Chemical Quality Assurance Report

Groundwater Investigations

Plum Brook Ordnance Works

Sandusky, Ohio

Prepared for the Shaw Group

By

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June 26, 2003

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Chemical Quality Assurance Report Groundwater Investigations 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 project investigation 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) groundwater program 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 QCAR 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	DA3005	10-April-03	REG	H3D110144	STL
	DA3007		FD	H3D110144	STL
	DA3008		FS	F17328	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: The chain of custody for sample DA3008 indicated that no preservative was added to the sample. However, since the analysis was performed within three days no effect on the analyses was expected.

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 26 comparisons were made and three (10.5%) of the sample pairs were designated as disagreement and five (19.2%) as major disagreement. Four of the sample results with major disagreement resulted from comparing samples with detects to samples with no detects.

Accuracy: The analyte groups may contain false positives or be biased high because of method and/or trip blank contamination. In the volatiles, bromomethane was qualified as present in the blank, "B", in the project and field QA samples since it was found in the associated trip blank sample. In the metals, thallium and zinc were in the method blank and were present in 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. Sample DA3008 had not been preserved in the field and the pH was >2.0. The analysis was performed within three days and the QC holding time limit for unpreserved samples was met.

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

- The following exhibited CCAL %D above the 25% QC limit. The CCAL non-detect results were qualified as "UJ" and detects as "J".

Sample Type	Samples Affected	Analyte / Analytes	Validation Qualifier
Field QC	DA3008	chloroethane, carbon tetrachloride, 1,1,1-trichloroethane	UJ
	DA3008	carbon tetrachloride	J

Blanks. The 5X/10X rule for contaminants found in the associated method blanks (MB) and trip blanks (TB) was applied to all sample results. All were found to be within the 5x/10x limits, except for the following:

Sample Type	Samples Affected	Analyte/Analytes	Blank	Validation Qualifier
Field QA	DA3007	bromomethane	TB	B

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 were performed and all results were acceptable. Some compounds in both SDGs associated with the project sample and field QC samples had high recoveries but all sample results were nondetects and therefore the potentially high bias did not affect the sample results.

Laboratory Control Sample (LCS). LCS analyses were performed and QC criteria were met except for methyl bromide in the LCS associated with the field QC (DA3008). The LCS results were high, but because the sample results were nondetect no qualifiers were added.

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

Field Duplicates (FD). The results for carbon disulfide exceeded the 30% RPD and were qualified as "J" for samples DA3005 and DA3007.

Quantitation. All results were reported as qualified.

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 associated with the project sample DA3005, and field QA sample DA3007 had a low tetryl recovery, but the LCS 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. All surrogate recoveries are within the laboratory QC limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD). The MS/MSD analyses were acceptable within QC limits.

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. The 5X rule for contaminants found in the associated calibration, prep, and method blanks (MB) was applied to all sample results. All were acceptable except the following:

Sample Type	Samples Affected	Analyte/Analytes	Blank	Validation Qualifier
Project Sample	DA3005T, DA3005D	aluminum	MB	B
	DA3005T	zinc	MB	B
Field QA	DA3007T, DA3007D	aluminum	MB	B
	DA3007T	zinc	MB	B

Matrix Spike/Matrix Spike Duplicate(MS/MSD). The MS/MSD recoveries were within the QC limits except for: antimony in the field QC, DA3008, total and dissolved, which had a low recovery and was qualified as "UJ" in DA3008; and Fe, which had a high duplicate analysis RPD and was qualified as "J" in DA3008, total and dissolved.

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	DA3008T, DA3008D	potassium, manganese	J

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. In one instance no preservatives were added to the field sample during field collection: sample DA3008 volatiles was received at a pH > 2.0 but was analyzed within the QC limit and was not considered to be bias low. 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. In some cases the comparison was labeled as a disagreement or major disagreement when the detect had been qualified as "B" (present in the method or trip blank). Since these compounds or elements may be biased high or a false positive, the comparison result could be overstated.

Data comparisons were appropriate in 25 cases where at least one of the compounds or elements was present in one of the three samples. Application of the comparison criteria resulted in thirteen major disagreements (MD) and four disagreements (D). Virtually all the major disagreements involved a situation where the compound was detected in one sample at levels below the reporting limit (qualified as "J") and in one of the corresponding samples at below the detection level (qualified as "U"). The volatiles had three cases where the disagreement criteria was applied. Two of those involved compounds where one value was a nondetect and one where all three samples had a detected result. The carbon disulfide results were agreeable between the project sample and the field QA (FD) sample as well as between the PS, the FD and the field QC (FS). The acetone results were in major disagreement between the FD and FS and a disagreement between the PS and FD. Bromomethane was reported as present in the FD but not in the PS and a disagreement was noted. The compound was not reported for the FS so no comparison was made.

The semivolatiles and explosives had no comparisons. All compounds were nondetect in all three samples for both analytical groups.

Of the 22 instances where the comparison criteria was applied to the metals results, eight involved comparisons where one value was a nondetect, and 14 where all values were detects. Twelve cases were categorized as major disagreements and two as disagreements. Three of the MDs were between the PS and FD. All three MDs were noted when one sample value was a detect and the other was a nondetect. All other MD or D notations were between the PS/FS or FD/FS samples.

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		DA3005 10-Apr-03	DA3007 10-Apr-03	DA3008 10-Apr-03			
	Acetone	10.0 U	2.3	50 U	D	A	MD
	Bromomethane	2.0 U	0.52 U, 6d	not analyzed	D	-	-
	Carbon disulfide	1.5	2.3	1.5 J, 5b	A	A	A

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		DA3005 10-Apr-03	DA3007 10-Apr-03	DA3008 10-Apr-03			
	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		DA3005 10-Apr-03	DA3007 10-Apr-03	DA3008 10-Apr-03			
	No detected compounds						

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		**DA3005** 10-Apr-03	**DA3007** 10-Apr-03	**DA3008** 10-Apr-03			
	Aluminum T	137 B, 6a	143 B, 6a	69 U	A	A	A
	Aluminum D	135 B, 6a	118 B, 6a	69 U	A	A	A
	Barium T	558	585	546	A	A	A
	Barium D	545	563	540	A	A	A
	Calcium T	194000	193000	196000	A	A	A
	Calcium D	188000	191000	189000	A	A	A
	Cobalt D	2.0 J	50 U	0.6 U	MD	D	A
	Iron T	102	92.3 J	472	A	MD	MD
	Iron D	18.8 J, 17	32.5 J, 17	305	A	MD	MD
	Magnesium T	81200	82400	77300	A	A	A
	Magnesium D	77900	79700	74700	A	A	A
	Manganese T	79.8	79.2	80.4	A	A	A
	Manganese D	75.7	77.3	75.7	A	A	A
	Nicket D	40 U	1.6 J	1.1 U	MD	A	A
	Potassium T	19200	219700	20200 J, 13	A	A	A
	Potassium D	18400	18700	19000	A	A	A
	Sodium T	223000	225000	251000	A	A	A
	Sodium D	217000	220000	235000	A	A	A
	Lead T	15 U	15 U	1.9 J	A	MD	MD
	Mercury D	0.056 J	0.2 U	0.052	MD	A	A
	Zinc T	1.4 B, 6a	2.0 B, 6A	8.0 U	A	MD	D
	Zinc D	1.0 J	0.83 J	8.0 U	A	MD	MD

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.

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:

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

ACCUTEST - F 17328

SDG: STL - P8043 Project: Plumbrook

Method: Volatiles - 8260B Matrix/No. of Samples: Water - 3

Validation Samples: DA3005
DA 3007
DA 3008

Data Validation Report Summary

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

Status Codes:
A = Acceptable
X = Data acceptable but qualified due to problems
R = Data Rejected

Qualifications:

6d • Bromomethane was present in the method blank associated with DA3005 and DA3007 and was qualified as "B" in DA 3007.

17 • Carbon disulfide exceeded the field duplicate QC limit of 30% D and was qualified as "J" in DA3005 & DA3007

5b • High % D's in the CCAL associated with DA3008 resulted in "UJ/J" qualifiers for chloroethane, carbon disulfide, carbon tetrachloride, and 1,1,2,2-TCE

Significant Findings/Recommendations:

#1 – The COC indicated no preservative was added to DA3008 but since the analysis was done within 3 days no qualifiers were added.

Overall Data Quality:

Acceptable as qualified

Validator's Signature: J. Thomas Kitchings **Date:** 6/19/2003

Peer Reviewer: **Date:**

SHAW E & I INC

Client Sample ID: DA3005

GC/MS Volatiles

Lot-Sample #...: H3D110144-001 **Work Order #...:** FLQAG1AC **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03
Prep Date.....: 04/16/03 **Analysis Date..:** 04/16/03
Prep Batch #...: 3106291
Dilution Factor: 1 **Method.....:** SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual	
Chloromethane	ND	2.0	ug/L	0.20	u	
Bromomethane	ND	2.0	ug/L	0.28		
Vinyl chloride	ND	1.0	ug/L	0.18		
Chloroethane	ND	2.0	ug/L	0.22		
Methylene chloride	ND	2.0	ug/L	0.13		
Acetone	ND	10	ug/L	1.3		
Carbon disulfide	**1.5**	**1.0**	**ug/L**	**0.10**	J	17
1,1-Dichloroethene	ND	1.0	ug/L	0.12	u	
1,1-Dichloroethane	ND	1.0	ug/L	0.10		
1,2-Dichloroethene (total)	ND	1.0	ug/L	0.13		
Chloroform	ND	1.0	ug/L	0.10		
1,2-Dichloroethane	ND	1.0	ug/L	0.10		
2-Butanone	ND	5.0	ug/L	0.40		
1,1,1-Trichloroethane	ND	1.0	ug/L	0.12		
Carbon tetrachloride	ND	1.0	ug/L	0.10		
Bromodichloromethane	ND	1.0	ug/L	0.10		
1,2-Dichloropropane	ND	1.0	ug/L	0.10		
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.10		
Trichloroethene	ND	1.0	ug/L	0.10		
Dibromochloromethane	ND	1.0	ug/L	0.22		
1,1,2-Trichloroethane	ND	1.0	ug/L	0.14		
Benzene	ND	1.0	ug/L	0.10		
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.11		
Bromoform	ND	1.0	ug/L	0.10		
4-Methyl-2-pentanone	ND	5.0	ug/L	0.40		
2-Hexanone	ND	5.0	ug/L	0.40		
Tetrachloroethene	ND	1.0	ug/L	0.15		
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.12		
Toluene	ND	1.0	ug/L	0.23		
Chlorobenzene	ND	1.0	ug/L	0.10		
Ethylbenzene	ND	1.0	ug/L	0.13		
Styrene	ND	1.0	ug/L	0.12		
Xylenes (total)	ND	1.0	ug/L	0.30		

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	105	(79 - 120)
1,2-Dichloroethane-d4	112	(71 - 127)
Toluene-d8	118	(80 - 120)
Bromofluorobenzene	98	(69 - 126)

