

F03-025

0066554

Date: 24 March 2005
 To: Fluor Hanford Inc. (technical representative)
 From: TechLaw, Inc.
 Project: 200-LW-1/LW-2 Characterization - Soil
 Subject: Wet Chemistry - Data Package No. W04380



INTRODUCTION

This memo presents the results of data validation on Data Package No. W04380 prepared by Severn Trent. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B19188	10/20/04	Soil	C	See note 1
B19189	10/26/04	Soil	C	See note 1
B193K1	10/26/04	Soil	C	See note 2

- 1 - Anions by 300.0, pH by 045C, ammonia by 350.1 and cyanide by 9010A.
- 2 - Chromium VI by 7196A, nitrate/nitrite by 353.1, oil & grease by 9071A and total sulfide by (9030).

Data validation was conducted in accordance with the FHI validation statement of work and the 200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan (DOE/RL-2001-66, Draft A, Redline, May 2002). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times/Sample Preservation**

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 30 days for chromium VI; 28 days for ammonia, nitrate/nitrite, oil & grease, chloride, fluoride and sulfate; 14 days for cyanide; 7 days for sulfide; and immediate (24 hours) for pH.

If holding times are exceeded, but not by greater than two times the limit, all

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associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".

Due to the holding time being exceeded by less than twice the limit, the cyanide result in sample B19189 was qualified as an estimate and flagged "J".

Due to the holding time being exceeded by greater than twice the limit, all sulfide results were rejected and flagged "R".

Due to the holding time being exceeded by greater than twice the limit, the cyanide result in sample B19188 was rejected and flagged "R".

All other holding times were acceptable.

- **Method Blanks**

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

Due to method blank contamination, all chloride results were qualified as estimates and flagged "UJ".

All other method blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Matrix Spike

Matrix spike (MS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike and LCS

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recoveries must fall within the range of 75% to 125%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to the lack of a matrix spike analysis, all analytes in sample B19188 were qualified as estimates and flagged "J".

All other matrix spike recovery results were acceptable.

Laboratory Control Sample

The LCS is used to monitor the overall performance of all steps in the analysis. Recoveries must fall within the range of 80% to 120% for LCS analysis. Samples with a recovery of less than 50% are rejected and flagged "UR". Samples with a recovery of 50% to 79% and a sample recovery below the IDL are qualified "UJ". Samples with a recovery of greater than 120% or less than 80% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 120% and a sample result less than the IDL, no qualification is required.

All LCS results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 35%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

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- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required target quantitation limits (RTQLs) to ensure that laboratory detection levels meet the required criteria. The cyanide, ammonia, oil & grease and sulfide results in all samples were reported above the RTQL. Under the FHI statement of work, no qualification is required. All other results met the RTQL.

- **Completeness**

Data package No. W04380 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 88%.

MAJOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all sulfide results were rejected and flagged "R". Due to the holding time being exceeded by greater than twice the limit, the cyanide result in sample B19188 was rejected and flagged "R". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J". Due to the holding time being exceeded by less than twice the limit, the cyanide result in sample B19189 was qualified as an estimate and flagged "J". Due to method blank contamination, all chloride results were qualified as estimates and flagged "UJ". Due to the lack of a matrix spike analysis, all analytes in sample B19188 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The cyanide, ammonia, oil & grease and sulfide results in all samples were reported above the RTQL. Under the FHI statement of work, no qualification is required. All other results met the RTQL.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001-66, Draft A, Redline, *200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan*, May 2002.

