> </table> MSD - high low • 1,2,4-TB • Acceptable Pentachlorop. - low MS - low MSD				3002 3005	RICT-MS 69-90 MSD 59-89 RPD 1.0-14.0	21485dff. Benzoic acid @ zero MSD RPD - high ✓ 3,3'-dcb - high RPD																									
3002 3005	RICT-MS 69-90 MSD 59-89 RPD 1.0-14.0	21485dff. Benzoic acid @ zero MSD RPD - high ✓ 3,3'-dcb - high RPD																													

**DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11

Project: Plum Brook SDG: F23936
H4E060131 Matrix/No. Samples: W-3

VIII. Laboratory Control Sample (LCS)			
1. Were LCS samples run at correct frequency for each matrix samples?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were LCS calculations performed correctly, and did laboratory reported values match raw data? Were recoveries within laboratory QC limits?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were any qualifications required based on LCS data in conjunction with other QC information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: 3002 PPIAC 76-111 3005 Pyrene $\frac{86.6}{100} = 86.6\%$ 21479.D 5/13 33-102 Chrysene $\frac{49.8}{50} = 99.6\%$			
IX. Internal Standards			
1. Were standard area counts within a factor of two (-50% to +100%) from associated calibration standard?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were retention times of internal standard within + or - 30 seconds of retention time of associated calibration check?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
3. Were any qualifications required based on internal standard results?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: 3006 23936-1 IS 6 $\frac{335740}{351869} = 95.4\%$ $\frac{18.61}{18.61}$			
X. Target Compound Identification			
1. Are relative retention times (RRTs) within + or - 0.06 RRT units of standard RRT?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
2. Do sample compound spectra meet specified criteria in relation to laboratory standard spectra?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
3. Were all compounds accounted for on chromatogram?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Comments/Qualifications: No raw data			

**DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS**

Reviewer: Kitchings Date: 8/11

F23936

Project: Plum Brook SDG: A4E060(3) Matrix/No. Samples: W-3

XI. Compound Quantitation and Reported Contract Required Quantitation Limits (CRQLs)			
1. Were sample results correctly calculated and reported by laboratory?	Yes	No	N/A
2. Were correct internal standard quantitation ion and RRF used to quantify all compounds for all samples?	Yes	No	N/A
3. Were CRQLs adjusted to reflect sample dilutions and dry weight factors not accounted for by the method?	Yes	No	N/A
4. Were any laboratory QA/QC sample results calculated from peaks derived using manual integration?	Yes	No	N/A
5. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications: <u>No raw data</u>			
XII. Field QC			
1. Were any Field Duplicates associated with this SDG?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
a. If Yes, were RPDs acceptable (50% for water samples, 100% for soil samples)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A
a. If yes, were any compounds reported in samples >IDL?	<input type="radio"/> Yes	<input type="radio"/> No	N/A
b. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <u>3002 3005</u> <u>u's u's</u>			
XIII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications:			

SDG: F23936
H4E060131 Project: PLUMBROOK
 Method: TOTAL/DISSOLV. METALS 6010B Matrix/No. of Samples: Water-3
 Validation Samples: DF 3002
DF 3005
DF 3006

Data Validation Report Summary

	Status Code	Comments
1. Sample Preservation, Handling, and Transport	<u>A</u>	
2. Chain of Custody	<u>A</u>	
3. Holding Times	<u>A</u>	
4. Calibrations	<u>A</u>	
5. Blanks	<u>X</u>	
6. ICP/ICS	<u>A</u>	
7. Blank Spike/LCS	<u>A</u>	
8. Duplicates	<u>N/A</u>	
9. Matrix Spike	<u>X</u>	
10. Furnace Atomic Absorption QC	<u>N/A</u>	
11. ICP Serial Dilution	<u>X</u>	
12. Sample Result Verification	<u>N/A</u>	
13. Field QC Samples	<u>X</u>	
14. Overall Assessment	<u>X</u>	

Status Codes:

A = Acceptable

R = Data Rejected

X = Data acceptable but qualified due to problems

SHAW E & I INC

Client Sample ID: DF3002

TOTAL Metals

Lot-Sample #...: H4E060131-002

Matrix.....: WATER

Date Sampled...: 05/05/04

Date Received...: 05/06/04

PARAMETER	RESULT	REPORTING LIMIT	UNITS ^{Rev} <i>Qual</i>	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	4128078					
Aluminum	1480	200	ug/L <i>J 17^{8a}</i>	SW846 6010B	05/07-05/10/04	GFL5R1CL
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 41.3	
Antimony	ND	60.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL5R1CP
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 4.0	
Arsenic	ND	10.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL5R1CT
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 2.6	
Barium	732	200	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1CW
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 0.96	
Beryllium	ND	5.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL5R1C1
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 0.56	
Cadmium	ND	5.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL5R1C4
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 0.84	
Calcium	134000	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1C7
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 58.2	
Chromium	ND	10.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL5R1DA
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 2.8	
Cobalt	ND	50.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL5R1DE
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 2.0	
Copper	ND	25.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL5R1DH
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 3.0	
Iron	2220	100	ug/L <i>J 17^{8a}</i>	SW846 6010B	05/07-05/10/04	GFL5R1DL
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 45.8	
Lead	ND	3.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL5R1DP
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 1.6	
Magnesium	39500	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1DT
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 37.0	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DF3002