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Client Sample ID: DA3007

GC/MS Volatiles

Lot-Sample #...: H3D110144-004 **Work Order #...:** FLQDC1AN **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03
Prep Date.....: 04/16/03 **Analysis Date..:** 04/16/03
Prep Batch #...: 3106291
Dilution Factor: 1 **Method.....:** SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
Chloromethane	ND	2.0	ug/L	0.20	u
Bromomethane	**0.52 J**	**2.0**	**ug/L**	**0.28**	~~B~~ 6d
Vinyl chloride	ND	1.0	ug/L	0.18	u
Chloroethane	ND	2.0	ug/L	0.22	↓
Methylene chloride	ND	2.0	ug/L	0.13	↓
Acetone	**2.3 J**	**10**	**ug/L**	**1.3**	
Carbon disulfide	**2.3**	**1.0**	**ug/L**	**0.10**	J 17
1,1-Dichloroethene	ND	1.0	ug/L	0.12	u
1,1-Dichloroethane	ND	1.0	ug/L	0.10	↓
1,2-Dichloroethene (total)	ND	1.0	ug/L	0.13	↓
Chloroform	ND	1.0	ug/L	0.10	↓
1,2-Dichloroethane	ND	1.0	ug/L	0.10	↓
2-Butanone	ND	5.0	ug/L	0.40	↓
1,1,1-Trichloroethane	ND	1.0	ug/L	0.12	↓
Carbon tetrachloride	ND	1.0	ug/L	0.10	↓
Bromodichloromethane	ND	1.0	ug/L	0.10	↓
1,2-Dichloropropane	ND	1.0	ug/L	0.10	↓
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.10	↓
Trichloroethene	ND	1.0	ug/L	0.10	↓
Dibromochloromethane	ND	1.0	ug/L	0.22	↓
1,1,2-Trichloroethane	ND	1.0	ug/L	0.14	↓
Benzene	ND	1.0	ug/L	0.10	↓
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.11	↓
Bromoform	ND	1.0	ug/L	0.10	↓
4-Methyl-2-pentanone	ND	5.0	ug/L	0.40	↓
2-Hexanone	ND	5.0	ug/L	0.40	↓
Tetrachloroethene	ND	1.0	ug/L	0.15	↓
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.12	↓
Toluene	ND	1.0	ug/L	0.23	↓
Chlorobenzene	ND	1.0	ug/L	0.10	↓
Ethylbenzene	ND	1.0	ug/L	0.13	↓
Styrene	ND	1.0	ug/L	0.12	↓
Xylenes (total)	ND	1.0	ug/L	0.30	↓

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	106	(79 - 120)
1,2-Dichloroethane-d4	112	(71 - 127)
Toluene-d8	120	(80 - 120)
Bromofluorobenzene	94	(69 - 126)

(Continued on next page)

Accutest Laboratories

Report of Analysis

Client Sample ID:	DA3008		
Lab Sample ID:	F17328-1	**Date Sampled:**	04/10/03
Matrix:	AQ - Water	**Date Received:**	04/11/03
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	PBOW		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J001994.D	1	04/14/03	RA	n/a	n/a	VJ92
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	Rev Qual	
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		uJ	5b
67-66-3	Chloroform	ND	2.0	0.50	ug/l		u	
75-15-0	Carbon disulfide	1.5	2.0	1.0	ug/l	J	J	5b
56-23-5	Carbon tetrachloride	ND	2.0	0.50	ug/l		uJ	5b
75-34-3	1,1-Dichloroethane	ND	2.0	0.50	ug/l		u	
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	0.50	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	0.50	ug/l			
100-41-4	Ethylbenzene	ND	2.0	0.70	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		uJ	5b
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	0.50	ug/l		u	
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

Accutest Laboratories

Report of Analysis

Client Sample ID:	DA3008		
Lab Sample ID:	F17328-1	**Date Sampled:**	04/10/03
Matrix:	AQ - Water	**Date Received:**	04/11/03
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	PBOW		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	Rev Qual
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l		U
1330-20-7	Xylene (total)	ND	6.0	1.0	ug/l		U

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		86-115%
17060-07-0	1,2-Dichloroethane-D4	118%		78-125%
2037-26-5	Toluene-D8	93%		87-113%
460-00-4	4-Bromofluorobenzene	102%		84-117%

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** 6/19

roject: Plumbrook **SDG:** F 17328, PB043 **Matrix/No. Samples:** W-3

I. Technical Holding Times			
A. Sample Preservation, Handling and Transport			
1. Have all samples been preserved correctly?	Yes	No	N/A
2. Have sample temperatures been kept at 4° C (+ or - 2 °)?	Yes	No	N/A
3. Were all samples received in proper condition?	Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	No	N/A
Coolers @ 3008 – COC indicated no preservative but analysis was within 3 days - no quals. – cooler 1.4°C. 3005, 007 – 1.9°C.			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	Yes	No	N/A
2. Were correct analyses performed on samples?	Yes	No	N/A
C. Holding Times			
1. Were samples extracted and analyzed within acceptable holding times?	Yes	No	N/A
2. Were any qualifications required based on this information?	Yes	No	N/A

SAMPLED	PREPPED	ANALYZED
3005, 3007 4/10		4/16
3008 4/10		4/14

II. GC/MS Instrument Performance Check			
1. Were instrument performance check samples run for each analysis period?	Yes	No	N/A
2. Were ion abundance criteria met for bromofluorobenzene (BFB) analysis?	Yes	No	N/A
3. Do laboratory forms match raw data?	Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008 CCAL 4/14 @ 11:28
95 base
all criteria met.
ICAL 4/7 @ 11:05
– all passed.

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings **Date** 6/19

roject: Plumbrook **SDG:** F17328, PB043 **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?	Yes	No	N/A
	2. Were initial calibration RRFs for all volatile target compounds and system monitoring compounds >or = 0.05? Do recalculations for RRFs agree with reported values?	Yes	No	N/A
	3. Were %RSDs < or = 30% for all volatile target compounds? Do recalculations for RSDs agree with reported values?	Yes	No	N/A
	4. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

4/8 ~ # linear
Rs @ >0.99
RSDs <20%
RRFs - all target cpds @ >0.05

IV.	Continuing Calibration			
	1. Were continuing calibration samples run at the required frequency, and compared to the correct initial calibration?	Yes	No	N/A
	2. Did calculations from raw data agree with laboratory reported values for RRF and %D?	Yes	No	N/A
	3. Were continuing calibration RRFs for volatile organic compounds and system monitoring compounds (surrogates) > or = 0.05?	Yes	No	N/A
	4. Were %D between initial calibration RRF and the continuing calibration RRFs within + or - 25%?	Yes	No	N/A
	5. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

4/14 @ 19:28
Chloroethane @ 29.7
carbon disulfide @ 32.3
carbon tet. @ 27.0
1,1,1-TCE @ 26.0

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings **Date** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **Matrix/No. Samples:** W-3

V.	Blanks			
	1. Were any target or non-target compounds reported in laboratory prep or calibration blanks?	Yes	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)?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008 1963.D - all nondetects
4/11 VW91-MB
VW

3005
3007
Q1AA
4/16 Methylene chloride @ 0.17
both samples @ nd.

VI.	System Monitoring Compounds (Surrogate Spikes)			
	1. Were laboratory surrogate recoveries calculated and reported correctly?	Yes	No	N/A
	2. Were surrogate recoveries within acceptable limits?	Yes	No	N/A
	3. Were any qualifications required based on surrogate spike QC information?	Yes	No	N/A

4-0 **Comments/Qualifications:** 3008 93-118% ✓
4-0 Range of R's. 3005 98-118% ✓
4-0 3007 94-120% ✓

VII.	Matrix Spikes/Matrix Spike Duplicates			
	1. Were MS/MSD samples analyzed at required frequency for each ample matrix?	Yes	No	N/A
	2. Were MS/MSD results for recovery and RPD within advisory limits?	Yes	No	N/A
	3. Were Samples used for MS/MSD field blanks?	Yes	No	N/A
	4. Were laboratory reported results correctly calculated from raw data?	Yes	No	N/A
	5. Were any qualifications required, based on results of MS/MSD samples in conjunction with other QC information?	Yes	No	N/A

3008 **Comments/Qualifications:**
F17322-9 MS/MSD
653 Methyl bromide high/high.
4-0 VC ok/high
all RPDs - ok

QA61DO/1DI Benz.
7.3 Toluene
0.5 chlorob. } high.
high RPD's
LCS & all other QC ok - no quals.

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings **Date** 6/19

Project: Plumbrook **SDG:** F-17328, PB043 **Matrix/No. Samples:** W-3

VIII.	Laboratory Control Sample (LCS)			
	1. Were LCS samples run at correct frequency for each matrix samples?	Yes	No	N/A
	2. Were LCS calculations performed correctly, and did laboratory reported values match raw data? Were recoveries within laboratory QC limits?	Yes	No	N/A
	4. Were any qualifications required based on LCS data in conjunction with other QC information?	Yes	No	N/A

Comments/Qualifications:

3008 V J91 - BS 4/11

33-1 Methyl Bromide - high - sample @ nondetect no quals.

FQIAC. 4/16 96-111% R's.

IX.	Internal Standards			
	1. Were standard area counts within a factor of two (-50% to +100%) from associated calibration standard?	Yes	No	N/A
	2. Were retention times of internal standard within + or - 30 seconds of retention time of associated calibration check?	Yes	No	N/A
	3. Were any qualifications required based on internal standard results?	Yes	No	N/A

Comments/Qualifications:

3008 IS1 $\frac{1375081}{1375150} = 99.99+$

RT 11.17

STD. 11.17

all w/in limits.

X.	Target Compound Identification			
	1. Are relative retention times (RRTs) within + or - 0.06 RRT units of standard RRT?	Yes	No	N/A
	2. Do sample compound spectra meet specified criteria in relation to laboratory standard spectra?	Yes	No	N/A
	3. Were all compounds accounted for on chromatogram?	Yes	No	N/A

Comments/Qualifications:

	SMP	RT	STD
3008 carbon disulf.	6.96		6.96

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings **Date** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **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:
3008 Carb. disulf. @ 1.5 1
3007 carb. disulf. @ 2.3
3005 carb disulf. @ 1.5

Rpt. As
1.5

XII. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (~~50~~ 30% for water samples, ~~100~~ 50% 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

ok JK

Comments/Qualifications:
4/11 DA5005 FB - all nondetects
3008 ~~30~~ FD
005 007
→ .8/1.9 = 42.1% 1.5 Carb.disulf. 2.3

3005] TB DA5003
3007]
Bromomethane 0.29 5X 1.45
MC @ .13 0.65

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:

ACCUTEST F17328

SDG: STL - PB043 Project: Plumbrook

Method: Semivolatiles 8270 C ..Matrix/No. of Samples: Water - 3

Validation Samples: DA 3005
DA 3007
DA 3008

Data Validation Report Summary

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

Status Codes:
A = Acceptable
X = Data acceptable but qualified due to problems
R = Data Rejected

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Validator's Signature: J. Thomas Kitchings Date: 6/19/2003

Peer Reviewer: Date:

SHAW E & I INC

Client Sample ID: DA3005

GC/MS Semivolatiles

Lot-Sample #...: H3D110144-001 **Work Order #...:** FLQAG1AD **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03
Prep Date.....: 04/14/03 **Analysis Date..:** 04/17/03
Prep Batch #...: 3104151
Dilution Factor: 1 **Method.....:** SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
Phenol	ND	10	ug/L	1.2	u
bis(2-Chloroethyl)-ether	ND	10	ug/L	1.1	
2-Chlorophenol	ND	10	ug/L	1.5	
1,3-Dichlorobenzene	ND	10	ug/L	1.3	
1,4-Dichlorobenzene	ND	10	ug/L	1.7	
1,2-Dichlorobenzene	ND	10	ug/L	1.1	
2-Methylphenol	ND	10	ug/L	1.0	
2,2'-oxybis(1-Chloro-propane)	ND	10	ug/L	1.3	
4-Methylphenol	ND	10	ug/L	2.1	
N-Nitrosodi-n-propyl-amine	ND	10	ug/L	1.4	
Hexachloroethane	ND	10	ug/L	1.6	
Nitrobenzene	ND	10	ug/L	1.6	
Isophorone	ND	10	ug/L	1.2	
2-Nitrophenol	ND	10	ug/L	1.7	
2,4-Dimethylphenol	ND	10	ug/L	1.8	
bis(2-Chloroethoxy) methane	ND	10	ug/L	1.2	
2,4-Dichlorophenol	ND	10	ug/L	1.4	
1,2,4-Trichloro-benzene	ND	10	ug/L	1.5	
Naphthalene	ND	10	ug/L	1.4	
4-Chloroaniline	ND	10	ug/L	1.2	
Hexachlorobutadiene	ND	10	ug/L	1.4	
4-Chloro-3-methylphenol	ND	10	ug/L	0.56	
2-Methylnaphthalene	ND	10	ug/L	1.0	
Hexachlorocyclopenta-diene	ND	50	ug/L	1.2	
2,4,6-Trichloro-phenol	ND	10	ug/L	1.3	
2,4,5-Trichloro-phenol	ND	10	ug/L	1.8	
2-Chloronaphthalene	ND	10	ug/L	1.3	
2-Nitroaniline	ND	50	ug/L	1.2	
Dimethyl phthalate	ND	10	ug/L	1.4	
Acenaphthylene	ND	10	ug/L	1.1	
2,6-Dinitrotoluene	ND	10	ug/L	1.5	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DA3005

GC/MS Semivolatiles

Lot-Sample #...: H3D110144-001 Work Order #...: FLQAG1AD Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
3-Nitroaniline	ND	50	ug/L	1.5	u
Acenaphthene	ND	10	ug/L	1.1	
2,4-Dinitrophenol	ND	50	ug/L	11	
4-Nitrophenol	ND	50	ug/L	5.7	
Dibenzofuran	ND	10	ug/L	1.2	
2,4-Dinitrotoluene	ND	10	ug/L	1.2	
Diethyl phthalate	ND	10	ug/L	1.4	
4-Chlorophenyl phenyl ether	ND	10	ug/L	1.3	
Fluorene	ND	10	ug/L	1.3	
4-Nitroaniline	ND	50	ug/L	1.3	
4,6-Dinitro-2-methylphenol	ND	50	ug/L	6.5	
N-Nitrosodiphenylamine	ND	10	ug/L	1.2	
4-Bromophenyl phenyl ether	ND	10	ug/L	1.8	
Hexachlorobenzene	ND	10	ug/L	1.4	
Pentachlorophenol	ND	50	ug/L	1.1	
Phenanthrene	ND	10	ug/L	1.4	
Anthracene	ND	10	ug/L	1.3	
Carbazole	ND	10	ug/L	1.5	
Di-n-butyl phthalate	ND	10	ug/L	1.6	
Fluoranthene	ND	10	ug/L	1.4	
Pyrene	ND	10	ug/L	1.2	
Butyl benzyl phthalate	ND	10	ug/L	1.7	
3,3'-Dichlorobenzidine	ND	50	ug/L	1.1	
Benzo(a)anthracene	ND	10	ug/L	1.2	
Chrysene	ND	10	ug/L	1.6	
bis(2-Ethylhexyl) phthalate	ND	10	ug/L	1.9	
Di-n-octyl phthalate	ND	10	ug/L	1.9	
Benzo(b)fluoranthene	ND	10	ug/L	1.0	
Benzo(k)fluoranthene	ND	10	ug/L	2.0	
Benzo(a)pyrene	ND	10	ug/L	2.0	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	0.83	
Dibenz(a,h)anthracene	ND	10	ug/L	1.2	
Benzo(ghi)perylene	ND	10	ug/L	1.1	

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorophenol	64	(29 - 110)
Phenol-d5	79	(41 - 115)
Nitrobenzene-d5	97	(46 - 117)
2-Fluorobiphenyl	97	(44 - 116)
2,4,6-Tribromophenol	102	(31 - 138)
Terphenyl-d14	106	(36 - 134)

SHAW E & I INC

Client Sample ID: DA3007

GC/MS Semivolatiles

Lot-Sample #...: H3D110144-004 **Work Order #...:** FLQDC1AP **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03
Prep Date.....: 04/14/03 **Analysis Date..:** 04/17/03
Prep Batch #...: 3104151
Dilution Factor: 1 **Method.....:** SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
Phenol	ND	10	ug/L	1.2	u
bis(2-Chloroethyl)-ether	ND	10	ug/L	1.1	
2-Chlorophenol	ND	10	ug/L	1.5	
1,3-Dichlorobenzene	ND	10	ug/L	1.3	
1,4-Dichlorobenzene	ND	10	ug/L	1.7	
1,2-Dichlorobenzene	ND	10	ug/L	1.1	
2-Methylphenol	ND	10	ug/L	1.0	
2,2'-oxybis(1-Chloro-propane)	ND	10	ug/L	1.3	
4-Methylphenol	ND	10	ug/L	2.1	
N-Nitrosodi-n-propyl-amine	ND	10	ug/L	1.4	
Hexachloroethane	ND	10	ug/L	1.6	
Nitrobenzene	ND	10	ug/L	1.6	
Isophorone	ND	10	ug/L	1.2	
2-Nitrophenol	ND	10	ug/L	1.7	
2,4-Dimethylphenol	ND	10	ug/L	1.8	
bis(2-Chloroethoxy) methane	ND	10	ug/L	1.2	
2,4-Dichlorophenol	ND	10	ug/L	1.4	
1,2,4-Trichloro-benzene	ND	10	ug/L	1.5	
Naphthalene	ND	10	ug/L	1.4	
4-Chloroaniline	ND	10	ug/L	1.2	
Hexachlorobutadiene	ND	10	ug/L	1.4	
4-Chloro-3-methylphenol	ND	10	ug/L	0.56	
2-Methylnaphthalene	ND	10	ug/L	1.0	
Hexachlorocyclopenta-diene	ND	50	ug/L	1.2	
2,4,6-Trichloro-phenol	ND	10	ug/L	1.3	
2,4,5-Trichloro-phenol	ND	10	ug/L	1.8	
2-Chloronaphthalene	ND	10	ug/L	1.3	
2-Nitroaniline	ND	50	ug/L	1.2	
Dimethyl phthalate	ND	10	ug/L	1.4	
Acenaphthylene	ND	10	ug/L	1.1	
2,6-Dinitrotoluene	ND	10	ug/L	1.5	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DA3007

GC/MS Semivolatiles

Lot-Sample #...: H3D110144-004 **Work Order #...:** FLQDC1AP **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
3-Nitroaniline	ND	50	ug/L	1.5	u
Acenaphthene	ND	10	ug/L	1.1	
2,4-Dinitrophenol	ND	50	ug/L	11	
4-Nitrophenol	ND	50	ug/L	5.7	
Dibenzofuran	ND	10	ug/L	1.2	
2,4-Dinitrotoluene	ND	10	ug/L	1.2	
Diethyl phthalate	ND	10	ug/L	1.4	
4-Chlorophenyl phenyl ether	ND	10	ug/L	1.3	
Fluorene	ND	10	ug/L	1.3	
4-Nitroaniline	ND	50	ug/L	1.3	
4,6-Dinitro-2-methylphenol	ND	50	ug/L	6.5	
N-Nitrosodiphenylamine	ND	10	ug/L	1.2	
4-Bromophenyl phenyl ether	ND	10	ug/L	1.8	
Hexachlorobenzene	ND	10	ug/L	1.4	
Pentachlorophenol	ND	50	ug/L	1.1	
Phenanthrene	ND	10	ug/L	1.4	
Anthracene	ND	10	ug/L	1.3	
Carbazole	ND	10	ug/L	1.5	
Di-n-butyl phthalate	ND	10	ug/L	1.6	
Fluoranthene	ND	10	ug/L	1.4	
Pyrene	ND	10	ug/L	1.2	
Butyl benzyl phthalate	ND	10	ug/L	1.7	
3,3'-Dichlorobenzidine	ND	50	ug/L	1.1	
Benzo(a)anthracene	ND	10	ug/L	1.2	
Chrysene	ND	10	ug/L	1.6	
bis(2-Ethylhexyl) phthalate	ND	10	ug/L	1.9	
Di-n-octyl phthalate	ND	10	ug/L	1.9	
Benzo(b)fluoranthene	ND	10	ug/L	1.0	
Benzo(k)fluoranthene	ND	10	ug/L	2.0	
Benzo(a)pyrene	ND	10	ug/L	2.0	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	0.83	
Dibenz(a,h)anthracene	ND	10	ug/L	1.2	
Benzo(ghi)perylene	ND	10	ug/L	1.1	

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorophenol	57	(29 - 110)
Phenol-d5	72	(41 - 115)
Nitrobenzene-d5	88	(46 - 117)
2-Fluorobiphenyl	92	(44 - 116)
2,4,6-Tribromophenol	98	(31 - 138)
Terphenyl-d14	101	(36 - 134)

Accutest Laboratories

Report of Analysis

Client Sample ID:	DA3008		
Lab Sample ID:	F17328-1	**Date Sampled:**	04/10/03
Matrix:	AQ - Water	**Date Received:**	04/11/03
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	PBOW		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W015054.D	1	04/21/03	MRE	04/15/03	OP7337	SW788
Run #2							

	Initial Volume	Final Volume
Run #1	990 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	5.1	2.0	ug/l		
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	2.0	ug/l		
120-83-2	2,4-Dichlorophenol	ND	5.1	2.0	ug/l		
105-67-9	2,4-Dimethylphenol	ND	5.1	2.0	ug/l		
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l		
534-52-1	4,6-Dinitro-o-cresol	ND	10	7.6	ug/l		
95-48-7	2-Methylphenol	ND	5.1	2.0	ug/l		
	3&4-Methylphenol	ND	5.1	2.0	ug/l		
88-75-5	2-Nitrophenol	ND	5.1	2.0	ug/l		
100-02-7	4-Nitrophenol	ND	25	10	ug/l		
87-86-5	Pentachlorophenol	ND	25	10	ug/l		
108-95-2	Phenol	ND	5.1	2.0	ug/l		
95-95-4	2,4,5-Trichlorophenol	ND	5.1	2.5	ug/l		
88-06-2	2,4,6-Trichlorophenol	ND	5.1	2.0	ug/l		
83-32-9	Acenaphthene	ND	5.1	1.0	ug/l		
208-96-8	Acenaphthylene	ND	5.1	1.0	ug/l		
120-12-7	Anthracene	ND	5.1	1.0	ug/l		
56-55-3	Benzo(a)anthracene	ND	5.1	1.0	ug/l		
50-32-8	Benzo(a)pyrene	ND	5.1	1.0	ug/l		
205-99-2	Benzo(b)fluoranthene	ND	5.1	1.0	ug/l		
191-24-2	Benzo(g,h,i)perylene	ND	5.1	2.0	ug/l		
207-08-9	Benzo(k)fluoranthene	ND	5.1	1.0	ug/l		
101-55-3	4-Bromophenyl phenyl ether	ND	5.1	1.0	ug/l		
85-68-7	Butyl benzyl phthalate	ND	5.1	2.0	ug/l		
100-51-6	Benzyl Alcohol	ND	5.1	1.0	ug/l		
91-58-7	2-Chloronaphthalene	ND	5.1	1.0	ug/l		
106-47-8	4-Chloroaniline	ND	5.1	2.0	ug/l		
86-74-8	Carbazole	ND	5.1	1.0	ug/l		
218-01-9	Chrysene	ND	5.1	1.0	ug/l		
111-91-1	bis(2-Chloroethoxy)methane	ND	5.1	1.0	ug/l		
111-44-4	bis(2-Chloroethyl)ether	ND	5.1	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