Appendix 1

Glossary of Data Reporting Qualifiers

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Qualifiers which may be applied by data validators in compliance with FHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

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Appendix 2

Summary of Data Qualification

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WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: W04380	REVIEWER: TLI	DATE: 3/24/05	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
pH	J	All	Holding time
Cyanide	J	B19189	Holding time
Sulfide	R	All	Holding time
Cyanide	R	B19188	Holding time
All	J	B19188	No matrix spike analysis
Chloride	UJ	All	Blank contamination

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: FLUOR-HANFORD								
Laboratory: Severn Trent								
Case:		SDG: W04380						
Sample Number		B19188		B19189		B193K1		
Remarks								
Sample Date		10/20/04		10/26/04		10/26/04		
General Chemistry		RTQL	Result	Q	Result	Q	Result	Q
Chromium VI		0.5	NA		NA		ND	U
Nitrate/Nitrite			NA		NA		24.9	
Oil & Grease		200	NA		NA		ND	U
Total Sulfide		5	NA		NA		ND	UR
pH**			10.1	J	10.2	J	NA	
Chloride		2	2.5	UJ	1.8	UJ	NA	
Fluoride		5	2.3	J	3.4		NA	
Ammonia		0.5	ND	UJ	ND		U	NA
Sulfate		5	9.6	J	12.6		NA	
Total cyanide		0.5	ND	UR	ND		UJ	NA

NA - Not analyzed
 ** - Units are pH units

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FLUOR HANFORD IC

Client Sample ID: B19188

General Chemistry

Lot-Sample #...: F4K120109-001 Work Order #...: GWTXX Matrix.....: SOLID
 Date Sampled...: 10/20/04 Date Received...: 11/11/04
 % Moisture.....: 5.3

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Phosphate as P, Ortho	25.2	5.3	mg/kg	MCAWW 300.0A	11/16/04	4322164
				Dilution Factor: 1	MDL.....: 0.53	
pH (solid)	10.1 J	0.10	No Units	SW846 9045C	11/16/04	4321162
				Dilution Factor: 1	MDL.....:	
Chloride	2.5 ^{5/8} UT <i>sk</i>	2.1	mg/kg	MCAWW 300.0A	11/16/04	4322160
				Dilution Factor: 1	MDL.....: 0.46	
Fluoride	2.3 J	1.1	mg/kg	MCAWW 300.0A	11/16/04	4322161
				Dilution Factor: 1	MDL.....: 0.11	
Nitrate	3.8	0.21	mg/kg	MCAWW 300.0A	11/16/04	4322162
				Dilution Factor: 1	MDL.....: 0.042	
Nitrite	0.77	0.21	mg/kg	MCAWW 300.0A	11/16/04	4322163
				Dilution Factor: 1	MDL.....: 0.042	
Nitrogen, as Ammonia	ND J <i>sk</i>	0.53	mg/kg	MCAWW 350.1	11/16/04	4321483
				Dilution Factor: 1	MDL.....: 0.061	
Percent Moisture	5.3	0.10	%	MCAWW 160.3 MOD	11/17-11/18/04	4322080
				Dilution Factor: 1	MDL.....:	
Sulfate	9.6 J	5.3	mg/kg	MCAWW 300.0A	11/16/04	4322165
				Dilution Factor: 1	MDL.....: 0.39	
Total Cyanide	ND UR	0.53	mg/kg	SW846 9010A	11/22/04	4327472
				Dilution Factor: 1	MDL.....: 0.13	

NOTE(S):

RL Reporting Limit
 Results and reporting limits have been adjusted for dry weight.
 I Method blank contamination. The associated method blank contains the target analyte at a reportable level.

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 3/21/04

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FLUOR HANFORD IC

Client Sample ID: B19189

General Chemistry

Lot-Sample #....: F4K100333-002 Work Order #....: GWNFG Matrix.....: SOLID
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 % Moisture.....: 6.6