TOTAL Metals

Lot-Sample #...: H4E060131-002

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS ^{Rev} _{Qual}	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Manganese	91.8	15.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1DW
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 1.6	
Nickel	2.8 B	40.0	ug/L J	SW846 6010B	05/07-05/10/04	GFL5R1D1
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 2.8	
Potassium	4780 B,J	5000	ug/L J	SW846 6010B	05/07-05/10/04	GFL5R1D4
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 66.8	
Selenium	ND	5.0	ug/L u	SW846 6010B	05/07-05/10/04	GFL5R1D7
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 1.5	
Silver	ND	10.0	ug/L u	SW846 6010B	05/07-05/10/04	GFL5R1AA
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 1.9	
Sodium	20400	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1AE
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 464	
Thallium	4.5 B,J	10.0	ug/L B 6a	SW846 6010B	05/07-05/10/04	GFL5R1AH
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 2.4	
Vanadium	ND	50.0	ug/L u	SW846 6010B	05/07-05/10/04	GFL5R1AL
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 3.6	
Zinc	22.0	20.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1AP
		Dilution Factor: 1		Analysis Time...: 14:28	MDL.....: 2.4	
Prep Batch #...: 4128475						
Mercury	ND	0.20	ug/L u	SW846 7470A	05/10/04	GFL5R1AT
		Dilution Factor: 1		Analysis Time...: 16:12	MDL.....: 0.060	

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

SHAW E & I INC

Client Sample ID: DF3002

DISSOLVED Metals

Lot-Sample #....: H4E060131-002
Date Sampled....: 05/05/04

Date Received...: 05/06/04

Matrix.....: WATER

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- WORK	
		LIMIT	UNITS ^{Rew} Qual		ANALYSIS DATE	ORDER #
Prep Batch #....: 4128078						
Aluminum	41.4 B	200	ug/L J	SW846 6010B	05/07-05/10/04	GFL5R1A1
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 41.3	
Antimony	ND	60.0	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1A4
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 4.0	
Arsenic	ND	10.0	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1A7
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 2.6	
Barium	730	200	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1EA
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 0.96	
Beryllium	ND	5.0	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1EE
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 0.56	
Cadmium	ND	5.0	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1EH
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 0.84	
Calcium	118000	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1EL
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 58.2	
Chromium	ND	10.0	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1EP
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 2.8	
Cobalt	ND	50.0	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1ET
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 2.0	
Copper	ND	25.0	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1EW
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 3.0	
Iron	ND	100	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1E1
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 45.8	
Lead	ND	3.0	ug/L U	SW846 6010B	05/07-05/10/04	GFL5R1E4
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 1.6	
Magnesium	37900	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1E7
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 37.0	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DF3002

DISSOLVED Metals

Lot-Sample #...: H4E060131-002

Matrix.....: WATER

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Manganese	47.4	15.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1FA
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 1.6	
Nickel	ND	40.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1FE
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 2.8	
Potassium	4300 B,J	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1FH
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 66.8	
Selenium	1.7 B	5.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1FL
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 1.5	
Silver	ND	10.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1FP
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 1.9	
Sodium	20600	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1FT
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 464	
Thallium	5.3 B,J	10.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1FW
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 2.4	
Vanadium	ND	50.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1F1
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 3.6	
Zinc	ND	20.0	ug/L	SW846 6010B	05/07-05/10/04	GFL5R1F4
		Dilution Factor: 1		Analysis Time...: 14:08	MDL.....: 2.4	
Prep Batch #...: 4128476						
Mercury	ND	0.20	ug/L	SW846 7470A	05/10/04	GFL5R1F7
		Dilution Factor: 1		Analysis Time...: 15:40	MDL.....: 0.060	

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

SHAW E & I INC

Client Sample ID: DF3005

TOTAL Metals

Lot-Sample #...: H4E060131-003

Matrix.....: WATER

Date Sampled...: 05/05/04

Date Received...: 05/06/04

PARAMETER	RESULT	REPORTING LIMIT	UNITS ^{Rev} <i>Qual</i>	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 4128078						
Aluminum	862	200	ug/L <i>J 17</i>	SW846 6010B	05/07-05/10/04	GFL501AQ
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 41.3	
Antimony	ND	60.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL501AR
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 4.0	
Arsenic	ND	10.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL501AT
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 2.6	
Barium	712	200	ug/L	SW846 6010B	05/07-05/10/04	GFL501AU
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 0.96	
Beryllium	ND	5.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL501AV
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 0.56	
Cadmium	ND	5.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL501AW
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 0.84	
Calcium	122000	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL501AX
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 58.2	
Chromium	ND	10.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL501A0
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 2.8	
Cobalt	ND	50.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL501A1
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 2.0	
Copper	ND	25.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL501A2
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 3.0	
Iron	1030	100	ug/L <i>J 17</i>	SW846 6010B	05/07-05/10/04	GFL501A3
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 45.8	
Lead	ND	3.0	ug/L <i>u</i>	SW846 6010B	05/07-05/10/04	GFL501A4
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 1.6	
Magnesium	37700	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL501A5
		Dilution Factor: 1		Analysis Time...: 14:55	MDL.....: 37.0	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DF3005

TOTAL Metals

Lot-Sample #...: H4E060131-003

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	<i>Rev Qual</i>	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Manganese	65.0	15.0	ug/L		SW846 6010B	05/07-05/10/04	GFL501A6
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 1.6
Nickel	ND	40.0	ug/L	U	SW846 6010B	05/07-05/10/04	GFL501A7
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 2.8
Potassium	4410 B,J	5000	ug/L	J	SW846 6010B	05/07-05/10/04	GFL501A8
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 66.8
Selenium	ND	5.0	ug/L	U	SW846 6010B	05/07-05/10/04	GFL501A9
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 1.5
Silver	ND	10.0	ug/L	U	SW846 6010B	05/07-05/10/04	GFL501AA
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 1.9
Sodium	19700	5000	ug/L		SW846 6010B	05/07-05/10/04	GFL501AC
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 464
Thallium	4.2 B,J	10.0	ug/L	B	SW846 6010B	05/07-05/10/04	GFL501AD
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 2.4
Vanadium	ND	50.0	ug/L	U	SW846 6010B	05/07-05/10/04	GFL501AE
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 3.6
Zinc	13.2 B	20.0	ug/L	J	SW846 6010B	05/07-05/10/04	GFL501AF
					Dilution Factor: 1	Analysis Time...: 14:55	MDL.....: 2.4
Prep Batch #...: 4128475							
Mercury	ND	0.20	ug/L	U	SW846 7470A	05/10/04	GFL501AG
					Dilution Factor: 1	Analysis Time...: 16:17	MDL.....: 0.060