Accutest Laboratories

Report of Analysis

Client Sample ID:	DA3008		
Lab Sample ID:	F17328-1	**Date Sampled:**	04/10/03
Matrix:	AQ - Water	**Date Received:**	04/11/03
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	PBOW		

ABN TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	Raw Qual
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.1	1.0	ug/l		u
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.1	1.0	ug/l		
95-50-1	1,2-Dichlorobenzene	ND	5.1	1.0	ug/l		
541-73-1	1,3-Dichlorobenzene	ND	5.1	1.0	ug/l		
106-46-7	1,4-Dichlorobenzene	ND	5.1	1.0	ug/l		
121-14-2	2,4-Dinitrotoluene	ND	5.1	2.0	ug/l		
606-20-2	2,6-Dinitrotoluene	ND	5.1	2.0	ug/l		
91-94-1	3,3'-Dichlorobenzidine	ND	10	5.1	ug/l		
53-70-3	Dibenzo(a,h)anthracene	ND	5.1	2.0	ug/l		
132-64-9	Dibenzofuran	ND	5.1	1.0	ug/l		
84-74-2	Di-n-butyl phthalate	ND	5.1	2.0	ug/l		
117-84-0	Di-n-octyl phthalate	ND	5.1	2.5	ug/l		
84-66-2	Diethyl phthalate	ND	5.1	2.0	ug/l		
131-11-3	Dimethyl phthalate	ND	5.1	2.0	ug/l		
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.1	2.5	ug/l		
206-44-0	Fluoranthene	ND	5.1	1.0	ug/l		
86-73-7	Fluorene	ND	5.1	1.0	ug/l		
118-74-1	Hexachlorobenzene	ND	5.1	1.0	ug/l		
87-68-3	Hexachlorobutadiene	ND	5.1	2.0	ug/l		
77-47-4	Hexachlorocyclopentadiene	ND	5.1	2.0	ug/l		
67-72-1	Hexachloroethane	ND	5.1	2.0	ug/l		
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.1	2.0	ug/l		
78-59-1	Isophorone	ND	5.1	1.0	ug/l		
91-57-6	2-Methylnaphthalene	ND	5.1	1.0	ug/l		
88-74-4	2-Nitroaniline	ND	5.1	2.0	ug/l		
99-09-2	3-Nitroaniline	ND	5.1	2.0	ug/l		
100-01-6	4-Nitroaniline	ND	5.1	2.0	ug/l		
91-20-3	Naphthalene	ND	5.1	1.0	ug/l		
98-95-3	Nitrobenzene	ND	5.1	1.0	ug/l		
621-64-7	N-Nitroso-di-n-propylamine	ND	5.1	2.0	ug/l		
86-30-6	N-Nitrosodiphenylamine	ND	5.1	2.0	ug/l		
85-01-8	Phenanthrene	ND	5.1	1.0	ug/l		
129-00-0	Pyrene	ND	5.1	1.0	ug/l		
120-82-1	1,2,4-Trichlorobenzene	ND	5.1	1.0	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	52%		19-90%
4165-62-2	Phenol-d5	34%		10-68%
118-79-6	2,4,6-Tribromophenol	83%		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

Report of Analysis

Client Sample ID:	DA3008		
Lab Sample ID:	F17328-1	**Date Sampled:**	04/10/03
Matrix:	AQ - Water	**Date Received:**	04/11/03
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	PBOW		

ABN TCL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	79%		49-119%
321-60-8	2-Fluorobiphenyl	71%		45-118%
1718-51-0	Terphenyl-d14	89%		46-135%

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:** 6/19

Project: Plum Brook **SDG:** F17328, PB043 **Matrix/No. Samples:** W-3

I. Technical Holding Times			
A. Sample Preservation, Handling and Transport			
1. Have all samples been preserved correctly?	Yes	No	N/A
2. Have sample temperatures been kept at 4° C (+ or - 2 °)?	Yes	No	N/A
3. Were all samples received in proper condition?	Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	No	N/A
Coolers @ 3005, 3007 - 1.9°C 3008 - 1.4°C.			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	Yes	No	N/A
2. Were correct analyses performed on samples?	Yes	No	N/A
C. Holding Times			
1. Were samples extracted and analyzed within acceptable holding times?	Yes	No	N/A
2. Were any qualifications required based on this information?	Yes	No	N/A

SAMPLED	PREPPED	ANALYZED
3005, 3007 — 4/10	4/14	4/17
3008 — 4/10	4/15	4/21

II. GC/MS Instrument Performance Check			
1. Were instrument performance check samples run for each analysis period?	Yes	No	N/A
2. Were ion abundance criteria met for DTFPP analysis?	Yes	No	N/A
3. Do laboratory forms match raw data?	Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008 CCAL 4/21@9:13
198 base.
all criteria pass
ICAL 3/14@11:26
all criteria met.

DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS

Reviewer: Kitchings **Date** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **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?	Yes	No	N/A
	2. Were initial calibration RRFs for all volatile target compounds and system monitoring compounds >or = 0.05? Do recalculations for RRFs agree with reported values?	Yes	No	N/A
	3. Were %RSDs < or = 30% for all volatile target compounds? Do recalculations for RSDs agree with reported values?	Yes	No	N/A
	4. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3/14@15:43
RRFs @ >0.05
RSDs, Target <12%.

IV.	Continuing Calibration			
	1. Were continuing calibration samples run at the required frequency, and compared to the correct initial calibration?	Yes	No	N/A
	2. Did calculations from raw data agree with laboratory reported values for RRF and %D?	Yes	No	N/A
	3. Were continuing calibration RRFs for volatile organic compounds and system monitoring compounds (surrogates) > or = 0.05?	Yes	No	N/A
	4. Were %D between initial calibration RRF and the continuing calibration RRFs within + or - 25%?	Yes	No	N/A
	5. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

4/21@ 9:31
target %D's
<17%

DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS

Reviewer: Kitchings **Date** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **Matrix/No. Samples:** w-3

V.	Blanks			
	1. Were any target or non-target compounds reported in laboratory prep or calibration blanks?	Yes	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)?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008 OP7337-MB 4/21 - all nondetects.

3005 ~~140-001~~ ~~144-004~~ 140100-151 4/17 - all u's
3007 ~~H3D110~~-

VI.	System Monitoring Compounds (Surrogate Spikes)			
	1. Were laboratory surrogate recoveries calculated and reported correctly?	Yes	No	N/A
	2. Were surrogate recoveries within acceptable limits?	Yes	No	N/A
	3. Were any qualifications required based on surrogate spike QC information?	Yes	No	N/A

Comments/Qualifications: 3008 34-89%
Range of R's, 3005 64-106
3007 57-101

VII.	Matrix Spikes/Matrix Spike Duplicates			
	1. Were MS/MSD samples analyzed at required frequency for each ample matrix?	Yes	No	N/A
	2. Were MS/MSD results for recovery and RPD within advisory limits?	Yes	No	N/A
	3. Were Samples used for MS/MSD field blanks?	Yes	No	N/A
	4. Were laboratory reported results correctly calculated from raw data?	Yes	No	N/A
	5. Were any qualifications required, based on results of MS/MSD samples in conjunction with other QC information?	Yes	No	N/A

Comments/Qualifications:

3008 OP7337 MS/MSD.
45-103; 39-90
RPDs - 0-26

H3D110144-001
AG1D2/D3
MS 81-105;
MSD. 82-101
RPDs 0.41-6.3

DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS

Reviewer: Kitchings **Date** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **Matrix/No. Samples:** W-3

VIII.	Laboratory Control Sample (LCS)			
	1. Were LCS samples run at correct frequency for each matrix samples?	Yes	No	N/A
	2. Were LCS calculations performed correctly, and did laboratory reported values match raw data? Were recoveries within laboratory QC limits?	Yes	No	N/A
	4. Were any qualifications required based on LCS data in conjunction with other QC information?	Yes	No	N/A

Comments/Qualifications:

3008 4/21
OP7337-BS
all w/in limits

· JJ IAC
4/17
82-101

IX.	Internal Standards			
	1. Were standard area counts within a factor of two (-50% to +100%) from associated calibration standard?	Yes	No	N/A
	2. Were retention times of internal standard within + or - 30 seconds of retention time of associated calibration check?	Yes	No	N/A
	3. Were any qualifications required based on internal standard results?	Yes	No	N/A

Comments/Qualifications:

3008 IS4 $\frac{576481}{511147}$ = 112.8%

all IS's w/in limits RT $\frac{11.06}{11.07}$

X.	Target Compound Identification			
	1. Are relative retention times (RRTs) within + or - 0.06 RRT units of standard RRT?	Yes	No	N/A
	2. Do sample compound spectra meet specified criteria in relation to laboratory standard spectra?	Yes	No	N/A
	3. Were all compounds accounted for on chromatogram?	Yes	No	N/A

Comments/Qualifications: 3008 - no cpds detected
3005 - " " "
3007 - " " "

DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS

Reviewer: Kitchings **Date** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **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: 3008 - no compounds on sample chromatogram.
3005 - " " "
3007 - " " "

XII. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (50% for water samples, 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:
005 007
all ui's

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:

ACCUTEST F17328

SDG: STL - PB043 Project: **Plumbrook**

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

Validation Samples: DA 3005
DA 3007
DA 3008

Data Validation Report Summary

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

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Validator's Signature: J. Thomas Kilbings Date: 6/19/2003

Peer Reviewer: Date:

SHAW E & I INC

Client Sample ID: DA3005

HPLC

Lot-Sample #...: H3D110144-001 **Work Order #...:** FLQAG1AA **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03
Prep Date.....: 04/15/03 **Analysis Date..:** 04/15/03
Prep Batch #...: 3105485
Dilution Factor: 1 **Method.....:** SW846 8330

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
HMX	ND	0.50	ug/L	0.10	u
RDX	ND	0.50	ug/L	0.13	
1,3,5-Trinitrobenzene	ND	0.20	ug/L	0.11	
1,3-Dinitrobenzene	ND	0.20	ug/L	0.080	
Tetryl	ND	0.20	ug/L	0.17	
Nitrobenzene	ND	0.20	ug/L	0.070	
2,4,6-Trinitrotoluene	ND	0.20	ug/L	0.080	
4-Amino-2,6-dinitrotoluene	ND	0.20	ug/L	0.11	
2-Amino-4,6-dinitrotoluene	ND	0.20	ug/L	0.090	
2,6-Dinitrotoluene	ND	0.20	ug/L	0.11	
2,4-Dinitrotoluene	ND	0.20	ug/L	0.070	
2-Nitrotoluene	ND	0.20	ug/L	0.14	
4-Nitrotoluene	ND	0.20	ug/L	0.17	
3-Nitrotoluene	ND	0.20	ug/L	0.13	