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Phosphate as P, Ortho	36.6 3/21/04	5.4	mg/kg	MCAWW 300.0A	11/10/04	4316163
				Dilution Factor: 1 MDL.....: 0.54		
pH (solid)	10.2	0.10	No Units	SW846 9045C	11/16/04	4321162
				Dilution Factor: 1 MDL.....:		
Chloride	1.8 ^B 3/21/04	2.1	mg/kg	MCAWW 300.0A	11/10/04	4316165
				Dilution Factor: 1 MDL.....: 0.47		
Fluoride	3.4 J	1.1	mg/kg	MCAWW 300.0A	11/10/04	4316160
				Dilution Factor: 1 MDL.....: 0.11		
Nitrate	7.8 3/21/04	0.21	mg/kg	MCAWW 300.0A	11/10/04	4316161
				Dilution Factor: 1 MDL.....: 0.042		
Nitrite	0.44 3/21/04	0.21	mg/kg	MCAWW 300.0A	11/10/04	4316162
				Dilution Factor: 1 MDL.....: 0.043		
Nitrogen, as Ammonia	ND	0.54	mg/kg	MCAWW 350.1	11/11/04	4316531
				Dilution Factor: 1 MDL.....: 0.23		
Percent Moisture	6.6	0.10	%	MCAWW 160.3 MOD	11/17-11/18/04	4322080
				Dilution Factor: 1 MDL.....:		
Sulfate	12.6	5.4	mg/kg	MCAWW 300.0A	11/10/04	4316164
				Dilution Factor: 1 MDL.....: 0.40		
Total Cyanide	ND J	0.54	mg/kg	SW846 9010A	11/22/04	4327472
				Dilution Factor: 1 MDL.....: 0.13		

NOTE(S):

- RL Reporting Limit
- Results and reporting limits have been adjusted for dry weight.
- B Estimated result. Result is less than RL.
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Handwritten signature and date: 3/21/04

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FLUOR HANFORD IC

Client Sample ID: B193K1

General Chemistry

Lot-Sample #....: F4K100333-001 Work Order #....: GWNAE Matrix.....: SOLID
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 % Moisture.....: 4.5

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	ND	0.40	mg/kg	SW846 7196A	11/11/04	4317200
		Dilution Factor: 1		MDL.....: 0.25		
Nitrate/Nitrite as N	24.9	0.50	mg/kg	MCAWW 353.1	11/15/04	4320217
		Dilution Factor: 1		MDL.....: 0.036		
Oil and Grease (Gravimetric)	ND	419	mg/kg	SW846 9071A	11/23-11/24/04	4328355
		Dilution Factor: 2		MDL.....: 173		
Percent Moisture	4.5	0.10	%	MCAWW 160.3 MOD	11/17-11/18/04	4322080
		Dilution Factor: 1		MDL.....:		
Total Sulfide	ND <i>UR</i>	10.5	mg/kg	SW846 9030	11/24/04	4334155
		Dilution Factor: 1		MDL.....: 7.6		

NOTE(S):

RL Reporting Limit
 Results and reporting limits have been adjusted for dry weight.

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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Case Narrative
SDG: W04380

This report contains the analytical results for the four samples received under chain of custody by STL St. Louis between November 10, 2004 and November 19, 2004. These samples are associated with your F03-025 SAF. The SDG was closed on 11/24/04.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Samples were received at the laboratory after the holding time had expired for several of the requested tests.

Volatiles

The LCS recoveries for batch 4317380 are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable LCS recoveries.

The MS/MSD recoveries are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable MS/MSD recoveries.

Case Narrative
SDG: W04380

Anions

The MS recovery for Nitrite was outside the QC limits. The anion matrix spike solution contains all routine anions. Spiking technique, sample preparation and method compliance is demonstrated by the remaining acceptable MS recoveries. Poor matrix spike recovery is attributed to matrix interference.

Nitrate

The MS recovery for Nitrate is outside the established QC limits. A matrix interference is physically evident in the sample. Method performance is demonstrated by acceptable LCS and LCS-Duplicate recoveries. No further action is required.

PCB

Due to its extremely high radiation readings, sample B19189 was analyzed at an initial ten fold dilution. The reporting limit has been adjusted for the dilution. Surrogates were diluted out.

The MS/MSD sample required at least a twenty fold dilution, making recoveries for the MS/MSD unreliable. There was no reportable data for the MS/MSD. LCS recoveries were acceptable.