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

SHAW E & I INC

Client Sample ID: DF3005

DISSOLVED Metals

Lot-Sample #...: H4E060131-003

Matrix.....: WATER

Date Sampled...: 05/05/04

Date Received...: 05/06/04

PARAMETER	RESULT	REPORTING LIMIT	UNITS	<i>Revised</i> UNIT	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	4128078						
Aluminum	51.5 B	200	ug/L	J	SW846 6010B	05/07-05/10/04	GFL501AJ
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 41.3	
Antimony	ND	60.0	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501AK
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 4.0	
Arsenic	ND	10.0	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501AL
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 2.6	
Barium	698	200	ug/L		SW846 6010B	05/07-05/10/04	GFL501CA
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 0.96	
Beryllium	ND	5.0	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501CC
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 0.56	
Cadmium	ND	5.0	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501CD
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 0.84	
Calcium	114000	5000	ug/L		SW846 6010B	05/07-05/10/04	GFL501CE
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 58.2	
Chromium	ND	10.0	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501CF
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 2.8	
Cobalt	ND	50.0	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501CG
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 2.0	
Copper	ND	25.0	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501CH
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 3.0	
Iron	ND	100	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501CJ
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 45.8	
Lead	ND	3.0	ug/L	u	SW846 6010B	05/07-05/10/04	GFL501CK
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 1.6	
Magnesium	36700	5000	ug/L		SW846 6010B	05/07-05/10/04	GFL501CL
		Dilution Factor: 1			Analysis Time...: 14:51	MDL.....: 37.0	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DF3005

DISSOLVED Metals

Lot-Sample #...: H4E060131-003

Matrix.....: WATER

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- WORK	
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Manganese	46.3	15.0	ug/L	SW846 6010B	05/07-05/10/04	GFL501CM
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 1.6	
Nickel	ND	40.0	ug/L	SW846 6010B	05/07-05/10/04	GFL501CN
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 2.8	
Potassium	4120 B,J	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL501CP
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 66.8	
Selenium	ND	5.0	ug/L	SW846 6010B	05/07-05/10/04	GFL501CQ
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 1.5	
Silver	ND	10.0	ug/L	SW846 6010B	05/07-05/10/04	GFL501CR
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 1.9	
Sodium	19800	5000	ug/L	SW846 6010B	05/07-05/10/04	GFL501CT
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 464	
Thallium	5.3 B,J	10.0	ug/L	SW846 6010B	05/07-05/10/04	GFL501CU
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 2.4	
Vanadium	ND	50.0	ug/L	SW846 6010B	05/07-05/10/04	GFL501CV
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 3.6	
Zinc	ND	20.0	ug/L	SW846 6010B	05/07-05/10/04	GFL501CW
		Dilution Factor: 1		Analysis Time...: 14:51	MDL.....: 2.4	
Prep Batch #...: 4128476						
Mercury	ND	0.20	ug/L	SW846 7470A	05/10/04	GFL501CX
		Dilution Factor: 1		Analysis Time...: 15:47	MDL.....: 0.060	

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Report of Analysis



Client Sample ID: DF3006	Date Sampled: 05/05/04
Lab Sample ID: F23936-1	Date Received: 05/06/04
Matrix: AQ - Water	Percent Solids: n/a
Project: PBOW	

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method	Request
Aluminum	618	200	20	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	
Antimony	3.5 U	5.0	3.5	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Arsenic	3.5 U	10	3.5	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Barium	702	200	1.1	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	
Beryllium	0.80 U	4.0	0.80	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Cadmium	0.30 U	5.0	0.30	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Calcium	121000	1000	42	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	JT 13
Chromium	2.4 U	10	2.4	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Cobalt	1.0 U	50	1.0	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Copper	1.4 U	25	1.4	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Iron	744	300	48	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	
Lead	2.9 U	5.0	2.9	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Magnesium	36700	5000	33	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	
Manganese	63.6	15	0.60	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	
Mercury	0.052 U	1.0	0.052	ug/l	1	05/21/04	05/24/04	SM SW846 7470A ²	SW846 7470A ⁴	u
Nickel	0.80 U	40	0.80	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Potassium	4380 B	5000	51	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	JT u
Selenium	3.6 U	10	3.6	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Silver	1.9 U	10	1.9	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Sodium	17600	5000	200	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	
Thallium	2.9 U	10	2.9	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	u
Vanadium	0.61 B	50	0.60	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	JT u
Zinc	16.1 B	20	5.1	ug/l	1	05/20/04	05/21/04	DM SW846 6010B ¹	SW846 3010A ³	JT 8af:

- (1) Instrument QC Batch: MA3812
- (2) Instrument QC Batch: MA3814
- (3) Prep QC Batch: MP6705
- (4) Prep QC Batch: MP6708

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID: DF3006	Date Sampled: 05/05/04
Lab Sample ID: F23936-1A	Date Received: 05/06/04
Matrix: AQ - Water Filtered	Percent Solids: n/a
Project: PBOW	



Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method	Req'd Qual
Aluminum	20 U	200	20	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Antimony	3.5 U	5.0	3.5	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Arsenic	3.5 U	10	3.5	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Barium	678	200	1.1	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³
Beryllium	0.80 U	4.0	0.80	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Cadmium	0.30 U	5.0	0.30	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Calcium	112000	1000	42	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³
Chromium	2.4 U	10	2.4	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Cobalt	1.0 U	50	1.0	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Copper	1.4 U	25	1.4	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Iron	48 U	300	48	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Lead	2.9 U	5.0	2.9	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Magnesium	35400	5000	33	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³
Manganese	44.2	15	0.60	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³
Mercury	0.052 U	1.0	0.052	ug/l	1	05/21/04	05/24/04	SM	SW846 7470A ²	SW846 7470A ⁴ U
Nickel	0.80 U	40	0.80	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Potassium	4170 B	5000	51	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ J
Selenium	3.6 U	10	3.6	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Silver	1.9 U	10	1.9	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Sodium	17400	5000	200	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³
Thallium	2.9 U	10	2.9	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Vanadium	0.60 U	50	0.60	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U
Zinc	5.1 U	20	5.1	ug/l	1	05/20/04	05/21/04	DM	SW846 6010B ¹	SW846 3010A ³ U

- (1) Instrument QC Batch: MA3812
- (2) Instrument QC Batch: MA3814
- (3) Prep QC Batch: MP6705
- (4) Prep QC Batch: MP6708

RL = Reporting Limit
 MDL = Method Detection Limit

U = Indicates a result < MDL
 B = Indicates a result >= MDL but < RL

**DATA VALIDATION WORKSHEET
METALS**

Reviewer: Kitchings Date: 8/11

Project: Plumbrook SDG: F23936
H4E060131 Matrix/No. Samples W-3

I. Sample Management																			
A. Sample Preservation, Handling and Transport																			
1. Have all samples been preserved with HNO ₃ to pH <2?	<input checked="" type="radio"/> Yes	No	N/A																
2. Have sample temperatures been kept at 4° C (+ or - 2° C)?	<input checked="" type="radio"/> Yes	No	N/A																
3. Were all samples received in proper condition?	<input checked="" type="radio"/> Yes	No	N/A																
4. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A																
Cooler @ ^{3002, 3005} 3.4°C ³⁰⁰⁶ 3.6°C																			
B. Chain of Custody																			
1. Were all samples properly recorded on COCs?	<input checked="" type="radio"/> Yes	No	N/A																
2. Were correct analyses performed on samples?	<input checked="" type="radio"/> Yes	No	N/A																
C. Holding Times																			
1. Were samples analyzed within acceptable holding times?	<input checked="" type="radio"/> Yes	No	N/A																
2. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A																
<table style="width:100%; border:none;"> <tr> <td style="width:33%;"></td> <td style="width:33%; text-align:center;">SAMPLED</td> <td style="width:33%;"></td> <td style="width:33%; text-align:center;">PREPPED/ANALYZED</td> </tr> <tr> <td>3002</td> <td style="text-align:center;">5/5</td> <td style="text-align:center;">5/7</td> <td style="text-align:center;">5/10</td> </tr> <tr> <td>3005</td> <td style="text-align:center;">5/5</td> <td style="text-align:center;">5/20</td> <td style="text-align:center;">5/21</td> </tr> <tr> <td>3006</td> <td style="text-align:center;">5/5</td> <td></td> <td></td> </tr> </table>					SAMPLED		PREPPED/ANALYZED	3002	5/5	5/7	5/10	3005	5/5	5/20	5/21	3006	5/5		
	SAMPLED		PREPPED/ANALYZED																
3002	5/5	5/7	5/10																
3005	5/5	5/20	5/21																
3006	5/5																		
II. Calibrations																			
1. Were proper number of calibration standards used for each analytical instrument used?	<input checked="" type="radio"/> Yes	No	N/A																
2. Is the calibration correlation coefficient >or = 0.995 for each analytical instrument used?	Yes	No	<input checked="" type="radio"/> N/A																
3. Are initial and continuing calibration verification %R within 10% (+ or - 1%) acceptance window?	<input checked="" type="radio"/> Yes	No	N/A																
4. Are CRDL Standard %R within 10% (+ or - 1%) acceptance window?	<input checked="" type="radio"/> Yes	No	N/A																
5. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A																
Comments/Qualifications: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;"> <p>3002 - none</p> <p>3005 - none</p> </div> <div style="width: 30%;"> <p>ICV 3006</p> <p>92.5 - 103.0</p> <p>CCR3</p> <p>92.0 - 103.5</p> </div> <div style="width: 30%;"> <p>Hg 100</p> <p>100</p> <p>106.7</p> </div> </div>																			

**DATA VALIDATION WORKSHEET
METALS**

Reviewer: Kitchings Date: 8/11

Project: Plumbrook SDG: F23936 H4E060131 Matrix/No. Samples W-3

III. Blanks			
1. Are any analytes reported in laboratory prep or calibration blanks above the IDL?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Are any analytes reported as negative values in laboratory prep or calibration blanks?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
3. Were any qualifications required based on this information?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
<p>Comments/Qualifications: 3006 ICB CCB3 3002 Meth. blk u's all u's. 3005 [Total] K @ 74.7 [DISSOL] → 74.7 - SMP/SX ug/L TL @ 9.7 9.7 Hg - u's 3002/3005 T & D</p>			
IV. ICP Interference Check Sample (ICS)			
1. Were ICS samples run at the beginning and end of each sample analysis run?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Are ICS %R within 80-120% acceptable control limits?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
3. Were any qualifications required based on this information?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
<p>Comments/Qualifications: ICSAB 3006 87.6 - 106.0 -</p>			
V. Blank Spike/Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 80-120% control limits?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Are all solid LCS %R within control limits established by EPA?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
3. Were any qualifications required based on this information?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
<p>Comments/Qualifications: 3002 AG1 diff. - total AG1 diff - dissolv, 3006 91.6 - 109.0 3005 Hg 106 → 94 ICP 96-106 → 96-106</p>			