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1-Chloro-3-nitrobenzene	94	(53 - 133)

SHAW E & I INC

Client Sample ID: DA3007

HPLC

Lot-Sample #...: H3D110144-004 **Work Order #...:** FLQDC1AM **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03
Prep Date.....: 04/15/03 **Analysis Date..:** 04/15/03
Prep Batch #...: 3105485
Dilution Factor: 1 **Method.....:** SW846 8330

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL	Rev Qual
HMX	ND	0.50	ug/L	0.10	u
RDX	ND	0.50	ug/L	0.13	
1,3,5-Trinitrobenzene	ND	0.20	ug/L	0.11	
1,3-Dinitrobenzene	ND	0.20	ug/L	0.080	
Tetryl	ND	0.20	ug/L	0.17	
Nitrobenzene	ND	0.20	ug/L	0.070	
2,4,6-Trinitrotoluene	ND	0.20	ug/L	0.080	
4-Amino-2,6-dinitrotoluene	ND	0.20	ug/L	0.11	
2-Amino-4,6-dinitrotoluene	ND	0.20	ug/L	0.090	
2,6-Dinitrotoluene	ND	0.20	ug/L	0.11	
2,4-Dinitrotoluene	ND	0.20	ug/L	0.070	
2-Nitrotoluene	ND	0.20	ug/L	0.14	
4-Nitrotoluene	ND	0.20	ug/L	0.17	
3-Nitrotoluene	ND	0.20	ug/L	0.13	

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1-Chloro-3-nitrobenzene	98	(53 - 133)

Accutest Laboratories

Report of Analysis

Client Sample ID:	DA3008		
Lab Sample ID:	F17328-1	**Date Sampled:**	04/10/03
Matrix:	AQ - Water	**Date Received:**	04/11/03
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	n/a
Project:	PBOW		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG006323.D	1	04/16/03	MRE	04/14/03	OP7328	GGG310
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q	Rev Qual
2691-41-0	HMX	ND	0.20	0.077	ug/l		u
121-82-4	RDX	ND	0.20	0.077	ug/l		
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.051	ug/l		
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.051	ug/l		
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.051	ug/l		
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.051	ug/l		
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.051	ug/l		
98-95-3	Nitrobenzene	ND	0.20	0.051	ug/l		
88-72-2	o-Nitrotoluene	ND	0.20	0.051	ug/l		
99-08-1	m-Nitrotoluene	ND	0.20	0.051	ug/l		
99-99-0	p-Nitrotoluene	ND	0.20	0.077	ug/l		
479-45-8	Tetryl	ND	0.20	0.077	ug/l		
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.051	ug/l		
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.051	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	56%		51-137%

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 WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC

Reviewer: Kitchings **Date:** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **Matrix/No. Samples:** W - 3

I. Technical Holding Times			
A. Sample Preservation, Handling and Transport			
1. Have all samples been preserved correctly?	Yes	No	N/A
2. Have sample temperatures been kept at 4° C (+or- 2 ° C)	Yes	No	N/A
3. Were all samples received in proper condition?	Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	No	N/A
Cooler @ ~~2.0~~. 1.4 ° C 1.9 ° C			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	Yes	No	N/A
2. Were correct analyses performed on samples?	Yes	No	N/A
C. Holding Times			
1. Were samples extracted and analyzed within acceptable holding times?	Yes	No	N/A
2. Were any qualifications required based on this information?	Yes	No	N/A

	Sampled	Prepped	Analyzed
	4/10	4/15	4/15
3008	4/10	4/14	4/16

II. Initial Calibration			
1. Were correct numbers and concentrations of standards used for initial calibration standards to establish calibration curve (i.e., water: 9 standards; soil: 7 standards)?	Yes	No	N/A
2. For sample results calculated using initial calibration, was correct standard used for calculating sample result?	Yes	No	N/A
3. Was calibration range within 25% of method range?	Yes	No	N/A
4. Were retention Times (RTs) within acceptable RT windows?	Yes	No	N/A

Comments/Qualifications:

ICAL 4/16 @ 7:50

RSDs Col 1 <10%

Col 2 <10%.

DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC

Reviewer: Kitchings **Date:** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **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?	Yes	No	N/A
	2. Were RTs for all standard compounds in continuing calibration samples within acceptable RT window?	Yes	No	N/A
	3. Were continuing calibration recoveries within control limit of 75-125%?	Yes	No	N/A
	4. Did laboratory reported calculations and data match raw data?	Yes	No	N/A
	5. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008 CCAL 4/16 @ 12:36 @ 19:01

1: <8% 2: <8% <8% <7%

3,4-dnt. $\frac{200-191.93}{200}$ = 4%

IV.	Blanks			
	1. Does data package include summary of method blank results?	Yes	No	N/A
	2. Were any compounds reported in laboratory method blanks?	Yes	No	N/A
	3. Were method blank analyses performed at required frequency?	Yes	No	N/A
	4. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008 OP7328-MB 4/16 - all nondet.

3005, 3007 - IMIAA 4/15 all nondetects

V.	System Monitoring Compounds (Surrogate Spikes)			
	1. Were all samples spiked with correct surrogate compounds?	Yes	No	N/A
	2. Were laboratory surrogate recoveries calculated and reported correctly on data forms?	Yes	No	N/A
	3. Were surrogate recoveries within laboratory established limits? 51-137	Yes	No	N/A
	4. Were any qualifications required based on surrogate spike QC information?	Yes	No	N/A

Comments/Qualifications:

3008 - 56% RT 17.19 / 17.20

3005 - 94% ✓

3007 - 98% ✓

DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC

Reviewer: Kitchings **Date:** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **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%)?	Yes	No	N/A
	2. Were MS/MSD results for recovery (+or- 40%) RPD (<30) within laboratory QC limits?	Yes	No	N/A
	3. Were Samples used for MS/MSD field blanks?	Yes	No	N/A
	4. Were matrix spike recoveries and RPDs calculated and reported correctly?	Yes	No	N/A
	5. Were any qualifications required, based on results of MS/MSD samples in conjunction with other QC information?	Yes	No	N/A

Comments/Qualifications:

3008 OP7328-MS/MSD
100-120 ; 92-108
RPD 6-12

3005
3007 Tetryl @ zero recovery
- ok in the LCS
- no quals.

AG1DWMS/MSD
73-95 ; 71-93

VII.	Laboratory Control Sample (LCS)			
	1. Were LCS samples run?	Yes	No	N/A
	2. If performed, were LCS recoveries within the QC limits?	Yes	No	N/A
	3. If performed, were LCS calculations performed correctly, and did laboratory reported values match raw data?	Yes	No	N/A
	4. Were any qualifications required based on LCS data in conjunction with other QC information?	Yes	No	N/A

Comments/Qualifications:

3008 OP7328-BS 88-100 %
Nitrob. 2.5/2.5 = 100%

IMIAC
4/15
75-93%

DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC

Reviewer: Kitchings **Date:** 6/19

Project: Plumbrook **SDG:** F17328, PB04F3 **Matrix/No. Samples:** W-3

VIII. Field QC Samples			
1. Were field blank or equipment rinsate samples associated with this SDG?	Yes	No	N/A
2. Were any compounds present in any associated field blank samples?	Yes	No	N/A
3. Were any field duplicate pairs analyzed in this SDG?	Yes	No	N/A
4. Were RPDs field duplicate pairs within acceptable limits (+ or -20%)	Yes	No	N/A
5. Were any qualifications required based on field QC information?	Yes	No	N/A

Comments/Qualifications:
3005 - 3007
all nondetect.

IX. Compound Identification			
1. Are relative retention times (RRTs) within acceptable RRT windows?	Yes	No	N/A
2. Were identified compounds confirmed on second column?	Yes	No	N/A
3. Were any qualification required based on this information?	Yes	No	N/A

Comments/Qualifications:
3008 - no compounds detected, 3005 3007 } no cpds detect.

X. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications:

ACCUTEST F17328

SDG: STL PB043 Project: PLUMBROOK

TOTAL/DISSOLVED 7470A

Method: METALS 6010B Matrix/No. of Samples: Water-3

Validation Samples: DA3005
DA3007
DA3008

Data Validation Report Summary

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

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

6a • Al was qualified as "B" in 3005T&D 3007 samples due to contamination in the associated method blank. Likewise Zn in the 3005T and 3007T samples were qualified as "B".

17 • Iron in 3005D and 3007D was qualified as "J" due to a high RPD in the field duplicate analysis.

8a • Fe had a high RPD in the duplicate analysis and the 3008T/D samples were qualified as "J". Sb had a low recovery in the MS/MSD and was qualified "UJ" in sample 3008T/D.

13 • A high %D in the serial dilution resulted in a "J" qualifier for manganese and potassium in samples 3008T/D.

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as

Date: 6/19

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

SHAW E & I INC

Client Sample ID: DA3005

TOTAL Metals

Lot-Sample #...: H3D110144-001 **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 3111123						
Mercury	ND	0.20	ug/L	SW846 7470A	04/21/03	FLQAG1A5
		Dilution Factor: 1		Analysis Time..: 15:00	MDL.....: 0.030	
Prep Batch #...: 3111523						
Aluminum	**137 B,J**	**200**	**ug/L**	**SW846 6010B**	**04/22-04/25/03**	**FLQAG1AE**
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 18.4	
Antimony	ND	60.0	ug/L	SW846 6010B	04/22-04/25/03	FLQAG1AF
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 3.1	
Arsenic	ND	10.0	ug/L	SW846 6010B	04/22-04/25/03	FLQAG1AG
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 2.7	
Barium	**558**	**200**	**ug/L**	**SW846 6010B**	**04/22-04/25/03**	**FLQAG1AH**
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 0.50	
Beryllium	ND	5.0	ug/L	SW846 6010B	04/22-04/25/03	FLQAG1AJ
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 0.22	
Cadmium	ND	5.0	ug/L	SW846 6010B	04/22-04/25/03	FLQAG1AK
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 0.22	
Calcium	**194000 J**	**5000**	**ug/L**	**SW846 6010B**	**04/22-04/25/03**	**FLQAG1AL**
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 10.0	
Chromium	ND	10.0	ug/L	SW846 6010B	04/22-04/25/03	FLQAG1AM
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 1.0	
Cobalt	ND	50.0	ug/L	SW846 6010B	04/22-04/25/03	FLQAG1AN
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 1.0	
Copper	ND	25.0	ug/L	SW846 6010B	04/22-04/25/03	FLQAG1AP
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 1.0	
Iron	**102**	**100**	**ug/L**	**SW846 6010B**	**04/22-04/25/03**	**FLQAG1AQ**
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 16.2	
Lead	ND G	15.0	ug/L	SW846 6010B	04/22-04/25/03	FLQAG1AR
		Dilution Factor: 1		Analysis Time..: 16:26	MDL.....: 0.92	