Continuing Calibration Checks 200, 208 and 216 all failed low for Aroclor 1016 and 1260 on the confirmation channel (A). All recoveries were acceptable on Channel B, which is where these samples were reported from.

Mercury

Analysis of the sample designated for MS/MSD resulted in a sufficiently high concentration such that the MS/MSD are above the instrument's calibration range. MS/MSD results should be considered estimated values.

Semi-Volatiles

Due to sample matrix, limited volume and RAD levels, an MS/MSD was not run for method 8270 on a sample from this SDG.

There was insufficient volume of sample B19188 provided to perform the analysis at the method specified amount due to laboratory request to limit volume due to high RAD levels. A reduced sample amount was prepared. The reporting limit has been elevated accordingly.

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STL ST. LOUIS

Case Narrative

SDG: W04380

Metals

The MS/MSD recoveries for sample B19189 for Antimony, Chromium and Nickel are outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

The MS/MSD recovery in sample B191F1 for Chromium, Copper and Lead is outside the established QC limits. The concentration of these metals in the original sample is greater than four times the amount spiked, making percent recovery information ineffective. The MS/MSD recovery for Antimony, Nickel and Silver is outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

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STL ST. LOUIS

LOT# FAK100333

SDG# W04380

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FLUOR Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-125	PAGE 1 OF 1
COLLECTOR Pope/Pfister/Hughes/Wiberg		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ	
SAMPLING LOCATION 216-T-28; 22.5ft-25ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025		PRICE CODE BN AIR QUALITY <input type="checkbox"/> DATA TURNAROUND 45 Days / 45 Days	
ICE CHEST NO. GRD-04-003		FIELD LOGBOOK NO. HNF-N-356 1		COA 119143E510		METHOD OF SHIPMENT Federal Express	
SHIPPED TO Severn Trent Incorporated, ^{Richland} Richland ^{OH} OH ⁴³⁰⁷¹ 43071		OFFSITE PROPERTY NO. See Shipment # DJ020		BILL OF LADING/AIR BILL NO. See Shipment # DJ020			
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A	PRESERVATION Cool 4C None					
		TYPE OF CONTAINER		gG	gG		
		NO. OF CONTAINER(S)		1	1		
	VOLUME		150 125ml 120 ml	60ml			
SPECIAL HANDLING AND/OR STORAGE Radioactive TIL TO: B91C7		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS		SEE ITEM (2) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME				
B193K1	SOIL	10-26-04	0941	X	X		
CHAIN OF POSSESSION				SIGN/ PRINT NAMES			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/ STORED IN		DATE/TIME	
JSPope/LAgh		10-26-04 1230		Site fridge		10-26-04 1230	
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/ STORED IN		DATE/TIME	
Site fridge		11/04/04 950		Greg Thomas / Greg Thomas		11/04/04 950	
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/ STORED IN		DATE/TIME	
Greg Thomas / Greg Thomas		11/04/04 1135		MO-026 Frig #3		11/04/04 1135	
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/ STORED IN		DATE/TIME	
MO-026 Frig #3		11/04/04 0820		Greg Thomas / Greg Thomas		11/04/04 0820	
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/ STORED IN		DATE/TIME	
Greg Thomas / Greg Thomas		11/04/04 0835		Fed Ex			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/ STORED IN		DATE/TIME	
				B- [Signature]		11-1-04 Office	
LABORATORY SECTION				SPECIAL INSTRUCTIONS			
RECEIVED BY		DATE/TIME		(1)Chromium Hex - 7196; NO2/NO3 - 353.1; Sulfides - 9030; Oil & Grease - 413.1;			
B- [Signature]		11/10/04 0900		(2)Nickel-63; Gamma Spec - Radium (Ra-226), Radium-228; Technetium-99; Isotopic Thorium (Thorium-232) Strontium-89,90 -- Total Sr; Tritium - H3; Carbon-14;			
FINAL SAMPLE DISPOSITION				DISPOSED BY			
DISPOSAL METHOD				DATE/TIME			