**DATA VALIDATION WORKSHEET
METALS**

Reviewer: Kitchings

Date: 8/11

Project: Plumbrook SDG: F23936
H4E060131

Matrix/No. Samples W-3

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	No	N/A
2. For duplicate samples >5x CRDL, were RPDs within control limits of + or - 20% for water, or + or - 35% for soil?	Yes	No	N/A
3. For duplicate samples <5x CRDL, were duplicate samples within control limit of + or - CRDL for water, or + or - 2xCRDL for soil?	Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			
VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	No	N/A
2. Were spike recoveries within 75-125% limits (limits do not apply when original sample concentration exceeds spike concentration by a factor of 4)?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			
<p align="right">3006</p> <p>3002 / 3005</p> <p>TOTAL Al - high / high. Fe - high / high</p> <p>DISSOLVED All w/in limits</p> <p>ms → a number where smp > 4x spike - no g/ds. Zn - low / low</p>			
VIII. ICP Serial Dilution			
1. Were %Ds for ICP serial dilution samples within 10% for analytes with concentrations greater than 50x IDL?	Yes	No	N/A
2. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			
<p>Zn / Ca high RPD</p> <p align="center">Ⓟ</p>			

**DATA VALIDATION WORKSHEET
METALS**

Reviewer: Kitchings

Date: 8/11

Project: Plumbrook

SDG: F23936
H4E060131

Matrix/No. Samples W-3

IX. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	<u>N/A</u>
2. Were correct calculations used to determine sample results?	Yes	No	<u>N/A</u>
3. Were any qualifications required based on this information?	Yes	No	<u>N/A</u>
Comments/Qualifications: <p align="center"><i>No raw data - level III</i></p>			
X. Field QC			
1. Were any Field Duplicates associated with this SDG?	<u>Yes</u>	No	N/A
a. If Yes, were RPDs acceptable (50% for water samples, 100% for soil samples)?	Yes	<u>No</u>	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	<u>Yes</u>	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	<u>No</u>	N/A
b. Were any qualifications required based on this information?	<u>Yes</u>	No	N/A
Comments/Qualifications: <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><i>618 1191 = 53.8</i></p> <p><i>1190 1625</i></p> <p><i>732</i></p> <p><i>34.1 26.8 178.4</i></p> </div> <div style="width: 40%;"> <p>3002D 3005D</p> <p>41.4 Al 51.5</p> <p>730 Ba 698</p> <p>118000 Ca 114000</p> <p>37900 Mg 36700</p> <p>47.4 Mn 46.3 <i>all k.</i></p> <p>4300 K 4120</p> <p>1.7 Se 4</p> </div> <div style="width: 25%;"> <p>3002T 3005T</p> <p>862</p> <p>712</p> <p>122000 Ca 122000</p> <p>1030 Fe</p> <p>37700 Mg</p> <p>65.0 Mn</p> <p>u Ni u</p> </div> </div> <p align="right"><i>5001 - u's,</i></p>			
XI. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	<u>No</u>	N/A
Comments/Qualifications: <p align="center"><i>20600 Na 19800</i></p> <p align="center"><i>5.3 Tl 5.3</i></p> <p>4780 K 4410</p> <p>20400 Na 19700</p> <p>4.5 Tl 4.2</p> <p><i>8.8, 150.6 17.6</i> 22.0 Zn 13.2</p>			

Attachment 2
Chain of Custody Forms



ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PR05 DS 045TLJK

PAGE 1 OF 2

Bill To: Accounting

Shaw E & I

312 Directors Drive

Knoxville, TN 37923

Report To: Maureen McAnally

Shaw E & I

312 Directors Drive

Knoxville, TN 37923

Project Name/No: PBOV
 Sample Team Member: David Keastler
 Profile Center: Knoxville
 Project Manager: Steve Downey
 Project No: 843656
 Reported Report Date: 21 DAYS

Sample Shipment Date: 5/5/04
 Laboratory Destination: STL, Knoxville
 Laboratory Contact: Janice McKinney
 Project Contact/Phone: Maureen McAnally/865-690-3211
 Order Worksheet No.: 839702935529

Sample Number	Sample Type/Description	Date/Time Collected	Container Type	Sample Volume	Pre-serve	Requested Testing Program	Condition on Receipt	Disposal Record
DF3001	WATER	5/5/04 0930	1 - Amber 1 - HDPE 1 - HDPE 2 - Amber 3 - Glass 1 - HDPE	1L 250 mL 250 mL 1L 40 mL 1L	Cool HNO3 HNO3 Cool HCL NaOH	Explosives by 8330 Total TAL Metals by 60108/470A Dissolved TAL Metals by 60108/470A TCL SVOCs by 8270C TCL VOCs by 8260B Explosives by 90109/012	Custody Seals Intact Received Temp. 2°C 2 COOLERS/E ED EX T#894702A35679 ADF 05-01-04	
DF3002	WATER	5/5/04 1530	1 - Amber 1 - HDPE 1 - HDPE 2 - Amber 3 - Glass 1 - HDPE	1L 250 mL 250 mL 1L 40 mL 1L	Cool HNO3 HNO3 Cool HCL NaOH	Explosives by 8330 Total TAL Metals by 60108/470A Dissolved TAL Metals by 60108/470A TCL SVOCs by 8270C TCL VOCs by 8260B	ph12 ph2 ph2 ph2 ph2	
DF3005	WATER	5/5/04 1530	1 - Amber 1 - HDPE 1 - HDPE 2 - Amber 3 - Glass 1 - HDPE	1L 250 mL 250 mL 1L 40 mL 1L	Cool HNO3 HNO3 Cool HCL NaOH	Explosives by 8330 Total TAL Metals by 60108/470A Dissolved TAL Metals by 60108/470A TCL SVOCs by 8270C TCL VOCs by 8260B	ph12 ph2 ph2 ph2 ph2	
DF5000	WATER	5/5/04	1 - Amber 1 - HDPE 1 - HDPE 2 - Amber 3 - Glass 1 - HDPE	1L 250 mL 250 mL 1L 40 mL 1L	Cool HNO3 HNO3 Cool HCL NaOH	Explosives by 8330 Total TAL Metals by 60108/470A Dissolved TAL Metals by 60108/470A TCL SVOCs by 8270C TCL VOCs by 8260B	ph12 ph2 ph2 ph2 ph2	