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SHAW E & I INC

Client Sample ID: DA3005

TOTAL Metals

Lot-Sample #...: H3D110144-001 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	Rev Qual	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Magnesium	**81200 J**	**5000**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQAG1AT**
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 10.2	
Manganese	**79.8**	**15.0**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQAG1AU**
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 0.51	
Nickel	ND	40.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQAG1AV
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 1.4	
Potassium	**19200**	**5000**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQAG1AW**
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 50.0	
Selenium	ND	5.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQAG1AX
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 3.1	
Silver	ND	10.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQAG1A0
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 0.78	
Sodium	**223000**	**5000**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQAG1A1**
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 233	
Thallium	ND	10.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQAG1A2
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 2.9	
Vanadium	ND	50.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQAG1A3
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 1.0	
Zinc	**1.4 B,J**	**20.0**	**ug/L**	~~J~~ ~~BK~~ B 6a	**SW846 6010B**	**04/22-04/25/03**	**FLQAG1A4**
		Dilution Factor: 1			Analysis Time..: 16:26	MDL.....: 0.53	

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.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

SHAW E & I INC

Client Sample ID: DA3005

DISSOLVED Metals

Lot-Sample #...: H3D110144-001 **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03

PARAMETER	RESULT	REPORTING LIMIT	UNITS	Rev Qual	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 3109100							
Aluminum	**135 B,J**	**200**	**ug/L**	B 6a	**SW846 6010B**	**04/19-04/25/03**	**FLQAG1CH**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 18.4	
Antimony	ND	60.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1CJ
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 3.1	
Arsenic	ND	10.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1CK
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 2.7	
Barium	**545**	**200**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQAG1CL**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 0.50	
Beryllium	ND	5.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1CM
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 0.22	
Cadmium	ND	5.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1CN
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 0.22	
Calcium	**188000 J**	**5000**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQAG1CP**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 10.0	
Chromium	ND	10.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1CQ
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 1.0	
Cobalt	**2.0 B**	**50.0**	**ug/L**	J	**SW846 6010B**	**04/19-04/25/03**	**FLQAG1CR**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 1.0	
Copper	ND	25.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1CT
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 1.0	
Iron	**18.8 B**	**100**	**ug/L**	J 17	**SW846 6010B**	**04/19-04/25/03**	**FLQAG1CU**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 16.2	
Lead	ND G	16.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1CV
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 0.92	
Magnesium	**77900 J**	**5000**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQAG1CW**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 10.2	

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SHAW E & I INC

Client Sample ID: DA3005

DISSOLVED Metals

Lot-Sample #...: H3D110144-001 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	Rev Qual	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese	**75.7**	**15.0**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQAG1CX**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 0.51	
Nickel	ND	40.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1C0
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 1.4	
Potassium	**18400**	**5000**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQAG1C1**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 50.0	
Selenium	ND	5.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1C2
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 3.1	
Silver	ND	10.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1C3
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 0.78	
Sodium	**217000**	**5000**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQAG1C4**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 233	
hallium	ND	10.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1C5
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 2.9	
Vanadium	ND	50.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQAG1C6
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 1.0	
Zinc	**1.0 B**	**20.0**	**ug/L**	J	**SW846 6010B**	**04/19-04/25/03**	**FLQAG1C7**
		Dilution Factor: 1			Analysis Time..: 15:24	MDL.....: 0.53	

Prep Batch #...: 3111123

Mercury	**0.056 B**	**0.20**	**ug/L**	J	**SW846 7470A**	**04/21/03**	**FLQAG1C8**
		Dilution Factor: 1			Analysis Time..: 14:54	MDL.....: 0.030	

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.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

SHAW E & I INC

Client Sample ID: DA3007

TOTAL Metals

Lot-Sample #...: H3D110144-004 **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03

PARAMETER	RESULT	REPORTING LIMIT	UNITS	Rev Qual	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 3111123							
Mercury	ND	0.20	ug/L	U	SW846 7470A	04/21/03	FLQDC1AG
		Dilution Factor: 1			Analysis Time..: 15:17	MDL.....: 0.030	
Prep Batch #...: 3111523							
Aluminum	**143 B,J**	**200**	**ug/L**	B ba	**SW846 6010B**	**04/22-04/25/03**	**FLQDC1AQ**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 18.4	
Antimony	ND	60.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1AR
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 3.1	
Arsenic	ND	10.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1AT
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 2.7	
Barium	**585**	**200**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQDC1AU**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 0.50	
Beryllium	ND	5.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1AV
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 0.22	
Cadmium	ND	5.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1AW
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 0.22	
Calcium	**193000 J**	**5000**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQDC1AX**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 10.0	
Chromium	ND	10.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1A0
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 1.0	
Cobalt	ND	50.0	ug/L		SW846 6010B	04/22-04/25/03	FLQDC1A1
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 1.0	
Copper	ND	25.0	ug/L		SW846 6010B	04/22-04/25/03	FLQDC1A2
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 1.0	
Iron	**92.3 B**	**100**	**ug/L**	J	**SW846 6010B**	**04/22-04/25/03**	**FLQDC1A3**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 16.2	
Lead	ND G	14.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1A4
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 0.92	

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SHAW E & I INC

Client Sample ID: DA3007

TOTAL Metals

Lot-Sample #...: H3D110144-004 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	Rev Qual	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Magnesium	**82400 J**	**5000**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQDC1A5**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 10.2	
Manganese	**79.2**	**15.0**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQDC1A6**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 0.51	
Nickel	ND	40.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1A7
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 1.4	
Potassium	**19700**	**5000**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQDC1A8**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 50.0	
Selenium	ND	5.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1A9
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 3.1	
Silver	ND	10.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1AA
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 0.78	
Sodium	**225000**	**5000**	**ug/L**		**SW846 6010B**	**04/22-04/25/03**	**FLQDC1AC**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 233	
Thallium	ND	10.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1AD
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 2.9	
Vanadium	ND	50.0	ug/L	U	SW846 6010B	04/22-04/25/03	FLQDC1AE
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 1.0	
Zinc	**2.0 B,J**	**20.0**	**ug/L**	~~J~~ 17 9Tk B 6a	**SW846 6010B**	**04/22-04/25/03**	**FLQDC1AF**
		Dilution Factor: 1			Analysis Time..: 16:57	MDL.....: 0.53	

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.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

SHAW E & I INC

Client Sample ID: DA3007

DISSOLVED Metals

Lot-Sample #...: H3D110144-004 **Matrix.....:** WATER
Date Sampled...: 04/10/03 **Date Received..:** 04/11/03

PARAMETER	RESULT	REPORTING LIMIT	UNITS	Rev Qual	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 3109100							
Aluminum	**118 B,J**	**200**	**ug/L**	B 6a	**SW846 6010B**	**04/19-04/25/03**	**FLQDC1CT**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 18.4	
Antimony	ND	60.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1CU
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 3.1	
Arsenic	ND	10.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1CV
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 2.7	
Barium	**563**	**200**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQDC1CW**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 0.50	
Beryllium	ND	5.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1CX
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 0.22	
Cadmium	ND	5.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1C0
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 0.22	
Calcium	**191000 J**	**5000**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQDC1C1**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 10.0	
Chromium	ND	10.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1C2
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 1.0	
Cobalt	ND	50.0	ug/L		SW846 6010B	04/19-04/25/03	FLQDC1C3
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 1.0	
Copper	ND	25.0	ug/L		SW846 6010B	04/19-04/25/03	FLQDC1C4
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 1.0	
Iron	**32.5 B**	**100**	**ug/L**	J 17	**SW846 6010B**	**04/19-04/25/03**	**FLQDC1C5**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 16.2	
Lead	ND G	14.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1C6
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 0.92	
Magnesium	**79700 J**	**5000**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQDC1C7**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 10.2	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DA3007

DISSOLVED Metals

Lot-Sample #...: H3D110144-004 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	Rev Qual	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese	**77.3**	**15.0**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQDC1C8**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 0.51	
Nickel	**1.6 B**	**40.0**	**ug/L**	J	**SW846 6010B**	**04/19-04/25/03**	**FLQDC1CA**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 1.4	
Potassium	**18700**	**5000**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQDC1CC**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 50.0	
Selenium	ND	5.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1CD
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 3.1	
Silver	ND	10.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1CE
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 0.78	
Sodium	**220000**	**5000**	**ug/L**		**SW846 6010B**	**04/19-04/25/03**	**FLQDC1CF**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 233	
hallium	ND	10.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1CG
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 2.9	
Vanadium	ND	50.0	ug/L	U	SW846 6010B	04/19-04/25/03	FLQDC1CH
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 1.0	
Zinc	**0.83 B**	**20.0**	**ug/L**	J	**SW846 6010B**	**04/19-04/25/03**	**FLQDC1CJ**
		Dilution Factor: 1			Analysis Time..: 15:55	MDL.....: 0.53	

Prep Batch #...: 3111123

Mercury	ND	0.20	ug/L	U	SW846 7470A	04/21/03	FLQDC1CK
		Dilution Factor: 1			Analysis Time..: 15:15	MDL.....: 0.030	

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.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

Accutest Laboratories

Report of Analysis

Client Sample ID:	DA3008		
Lab Sample ID:	F17328-1	**Date Sampled:**	04/10/03
Matrix:	AQ - Water	**Date Received:**	04/11/03
		Percent Solids:	n/a
Project:	PBOW		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF Rev Qual	Prep	Analyzed	By	Method	Prep Method
Aluminum	69 U	200	69	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Antimony	2.1 U	5.0	2.1	ug/l	1 UJ ca	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Arsenic	3.1 U	10	3.1	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Barium	546	200	1.8	ug/l	1	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Beryllium	0.50 U	5.0	0.50	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Cadmium	0.40 U	5.0	0.40	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Calcium	196000	1000	66	ug/l	1	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Chromium	1.7 U	10	1.7	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Cobalt	0.60 U	50	0.60	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Copper	1.0 U	25	1.0	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Iron	472	300	20	ug/l	1 J ca	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Lead	1.9 B	5.0	1.4	ug/l	1 J	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Magnesium	77300	5000	45	ug/l	1	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Manganese	80.4	15	0.40	ug/l	1 J 13	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Mercury	0.052 U	1.0	0.052	ug/l	1 U	04/17/03	04/21/03	LIR	SW846 7470A	SW846 7470A
Nickel	1.1 U	40	1.1	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Potassium	20200	5000	120	ug/l	1 J 13	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Selenium	3.1 U	10	3.1	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Silver	1.8 U	10	1.8	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Sodium	251000	5000	170	ug/l	1	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Thallium	3.3 U	10	3.3	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Vanadium	0.90 U	50	0.90	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Zinc	8.0 U	20	8.0	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A

RL = Reporting Limit
MDL = Method Detection Limit

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

Accutest Laboratories

Report of Analysis

Client Sample ID:	DA3008		
Lab Sample ID:	F17328-1A	**Date Sampled:**	04/10/03
Matrix:	AQ - Water Filtered	**Date Received:**	04/11/03
		Percent Solids:	n/a
Project:	PBOW		