500g, 250g, 2x120g bag

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-057		PAGE 1 OF 2			
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE BN			
SAMPLING LOCATION 216-T-28; 22.5R-25R		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>		DATA TURNAROUND 45 Days / 45 Days			
ICE CHEST NO. GRP-04-003		FIELD LOGBOOK NO. HNF-N-356-1		COA 119143E510		METHOD OF SHIPMENT Government Vehicle					
SHIPPED TO Waste Sampling & Characterization Severn Trent		OFFSITE PROPERTY NO. AT 11/09/04 See Shipment # D1020		BILL OF LADING/AIR BILL NO. AT 11/09/04 See Shipment # D1020							
MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid Q=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WJ=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A	PRESERVATION		Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None	
		TYPE OF CONTAINER		Gs*	aG	aG	Gs*	P	aG	aG	
		NO. OF CONTAINER(S)		3	1	1	3	1	1	1	
		VOLUME		40mL	120mL	120mL	40mL	500mL	250mL	120mL	
SPECIAL HANDLING AND/OR STORAGE Radioactive tree to: R191C7		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	FCB - 8042	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B19189	SOIL	10-26-04	0941	X	X	X	X	X	X	X	
CHAIN OF POSSESSION				SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME		SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS W04380			
J.S. RPE/AS/HR		10-26-04 1230		Site Fridge		10-26-04 1230					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
Site Fridge		11/04/04 0950		Greg Thomas Aug Thomas		11/04/04 0950					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
Greg Thomas Aug Thomas		11/04/04 1135		MO-026 Fridge #3		11/04/04 1135					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
MO-026 Fridge #3		11/09/04 0820		Greg Thomas Aug Thomas		11/09/04 0820					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
Greg Thomas Aug Thomas		11/09/04 0835		Fed Ex							
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
LABORATORY SECTION		RECEIVED BY				TITLE				DATE/TIME	
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD				DISPOSED BY				DATE/TIME	

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STL ST. LOUIS

Floor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F03-025-057	PAGE 2 OF 2
COLLECTOR Pope/Pfister/Wiberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ		PRICE CODE 2A EN ST 11/04/04	DATA TURNAROUND 24 Hours 45 days
SAMPLING LOCATION 216-T-28; 22.5ft-25ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GRP-04-003	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle			
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. ST 11/01/04 Shipment # DJ020		BILL OF LADING/AIR BILL NO. ST 11/09/04 Shipment # DJ020			
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1)VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Butanol) (2)Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA - 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3)Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol) (4)Gamma Spectroscopy (Caesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241; ST 11/04/04 (5)ICP/MS - 200.0 (TAL) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6010A (Add-on) (Bismuth) (6)IC Anions / 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorous in phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Cyanide (Total) - 335.2; pH (Soil) - 9045;</p> <p>60104 (Supertrace) ST 11/04/04</p>						

LOT# 14100333

SDG# W04380

000021

11

Q-6003-618(03/03)