Special Instructions: Possible Hazard Identification: Non-haz: Parametric: Poison B: Unknown: Level of QC Required: Return to Client: Disposal by Lab: Archive: Sample Disposal:

Normal: Rush: Definitive:
 1. Relinquished by: David Keastler - Steve Downey Date: 5/5/04 Time: 1800
 1. Received by: Andrew D. Flinn, STL Date: 05-06-04 Time: 09:00
 2. Relinquished by: _____ Date: _____ Time: _____
 2. Received by: _____ Date: _____ Time: _____
 3. Relinquished by: _____ Date: _____ Time: _____
 2. Received by: _____ Date: _____ Time: _____

Comments: _____

Knox page 1 of 2 original

AME 00131



ANALYSIS REQUEST AND
CHAIN-OF-CUSTODY RECORD

Page 2 of 2

HYE00131

REFERENCE COC NO: EB05 05 JUSTL&K

PAGE 2 OF 2

Bill To: Accounting

Project Name/No: EB05
 Sample Team Member: David Kesler
 Profit Center: Knoxville
 Project Manager: Steve Downey
 Project No.: 843656
 Requested Report Date: 21 DAYS

Sample Shipment Date: 5/5/04
 Laboratory Destination: STL, Knoxville
 Laboratory Contact: Jarvis McKinstry
 Project Contact/Phone: Maureen McAlyler/865-690-3211
 Carrier Workbill No.: _____

Report To: Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/Description	Date/Time Collected	Container Type	Sample Volume	Pre-ervative	Requested Testing Program	Condition on Receipt	Disposal Record
DF3002-MS	WATER	5/5/04 1530	1 - Amber 1 - HDPE 1 - HDPE 2 - Amber 3 - Glass	1 L 250 mL 250 mL 1 L 40 mL	Cool HNO3 HNO3 Cool HCL	Explosives by 8330 Total TAL Metals by 60108/7470A Dashed TAL Metals by 60108/7470A TCL SVOCs by 8270C TCL VOCs by 8260B Oxides by 90109012		
DF3002-MSD	WATER	5/5/04 1530	1 - Amber 1 - HDPE 1 - HDPE 2 - Amber 3 - Glass 1 - HDPE 2 - Glass	1 L 250 mL 250 mL 1 L 40 mL 1 L 40 mL	Cool HNO3 HNO3 Cool HCL NaOH HCL	Explosives by 8330 Total TAL Metals by 60108/7470A Dashed TAL Metals by 60108/7470A TCL SVOCs by 8270C TCL VOCs by 8260B Oxides by 90109012 TCL VOCs by 8260B		
	WATER	DKK						

Special Instructions: _____

Possible Hazard Identification: _____

Non-haz: _____ Placardable: _____ Poison B: _____

Temperature/Tone: _____ Level of QC Required: _____ Unknown: Return to Client: _____ Disposal by Lab: Archive: _____

Normal: Rush: _____

1. Relinquished by: David Knud Date: 5/5/04 Time: 1800

2. Relinquished by: _____ Date: _____ Time: _____

3. Relinquished by: _____ Date: _____ Time: _____

Project Specific: _____

1. Received by: Maureen D. Flynn Date: 05-06-04 Time: 09:00

2. Received by: _____ Date: _____ Time: _____

2. Received by: _____ Date: _____ Time: _____

Comments: _____

Attachment 3

Project Data

Volatiles

LOCATION_CODE		PB-BED-MW22	PB-BED-MW22	PB-BED-MW22
SAMPLE_NO		DF3002	DF3005	DF3006
SAMPLE_DATE		5-May-04	5-May-04	5-May-04
		35	35	35
		35_5	35_5	35_5
		REG	FD	FS
<u>Parameter</u>	<u>Units Filtered</u>	<u>Result Qual</u>	<u>Result Qual</u>	<u>Result Qual</u>
Acetone	ug/L N	140 J B	140 J B	50 U
Benzene	ug/L N	20 U	20 U	1 U
Bromodichloromethane	ug/L N	20 U	20 U	2 U
Bromoform	ug/L N	20 U	20 U	2 U
Bromomethane	ug/L N	40 U	40 U	2 U
Butanone, 2-	ug/L N	100 U	100 U	10 U
Carbon disulfide	ug/L N	20 U	20 U	2 U
Carbon tetrachloride	ug/L N	20 U	20 U	2 U
Chlorobenzene	ug/L N	20 U	20 U	2 U
Chloroethane	ug/L N	40 U	40 U	2 U
Chloroform	ug/L N	20 U	20 U	2 U
Chloromethane	ug/L N	40 U	40 U	2 U
Dibromochloromethane	ug/L N	20 U	20 U	2 U
Dichloroethane, 1,1-	ug/L N	20 U	20 U	2 U
Dichloroethane, 1,2-	ug/L N	20 U	20 U	2 U
Dichloroethene, 1,1-	ug/L N	20 U	20 U	2 U
Dichloroethene, 1,2-	ug/L N	20 U	20 U	
Dichloroethene, cis-1,2-	ug/L N			2 U
Dichloroethene, trans-1,2-	ug/L N			2 U
Dichloropropane, 1,2-	ug/L N	20 U	20 U	2 U
Dichloropropene, cis-1,3-	ug/L N	20 U	20 U	2 U
Dichloropropene, trans-1,3-	ug/L N	20 U	20 U	2 U
Ethylbenzene	ug/L N	20 U	20 U	2 U
Hexanone, 2-	ug/L N	100 U	100 U	10 U
Methyl-2-pentanone, 4-	ug/L N	100 U	100 U	10 U
Methylene chloride	ug/L N	5.8 J	6.1 J	5 U
Styrene	ug/L N	20 U	20 U	2 U
Tetrachloroethane, 1,1,2,2-	ug/L N	20 U	20 U	2 U
Tetrachloroethene	ug/L N	20 U	20 U	2 U
Toluene	ug/L N	20 U	20 U	2 U
Trichloroethane, 1,1,1-	ug/L N	20 U	20 U	2 U
Trichloroethane, 1,1,2-	ug/L N	20 U	20 U	2 U
Trichloroethene	ug/L N	20 U	20 U	2 U
Vinyl chloride	ug/L N	20 U	20 U	1 U
Xylenes, total	ug/L N	20 U	20 U	6 U