Metals Analysis

Rev Qual

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	69 U	200	69	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Antimony	2.1 U	5.0	2.1	ug/l	1 UJ 8a	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Arsenic	3.1 U	10	3.1	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Barium	540	200	1.8	ug/l	1	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Beryllium	0.50 U	5.0	0.50	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Cadmium	0.40 U	5.0	0.40	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Calcium	189000	1000	66	ug/l	1	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Chromium	1.7 U	10	1.7	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Cobalt	0.60 U	50	0.60	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Copper	1.0 U	25	1.0	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Iron	305	300	20	ug/l	1 J 8a	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Lead	1.4 U	5.0	1.4	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Magnesium	74700	5000	45	ug/l	1	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Manganese	75.7	15	0.40	ug/l	1 J 13	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Mercury	0.052 U	1.0	0.052	ug/l	1 U	04/17/03	04/21/03	LIR	SW846 7470A	SW846 7470A
Nickel	1.1 U	40	1.1	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Potassium	19000	5000	120	ug/l	1 J 13	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Selenium	3.1 U	10	3.1	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Silver	1.8 U	10	1.8	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Sodium	235000	5000	170	ug/l	1	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Thallium	3.3 U	10	3.3	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Vanadium	0.90 U	50	0.90	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A
Zinc	8.0 U	20	8.0	ug/l	1 U	04/14/03	04/16/03	DM	SW846 6010B	SW846 3010A

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:** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **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?	Yes	No	N/A
2. Have sample temperatures been kept at 4° C (+ or - 2 ° C)?	Yes	No	N/A
3. Were all samples received in proper condition?	Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	No	N/A
Cooler @ 1.4° C 1.9° C			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	Yes	No	N/A
2. Were correct analyses performed on samples?	Yes	No	N/A
C. Holding Times			
1. Were samples analyzed within acceptable holding times?	Yes	No	N/A
2. Were any qualifications required based on this information?	Yes	No	N/A

SAMPLED		PREPPED/ANALYZED	
3005 3007	4/10		
3008	4/10	ICP 4/14 Hg 4/17	4/16 4/21

II. Calibrations			
1. Were proper number of calibration standards used for each analytical instrument used?	Yes	No	N/A
2. Is the calibration correlation coefficient >or = 0.995 for each analytical instrument used?	Yes	No	N/A
3. Are initial and continuing calibration verification %R within 10% (+ or - 1%) acceptance window?	Yes	No	N/A
4. Are CRDL Standard %R within 10% (+ or - 1%) acceptance window?	Yes	No	N/A
5. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008 ICP ICV 94.5-104 CCV 4 94.5-105.3

Range of R's

Hg ICV 103.3 CCV/2 103.3

CRI -76.5-130
70-130

DATA VALIDATION WORKSHEET
METALS

Reviewer: Kitchings **Date:** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **Matrix/No. Samples** W-3

III.	Blanks			
	1. Are any analytes reported in laboratory prep or calibration blanks above the IDL?	Yes	No	N/A
	2. Are any analytes reported as negative values in laboratory prep or calibration blanks?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008
ICP ICB all u's. CCB 5 all u's.
Hg ICB u CCB2 u
Method blank. - all nondetect.

MB - 3005, 3007
D
Al 469 5X 234.5 both
Ca 23.3 116.5
Mg 81.2 1060
Tl 4.0 20.0

MB
D
Al 32.2 161.0 both
Ca 14.4 72.0
Mg 12.9 64.5
Tl 6.3 31.5
Zn 1.1 5.5 - both

IV.	ICP Interference Check Sample (ICS)			
	1. Were ICS samples run at the beginning and end of each sample analysis run?	Yes	No	N/A
	2. Are ICS %R within 80-120% acceptable control limits?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008 - Ca 451000/500000 = 90.2%

all w/in limits.
range. 89.3 - 108.4

V.	Blank Spike/Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 80-120% control limits?	Yes	No	N/A
	2. Are all solid LCS %R within control limits established by EPA?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3008
all w/in limits.
86.7 - 108.3

3005
3007 LCS-DISSOL
ICP 93 - 106
Hg - 96

Total
ICP 100 - 109
Hg - 96

DATA VALIDATION WORKSHEET
METALS

Reviewer: Kitchings **Date:** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **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:

3008 Iron - high RPD - J

$\frac{6040-4710}{(\text{"} + \text{"})/2} = \frac{1330}{5375} = 24.7\%$

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:

3008 Sb - low ms/msd recoveries — UJ

@ 70.6 ; 67.7

3005 DISSOLV.
3007 all w/in limits.

3005 TOTAL
3007 all w/in limits.

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:

3008 Mn @ 13.7 %D
K @ 16.9 %D
↳ J

DATA VALIDATION WORKSHEET
METALS

Reviewer: Kitchings **Date:** 6/19

Project: Plumbrook **SDG:** F17328, PB043 **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	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

			Rpt. As
144-001 3005 T	Ca	✓	19400
	Fe	✓	102
3007 T	Mg	✓	82400
	K	✓	19700
17328-1A 3008 F	Ba	.5400 ppm ✓	540 ug/l ✓
	Na	235.3 ppm ✓	235000 ug/l ✓

X.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (50% for water samples, 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 analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

	3005 T		3007 T	3005 D	3007 D
	u/MB - 137	Al	143	u/MB 135	118
	545	Ba	585	545	563
	194000	Ca	193000	188000	191000
	102	Fe	92.3	18.8	32.5 — 13.7/25.65 = 53.4% J
	81200	Mg	82400	77900	79700
	798	Mn	79.2	75.7	77.3
	19200	K	19700	18400	18700
J - both @ u due to .6/1.7 = 35.2 MB	223000	Na	225000	217000	220000
	1.4	Zn	2.0	1.0	
				20	Ca u

XI.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications:

u Ni 1.6
0.056 Hg u
u Zn 0.83

Attachment 2

Chain of Custody Forms

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB04 10 03STL N

PAGE 1 OF 2

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

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

Project Name/No: PBOW/833886
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 833886.03010000
Required Report Date: 21 days

Sample Shipment Date: 4/10/03
Laboratory Destination: STL-North Canton
Laboratory Contact: Ken Kuzior
Project Contact/Phone: Maureen McMyler/865-690-3211
Carrier Waybill No.: 839702140103

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
DA3005	WATER	4/10/03 1035	2 - Glass	40 mL	H2SO4	TOC by 9060		
			1 - HDPE	1000 mL	Cool	Alkalinity by 310.1; Chloride by 325.2		
						Nitrate by 353.2; Sulfate by 375.4		
						TDS by 160.1; TSS by 160.2		
						Turbidity by 180.1		
			1 - HDPE	250 mL	HNO3	Hardness by 130.2		
DA 3005-MS	WATER	4/10/03 1035	2 - Glass	40 mL	H2SO4	TOC by 9060		
			1 - HDPE	1000 mL	Cool	Alkalinity by 310.1, Chloride by 325.2		
						Nitrate by 353.2; Sulfate by 375.4		
						TDS by 160.1, TSS by 160.2		
						Turbidity by 180.1		
			1 - HDPE	250 mL	HNO3	Hardness by 130.2		
DA 3005-MSD	WATE	4/10/03 1035	2-Glass	40 ml	H_2SO_4	TOC by 9060		
			1-HDPE	1000 ml	Cool	Alkalinity by 310.1; Chloride 325.2		
						Nitrate by 353.2; Sulfate 375.4		
						TDS - 160.1; TSS - 160.2		
						Turbidity - 180.1		
			1-HDPE	250 ml	HNO_3	Hardness - 130.2		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: David Kessler - Shaw	Date: 4/10/03 Time: 1800	1. Received by: [signature]	Date: 4-11-03 Time: 950
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

H3D110144

Shaw™
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB04 10 03STL K

PAGE 2 OF 2

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

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

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 833886.03010000
Required Report Date: 21 DAYS

Sample Shipment Date: 4/10/03
Laboratory Destination: STL-Knoxville
Laboratory Contact: Jamie McKinney
Project Contact/Phone: Maureen McMyler/865-690-3211
Carrier Waybill No.: 839702 140099

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
DA3001	WATER	4/10/03	1 - Amber	1 L	Cool	Explosives by 8830		
			1 - HDPE	~~500~~ 250 mL	HNO3	Total TAL Metals by 6010B/7470A PH<2		
			1 - HDPE	~~500~~ 250 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			3 - Glass	40 mL	HCL	TCL VOCs by 8260B		
			1 - HDPE	1000 mL	NaOH	Cyanide by 9010A PH>12		
DA3007	WATER	4/10/03 1035	1 - Amber	1 L	Cool	Explosives by 8830		
			1 - HDPE	~~500~~ 250 mL	HNO3	Total TAL Metals by 6010B/7470A PH<2		
			1 - HDPE	~~500~~ 250 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			3 - Glass	40 mL	HCL	TCL VOCs by 8260B		
			1 - HDPE	1000 mL	NaOH	Cyanide by 9010A	Did not receive 4-11-03	
	WATER		2 - Glass	40 mL	HCL	TCL VOCs by 8260B		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: David Kessler-Shaw	Date: 4/10/03 Time: 1800	1. Received by: Greg B. Sharp	Date: 4/11/03 Time: 9:30
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

174

Shaw™
Shaw E & I, Inc.

F17328

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB04 10 03ACC

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000011

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 833886.03010000
Required Report Date: 21 days

Sample Shipment Date: 4/10/03
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Maureen McMyler/865-560-5271
Carrier Waybill No.: 839702140114

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

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

	Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1	DA3008	WATER	4/10/03 1035	1 - Amber	1 L	Cool	Explosives by 8830		
1	DA3008	WATER	4/10/03 1035	1 - HDPE	250 ~~500~~ mL DKK 4/10/03	HNO3	Total TAL Metals by 6010B/7470A		
1	DA3008	WATER	4/10/03 1035	1 - HDPE	250 ~~500~~ mL DKK 4/10/03	HNO3	Dissolved TAL Metals by 6010B/7470A		
1	DA3008	WATER	4/10/03 1035	2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
1	DA3008	WATER	4/10/03 1035	3 - Glass	40 mL	Cool	TCL VOCs by 8260B		
2	DA5005	WATER	4/10/03 ~~1035~~ DKK 4/10/03	2 - Glass	40 mL	Cool	TCL VOCs by 8260B		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler Shaw	Date: 4/10/03 Time: 1800	1. Received by: FED EX	Date: Time:
2. Relinquished by: FED EX	Date: Time:	2. Received by: Muna Mohammed	Date: 4/11/03 Time: 0915
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