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STL ST. LOUIS

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-056	PAGE 1 OF 2				
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days		
SAMPLING LOCATION 216-T-28; 17.5ft-20ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil				SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>			
ICE CHEST NO. 04/04-00037		FIELD LOGBOOK NO. HNF-N-356-1		COA 119143E510		METHOD OF SHIPMENT 11/10/04 Fed Ex					
SHIPPED TO Waste Sampling & Characterization Seven Trent		OFFSITE PROPERTY NO. N/A 11/10/04 See Shipment # DJ021				BILL OF LADING/AIR BILL NO. N/A 11/10/04 See Shipment # DJ021					
MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A		PRESERVATION		Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
			TYPE OF CONTAINER		Gs*	gG	gG	Gs*	P	gG	gG
			NO. OF CONTAINER(S)		3	1	1	3	1	1	1
			VOLUME		40mL	120mL	120mL	40mL	200mL	250mL	120mL
SPECIAL HANDLING AND/OR STORAGE N/A Radioactive Tie To B19106		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS (2),(3), (5)(6)	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	PCBs - B042	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B19188	SOIL	10-20-04	1040	X	X	X	X	X	X	X	X
CHAIN OF POSSESSION				SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
J. SPOPE/OSFW		10-20-04 1230		SITE RMA FRIDGE		10-20-04 1230					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
J.R. RMA Fridge		11/10/04 0810		Greg Thomas / Mrs. Thomas		11/10/04 0810					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
Greg Thomas / Mrs. Thomas		11/10/04 0815		Fed Ex							
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
LABORATORY SECTION	RECEIVED BY	DATE/TIME		TITLE				DATE/TIME			
	Jill Clark	11-12-04 0940									
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DATE/TIME		DISPOSED BY				DATE/TIME			

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Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F03-025-056	PAGE 2 OF 2
COLLECTOR Pope/Pfister/Wiberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ		PRICE CODE 2A	DATA TURNAROUND
SAMPLING LOCATION D-216-T-28; 17.5ft-20ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025	AIR QUALITY <input type="checkbox"/>	24 Hours	
ICE CHEST NO. 04/04-010037	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle Fed Ex			
SHIPPED TO Waste Sampling & Characterization Severn Trent	OFFSITE PROPERTY NO. MS47 11/10/04 See Shipment # D1021		BILL OF LADING/AIR BILL NO. MS47 11/10/04 See Shipment # D1021			
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1)VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Butanol} (2)Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA - 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3)Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol) (4)Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma.Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241; (5)ICP/MS - 200.8 (TAL) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6010A (Add-on) (Bismuth) (6)IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorous in phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Cyanide (Total) - 335.2; pH (Soil) - 9045;</p>						

LOT# FA 00033

SDG# W04380

000023

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Appendix 5

Data Validation Supporting Documentation

000024

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-LW-1/LW-2		DATA PACKAGE: W04380		
VALIDATOR:	TJT	LAB: ST	DATE: 3/21/05		
		SDG:	W04380		
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO ₃ /NO ₂
Sulfate	TDS	TKN	Phosphate		
Sulfide				Cyanide	
SAMPLES/MATRIX					
B1931-1		B19189	B19188		
soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? Yes No N/A

Initial calibrations acceptable? Yes No N/A

ICV and CCV checks performed on all instruments? Yes No N/A

ICV and CCV checks acceptable? Yes No N/A

Standards traceable? Yes No N/A

Standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)..... Yes No N/A
 ICB and CCB results acceptable? (Levels D, E) Yes No N/A
 Laboratory blanks analyzed? Yes No N/A
 Laboratory blank results acceptable?..... Yes No N/A
 Field blanks analyzed? (Levels C, D, E) Yes No N/A 3/21
 Field blank results acceptable? (Levels C, D, E)..... Yes No N/A
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A
 Comments: chloride - UJ both NO FR

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed? Yes No N/A
 Spike recoveries acceptable? Yes No N/A
 Spike standards NIST traceable? (Levels D, E)..... Yes No N/A
 Spike standards expired? (Levels D, E)..... Yes No N/A
 LCS/BSS samples analyzed?..... Yes No N/A
 LCS/BSS results acceptable?..... Yes No N/A
 Standards traceable? (Levels D, E)..... Yes No N/A
 Standards expired? (Levels D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable?..... Yes No N/A
 Comments: MS cyanide ok
-MS chloride - 88 no ms fluoride - 88 no ms 3/20/05
- NO MS for 188 - T all
LCS - no cyanide LCS - 3/20/05

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

- Duplicate RPD values acceptable? Yes No N/A
- Duplicate results acceptable? Yes No N/A
- MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
- MS/MSD standards expired? (Levels D, E) Yes No N/A
- Field duplicate RPD values acceptable? Yes No N/A
- Field split RPD values acceptable? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