Semivolatiles

LOCATION_CODE		PB-BED-MW22	PB-BED-MW22	PB-BED-MW22
SAMPLE_NO		DF3002	DF3005	DF3006
SAMPLE_DATE		5-May-04	5-May-04	5-May-04
		35	35	35
		35_5	35_5	35_5
		REG	FD	FS
<u>Parameter</u>	<u>Units Filtered</u>	<u>Result Qual</u>	<u>Result Qual</u>	<u>Result Qual</u>
3-Methylphenol and 4-Methylphenol	ug/L N			5 U
Acenaphthene	ug/L N	10 U	10 U	5 U
Acenaphthylene	ug/L N	10 U	10 U	5 U
Anthracene	ug/L N	10 U	10 U	5 U
Benzo(a)anthracene	ug/L N	10 U	10 U	5 U
Benzo(a)pyrene	ug/L N	10 U	10 U	5 U
Benzo(b)fluoranthene	ug/L N	10 U	10 U	5 U
Benzo(ghi)perylene	ug/L N	10 U	10 U	5 U
Benzo(k)fluoranthene	ug/L N	10 U	10 U	5 U
Benzoic acid	ug/L N			25 U
Benzyl alcohol	ug/L N			5 U
Bis(2-chloroethoxy)methane	ug/L N	10 U	10 U	5 U
Bis(2-chloroethyl)ether	ug/L N	10 U	10 U	5 U
Bis(2-chloroisopropyl)ether	ug/L N	10 U	10 U	5 U
Bis(2-ethylhexyl)phthalate	ug/L N	10 U	10 U	5 U
Bromophenyl phenyl ether, 4-	ug/L N	10 U	10 U	5 U
Butyl benzyl phthalate	ug/L N	10 U	10 U	5 U
Carbazole	ug/L N	10 U	10 U	5 U
Chloro-3-methylphenol, 4-	ug/L N	10 U	10 U	5 U
Chloroaniline, 4-	ug/L N	10 U	10 U	9.9 U
Chloronaphthalene, 2-	ug/L N	10 U	10 U	5 U
Chlorophenol, 2-	ug/L N	10 U	10 U	5 U
Chlorophenyl phenyl ether, 4-	ug/L N	10 U	10 U	5 U
Chrysene	ug/L N	10 U	10 U	5 U
Dibenz(a,h)anthracene	ug/L N	10 U	10 U	5 U
Dibenzofuran	ug/L N	10 U	10 U	5 U
Dichlorobenzene, 1,2-	ug/L N	10 U	10 U	5 U
Dichlorobenzene, 1,3-	ug/L N	10 U	10 U	5 U
Dichlorobenzene, 1,4-	ug/L N	10 U	10 U	5 U
Dichlorobenzidine, 3,3'-	ug/L N	50 U	50 U	9.9 U
Dichlorophenol, 2,4-	ug/L N	10 U	10 U	5 U
Diethyl phthalate	ug/L N	10 U	10 U	5 U
Dimethyl phthalate	ug/L N	10 U	10 U	5 U
Dimethylphenol, 2,4-	ug/L N	10 U	10 U	5 U
Di-n-butyl phthalate	ug/L N	10 U	10 U	5 U
Dinitro-2-methylphenol, 4,6-	ug/L N	50 U	50 U	9.9 U
Dinitrophenol, 2,4-	ug/L N	50 U	50 U	25 U
Dinitrotoluene, 2,4-	ug/L N	10 U	10 U	5 U
Dinitrotoluene, 2,6-	ug/L N	10 U	10 U	5 U
Di-n-octyl phthalate	ug/L N	10 U	10 U	5 U
Fluoranthene	ug/L N	10 U	10 U	5 U
Fluorene	ug/L N	10 U	10 U	5 U
Hexachlorobenzene	ug/L N	10 U	10 U	5 U
Hexachlorobutadiene	ug/L N	10 U	10 U	5 U
Hexachlorocyclopentadiene	ug/L N	50 U	50 U	5 U
Hexachloroethane	ug/L N	10 U	10 U	5 U
Indeno(1,2,3-cd)pyrene	ug/L N	10 U	10 U	5 U
Isophorone	ug/L N	10 U	10 U	5 U