1.4

Attachment 3

Project Data

[USER_TEST_GROUP] = VOLATILES

LOCATION_CODE			PBOW H3D110144		PBOW H3D110144		PBOW-F17328	
SAMPLE_NO			DA3005		DA3007		DA3008	
SAMPLE_DATE			10-Apr-03		10-Apr-03		10-Apr-03	
SAMPLE_PURPOSE			REG		FD		FS	
Parameter	Units	Filtered	Result	Qual	Result	Qual	Result	Qual
Acetone	ug/L	N	10	U	2.3	J	50	U
Benzene	ug/L	N	1	U	1	U	1	U
Bromodichloromethane	ug/L	N	1	U	1	U	2	U
Bromoform	ug/L	N	1	U	1	U	2	U
Bromomethane	ug/L	N	2	U	0.52	J		
Butanone, 2-	ug/L	N	5	U	5	U		
Carbon disulfide	ug/L	N	1.5		2.3		1.5	J
Carbon tetrachloride	ug/L	N	1	U	1	U	2	U
Chlorobenzene	ug/L	N	1	U	1	U	2	U
Chloroethane	ug/L	N	2	U	2	U	5	U
Chloroform	ug/L	N	1	U	1	U	2	U
Chloromethane	ug/L	N	2	U	2	U		
Dibromochloromethane	ug/L	N	1	U	1	U	2	U
Dichloroethane, 1,1-	ug/L	N	1	U	1	U	2	U
Dichloroethane, 1,2-	ug/L	N	1	U	1	U	2	U
Dichloroethene, 1,1-	ug/L	N	1	U	1	U	2	U
Dichloroethene, 1,2-	ug/L	N	1	U	1	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	1	U	1	U	2	U
Dichloropropene, cis-1,3-	ug/L	N	1	U	1	U	2	U
Dichloropropene, trans-1,3-	ug/L	N	1	U	1	U	2	U
Ethylbenzene	ug/L	N	1	U	1	U	2	U
Hexanone, 2-	ug/L	N	5	U	5	U	10	U
Methyl bromide	ug/L	N					2	U
Methyl chloride	ug/L	N					2	U
Methyl-2-pentanone, 4-	ug/L	N	5	U	5	U	10	U
Methyl ethyl ketone	ug/L	N					10	U
Methylene chloride	ug/L	N	2	U	2	U	5	U
Styrene	ug/L	N	1	U	1	U	2	U
Tetrachloroethane, 1,1,2,2-	ug/L	N	1	U	1	U	2	U
Tetrachloroethene	ug/L	N	1	U	1	U	2	U
Toluene	ug/L	N	1	U	1	U	2	U
Trichloroethane, 1,1,1-	ug/L	N	1	U	1	U	2	U
Trichloroethane, 1,1,2-	ug/L	N	1	U	1	U	2	U
Trichloroethene	ug/L	N	1	U	1	U	2	U
Vinyl chloride	ug/L	N	1	U	1	U	1	U
Xylenes, total	ug/L	N	1	U	1	U	6	U

[USER_TEST_GROUP] = EXPLOSIVES

LOCATION_CODE			PBOW-H3D110144		PBOW-H3D110144		PBOW-F17328
SAMPLE_NO			DA3005		DA3007		DA3008
SAMPLE_DATE			10-Apr-03		10-Apr-03		10-Apr-03
SAMPLE_PURPOSE			REG		FD		FS
Parameter	Units	Filtered	Result	Qual	Result	Qual	Result	Qual
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

[USER_TEST_GROUP] = SEMIVOLATILES

LOCATION_CODE			PBOW-H3D110144		PBOW-H3D110144		PBOW-F17328	
SAMPLE_NO			DA3005		DA3007		DA3008	
SAMPLE_DATE			10-Apr-03		10-Apr-03		10-Apr-03	
SAMPLE_PURPOSE			REG		FD		FS	
Parameter	Units	Filtered	Result	Qual	Result	Qual	Result	Qual
Acenaphthene	ug/L	N	10	U	10	U	5.1	U
Acenaphthylene	ug/L	N	10	U	10	U	5.1	U
Anthracene	ug/L	N	10	U	10	U	5.1	U
Benzoic acid	ug/L	N					25	U
Benzo(a)anthracene	ug/L	N	10	U	10	U	5.1	U
Benzo(a)pyrene	ug/L	N	10	U	10	U	5.1	U
Benzo(b)fluoranthene	ug/L	N	10	U	10	U	5.1	U
Benzo(ghi)perylene	ug/L	N	10	U	10	U	5.1	U
Benzo(k)fluoranthene	ug/L	N	10	U	10	U	5.1	U
Bis(2-chloroethoxy)methane	ug/L	N	10	U	10	U	5.1	U
Bis(2-chloroethyl)ether	ug/L	N	10	U	10	U	5.1	U
Bis(2-chloroisopropyl)ether	ug/L	N	10	U	10	U	5.1	U
Bis(2-ethylhexyl)phthalate	ug/L	N	10	U	10	U	5.1	U
Bromophenyl phenyl ether, 4-	ug/L	N	10	U	10	U	5.1	U
Butyl benzyl phthalate	ug/L	N	10	U	10	U	5.1	U
Carbazole	ug/L	N	10	U	10	U	5.1	U
Chloro-3-methylphenol, 4-	ug/L	N	10	U	10	U	5.1	U
Chloroaniline, 4-	ug/L	N	10	U	10	U	5.1	U
Chloronaphthalene, 2-	ug/L	N	10	U	10	U	5.1	U
Chlorophenol, 2-	ug/L	N	10	U	10	U	5.1	U
Chlorophenyl phenyl ether, 4-	ug/L	N	10	U	10	U	5.1	U
Chrysene	ug/L	N	10	U	10	U	5.1	U
Di-n-butyl phthalate	ug/L	N	10	U	10	U	5.1	U
Di-n-octyl phthalate	ug/L	N	10	U	10	U	5.1	U
Dibenz(a,h)anthracene	ug/L	N	10	U	10	U	5.1	U
Dibenzofuran	ug/L	N	10	U	10	U	5.1	U
Dinitro-o-cresol,4,6-	ug/L	N					10	U
Dichlorobenzene, 1,2-	ug/L	N	10	U	10	U	5.1	U
Dichlorobenzene, 1,3-	ug/L	N	10	U	10	U	5.1	U
Dichlorobenzene, 1,4-	ug/L	N	10	U	10	U	5.1	U
Dichlorobenzidine, 3,3'-	ug/L	N	50	U	50	U	10	U
Dichlorophenol, 2,4-	ug/L	N	10	U	10	U	5.1	U
Diethyl phthalate	ug/L	N	10	U	10	U	5.1	U
Dimethyl phthalate	ug/L	N	10	U	10	U	5.1	U
Dimethylphenol, 2,4-	ug/L	N	10	U	10	U	5.1	U
Dinitro-2-methylphenol, 4,6-	ug/L	N	50	U	50	U	9.7	U
Dinitrophenol, 2,4-	ug/L	N	50	U	50	U	25	U
Dinitrotoluene, 2,4-	ug/L	N	10	U	10	U	5.1	U
Dinitrotoluene, 2,6-	ug/L	N	10	U	10	U	5.1	U

Fluoranthene	ug/L	N	10 U	10 U	5.1 U
Fluorene	ug/L	N	10 U	10 U	5.1 U
Hexachlorobenzene	ug/L	N	10 U	10 U	5.1 U
Hexachlorobutadiene	ug/L	N	10 U	10 U	5.1 U
Hexachlorocyclopentadiene	ug/L	N	50 U	50 U	5.1 U
Hexachloroethane	ug/L	N	10 U	10 U	5.1 U
Indeno(1,2,3-cd)pyrene	ug/L	N	10 U	10 U	5.1 U
Isophorone	ug/L	N	10 U	10 U	5.1 U
Methylnaphthalene, 2-	ug/L	N	10 U	10 U	5.1 U
Methylphenol, 2-	ug/L	N	10 U	10 U	5.1 U
Methylphenol, 4-	ug/L	N	10 U	10 U	5.1
Methylphenol, 3- and 4-	ug/L	N			5.1 U
n-Nitroso-di-n-propylamine	ug/L	N	10 U	10 U	5.1 U
n-Nitrosodiphenylamine	ug/L	N	10 U	10 U	5.1 U
Naphthalene	ug/L	N	10 U	10 U	5.1 U
Nitroaniline, 2-	ug/L	N	50 U	50 U	5.1 U
Nitroaniline, 3-	ug/L	N	50 U	50 U	5.1 U
Nitroaniline, 4-	ug/L	N	50 U	50 U	5.1 U
Nitrobenzene	ug/L	N	10 U	10 U	5.1 U
Nitrophenol, 2-	ug/L	N	10 U	10 U	5.1 U
Nitrophenol, 4-	ug/L	N	50 U	50 U	25 U
Pentachlorophenol	ug/L	N	50 U	50 U	25 U
Phenanthrene	ug/L	N	10 U	10 U	5.1 U
Phenol	ug/L	N	10 U	10 U	5.1 U
Pyrene	ug/L	N	10 U	10 U	5.1 U
Trichlorobenzene, 1,2,4-	ug/L	N	10 U	10 U	5.1 U
Trichlorophenol, 2,4,5-	ug/L	N	10 U	10 U	5.1 U
Trichlorophenol, 2,4,6-	ug/L	N	10 U	10 U	5.1 U

[USER_TEST_GROUP] = METALS

LOCATION_CODE			PBOW-H3D110144		PBOW-H3D110144		PBOW-F17328	
SAMPLE_NO			DA3005		DA3007		DA3008	
SAMPLE_DATE			10-Apr-03		10-Apr-03		10-Apr-03	
SAMPLE_PURPOSE			REG		FD		FS	
Parameter	Units	Filtered	Result	Qual	Result	Qual	Result	Qual
Aluminum	ug/L	N	137	B,J	143	B,J	69	U
Aluminum	ug/L	Y	135	B,J	118	B,J	69	U
Antimony	ug/L	N	60	U	60	U	2.1	U
Antimony	ug/L	Y	60	U	60	U	2.1	U
Arsenic	ug/L	N	10	U	10	U	3.1	U
Arsenic	ug/L	Y	10	U	10	U	3.1	U
Barium	ug/L	N	558		585		546	
Barium	ug/L	Y	545		563		540	
Beryllium	ug/L	N	5	U	5	U	0.5	U
Beryllium	ug/L	Y	5	U	5	U	0.5	U
Cadmium	ug/L	N	5	U	5	U	0.4	U
Cadmium	ug/L	Y	5	U	5	U	0.4	U
Calcium	ug/L	N	194000	J	193000	J	196000	
Calcium	ug/L	Y	188000	J	191000	J	189000	
Chromium	ug/L	N	10	U	10	U	1.7	U
Chromium	ug/L	Y	10	U	10	U	1.7	U
Cobalt	ug/L	N	50	U	50	U	0.6	U
Cobalt	ug/L	Y	2	B	50	U	0.6	U
Copper	ug/L	N	25	U	25	U	1	U
Copper	ug/L	Y	25	U	25	U	1	U
Iron	ug/L	N	102		92.3	B	472	
Iron	ug/L	Y	18.8	B	32.5	B	305	
Lead	ug/L	N	3	U	3	U	1.9	B
Lead	ug/L	Y	3	U	3	U	1.4	U
Magnesium	ug/L	N	81200	J	82400	J	77300	
Magnesium	ug/L	Y	77900	J	79700	J	74700	
Manganese	ug/L	N	79.8		79.2		80.4	
Manganese	ug/L	Y	75.7		77.3		75.7	
Mercury	ug/L	N	0.2	U	0.2	U	0.052	U
Mercury	ug/L	Y	0.0056	B	0.2	U	0.052	U
Nickel	ug/L	N	40	U	40	U	1.1	U
Nickel	ug/L	Y	40	U	40	U	1.1	U
Potassium	ug/L	N	19200		19700		20200	
Potassium	ug/L	Y	18400		18700		19000	
Selenium	ug/L	N	5	U	5	U	3.1	U
Selenium	ug/L	Y	5	U	5	U	3.1	U
Silver	ug/L	N	10	U	10	U	1.8	U
Silver	ug/L	Y	10	U	10	U	1.8	U
Sodium	ug/L	N	223000		225000		251000	

Sodium	ug/L	Y	217000	220000	235000
Thallium	ug/L	N	10 U	10 U	3.3 U
Thallium	ug/L	Y	10 U	10 U	3.3 U
Vanadium	ug/L	N	50 U	50 U	0.9 U
Vanadium	ug/L	Y	50 U	50 U	0.9 U
Zinc	ug/L	N	1.4 B,J	2 B,J	8 U
Zinc	ug/L	Y	1 B	0.83 B	8 U