Methylnaphthalene, 2-	ug/L N	10 U	10 U	5 U
Methylphenol, 2-	ug/L N	10 U	10 U	5 U
Methylphenol, 4-	ug/L N	10 U	10 U	
Naphthalene	ug/L N	10 U	10 U	5 U
Nitroaniline, 2-	ug/L N	50 U	50 U	5 U
Nitroaniline, 3-	ug/L N	50 U	50 U	5 U
Nitroaniline, 4-	ug/L N	50 U	50 U	5 U
Nitrobenzene	ug/L N	10 U	10 U	5 U
Nitrophenol, 2-	ug/L N	10 U	10 U	5 U
Nitrophenol, 4-	ug/L N	50 U	50 U	25 U
n-Nitroso-di-n-propylamine	ug/L N	10 U	10 U	5 U
n-Nitrosodiphenylamine	ug/L N	10 U	10 U	5 U
Pentachlorophenol	ug/L N	50 U	50 U	25 U
Phenanthrene	ug/L N	10 U	10 U	5 U
Phenol	ug/L N	10 U	10 U	3.6 J
Pyrene	ug/L N	10 U	10 U	5 U
Trichlorobenzene, 1,2,4-	ug/L N	10 U	10 U	5 U
Trichlorophenol, 2,4,5-	ug/L N	10 U	10 U	5 U
Trichlorophenol, 2,4,6-	ug/L N	10 U	10 U	5 U

Metals

LOCATION_CODE		PB-BED-MW22	PB-BED-MW22	PB-BED-MW22
SAMPLE_NO		DF3002	DF3005	DF3006
SAMPLE_DATE		5-May-04	5-May-04	5-May-04
		35	35	35
		35_5	35_5	35_5
		REG	FD	FS
<u>Parameter</u>	<u>Units Filtered</u>	<u>Result Qual</u>	<u>Result Qual</u>	<u>Result Qual</u>
Aluminum	ug/L N	1480	862	618
Aluminum	ug/L Y	41.4 B	51.5 B	200 U
Antimony	ug/L N	60 U	60 U	5 U
Antimony	ug/L Y	60 U	60 U	5 U
Arsenic	ug/L N	10 U	10 U	10 U
Arsenic	ug/L Y	10 U	10 U	10 U
Barium	ug/L N	732	712	702
Barium	ug/L Y	730	698	678
Beryllium	ug/L N	5 U	5 U	4 U
Beryllium	ug/L Y	5 U	5 U	4 U
Cadmium	ug/L N	5 U	5 U	5 U
Cadmium	ug/L Y	5 U	5 U	5 U
Calcium	ug/L N	134000	122000	121000
Calcium	ug/L Y	118000	114000	112000
Chromium	ug/L N	10 U	10 U	10 U
Chromium	ug/L Y	10 U	10 U	10 U
Cobalt	ug/L N	50 U	50 U	50 U
Cobalt	ug/L Y	50 U	50 U	50 U
Copper	ug/L N	25 U	25 U	25 U
Copper	ug/L Y	25 U	25 U	25 U
Iron	ug/L N	2220	1030	744
Iron	ug/L Y	100 U	100 U	300 U
Lead	ug/L N	3 U	3 U	5 U
Lead	ug/L Y	3 U	3 U	5 U
Magnesium	ug/L N	39500	37700	36700
Magnesium	ug/L Y	37900	36700	35400
Manganese	ug/L N	91.8	65	63.6
Manganese	ug/L Y	47.4	46.3	44.2
Mercury	ug/L N	0.2 U	0.2 U	1 U
Mercury	ug/L Y	0.2 U	0.2 U	1 U
Nickel	ug/L N	2.8 B	40 U	40 U
Nickel	ug/L Y	40 U	40 U	40 U
Potassium	ug/L N	4780 B J	4410 B J	4380 B
Potassium	ug/L Y	4300 B J	4120 B J	4170 B
Selenium	ug/L N	5 U	5 U	10 U
Selenium	ug/L Y	1.7 B	5 U	10 U
Silver	ug/L N	10 U	10 U	10 U
Silver	ug/L Y	10 U	10 U	10 U
Sodium	ug/L N	20400	19700	17600
Sodium	ug/L Y	20600	19800	17400
Thallium	ug/L N	4.5 B J	4.2 B J	10 U
Thallium	ug/L Y	5.3 B J	5.3 B J	10 U
Vanadium	ug/L N	50 U	50 U	0.61 B
Vanadium	ug/L Y	50 U	50 U	50 U
Zinc	ug/L N	22	13.2 B	16.1 B
Zinc	ug/L Y	20 U	20 U	20 U

Explosives

LOCATION_CODE		PB-BED-MW22	PB-BED-MW22	PB-BED-MW22
SAMPLE_NO		DF3002	DF3005	DF3006
SAMPLE_DATE		5-May-04	5-May-04	5-May-04
		35	35	35
		35_5	35_5	35_5
		REG	FD	FS
<u>Parameter</u>	<u>Units Filtered</u>	<u>Result Qual</u>	<u>Result Qual</u>	<u>Result Qual</u>
Amino-2,6-dinitrotoluene, 4-	ug/L N	0.2 U	0.2 U	0.2 U
Amino-4,6-dinitrotoluene, 2-	ug/L N	0.2 U	0.2 U	0.2 U
Dinitrobenzene, 1,3-	ug/L N	0.2 U	0.2 U	0.2 U
Dinitrotoluene, 2,4-	ug/L N	0.2 U	0.2 U	0.2 U
Dinitrotoluene, 2,6-	ug/L N	0.2 U	0.2 U	0.2 U
HMX	ug/L N	0.5 U	0.5 U	0.2 U
Nitrobenzene	ug/L N	0.2 U	0.2 U	0.2 U
Nitrotoluene, 2-	ug/L N	0.2 U	0.2 U	0.2 U
Nitrotoluene, 3-	ug/L N	0.2 U	0.2 U	0.2 U
Nitrotoluene, 4-	ug/L N	0.2 U	0.2 U	0.2 U
RDX	ug/L N	0.5 U	0.5 U	0.2 U
Tetryl	ug/L N	0.2 U	0.2 U	0.2 U
Trinitrobenzene, 1,3,5-	ug/L N	0.2 U	0.2 U	0.2 U
Trinitrotoluene, 2,4,6-	ug/L N	0.2 U	0.2 U	0.2 U