6. HOLDING TIMES (all levels)

- Samples properly preserved? Yes No N/A
- Sample holding times acceptable? Yes No N/A

Comments: *ph > 2x J booth*
cyamide < 2x J-89x 88 ju
cyside > 2x B-88
solide > 2x limit R

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

- Results reported for all requested analyses? Yes No N/A
- Results supported in the raw data? (Levels D, E)..... Yes No N/A
- Samples properly prepared? (Levels D, E)..... Yes No N/A
- Detection limits meet RDL? Yes No N/A
- Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: ~~ammonia, cyanide,~~
oil + grease over
sulfide
ammonia
cyanide

Appendix 6

Additional Documentation Requested by Client

000029

MATRIX SPIKE SAMPLE DATA REPORT

General Chemistry

Client Lot #...: W04380
 Date Sampled...: 11/10/04

Date Received...: 11/12/04

Matrix.....: SOLID

Percnt Moisture: 3.4

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Chloride	1.8	21.4	22.0	mg/kg	95	MCAWW 300.0A	11/10/04	4316165
			Work Order #...: GWNFG1FD				MS Lot-Sample #: F4K100333-002	
			Dilution Factor: 1					
Fluoride	3.4	21.4	25.0	mg/kg	101	MCAWW 300.0A	11/10/04	4316160
			Work Order #...: GWNFG1C1				MS Lot-Sample #: F4K100333-002	
			Dilution Factor: 1					
Hexavalent Chromium	ND	40.0	35.8	mg/kg	89	SWB46 7196A	11/11-11/12/04	4317200
			Work Order #...: GWNAE1AH				MS Lot-Sample #: F4K100333-001	
			Dilution Factor: 1					
Nitrate	7.8	42.8	48.2	mg/kg	95	MCAWW 300.0A	11/10/04	4316161
			Work Order #...: GWNFG1C2				MS Lot-Sample #: F4K100333-002	
			Dilution Factor: 10					
Nitrate/Nitrite as N	24.9	25.0	43.8 N	mg/kg	76	MCAWW 353.1	11/15/04	4320217
			Work Order #...: GWNAE1AG				MS Lot-Sample #: F4K100333-001	
			Dilution Factor: 1					
Nitrate/Nitrite as N	22.6	25.0	44.6 N	mg/kg	88	MCAWW 353.1	11/15/04	4320217
			Work Order #...: GWVD81AK				MS Lot-Sample #: F4K120155-001	
			Dilution Factor: 1					
Nitrite	0.44	1.07	1.91 N	mg/kg	137	MCAWW 300.0A	11/10/04	4316162
			Work Order #...: GWNFG1C3				MS Lot-Sample #: F4K100333-002	
			Dilution Factor: 1					
Nitrogen, as Ammonia	ND	2.14	1.94	mg/kg	90	MCAWW 350.1	11/11/04	4316531
			Work Order #...: GWNFG1EF				MS Lot-Sample #: F4K100333-002	
			Dilution Factor: 1					
Oil and Grease (Gravimetric)	ND	6980	6080	mg/kg	87	SWB46 9071A	11/23-11/24/04	4328355
			Work Order #...: GWNAE1AK				MS Lot-Sample #: F4K100333-001	
			Dilution Factor: 2					
Phosphate as P, Ortho	36.6	42.8	73.1	mg/kg	85	MCAWW 300.0A	11/10/04	4316163
			Work Order #...: GWNFG1C4				MS Lot-Sample #: F4K100333-002	
			Dilution Factor: 1					

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

General Chemistry

Client Lot #...: W04380
 Date Sampled...: 11/10/04

Date Received...: 11/12/04

Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Sulfate	12.6	42.8	50.6	mg/kg	89	MCAWW 300.0A	11/10/04	4316164
			Work Order #...: GWNFG1EE		MS Lot-Sample #: F4K100333-002			
			Dilution Factor: 1					
Total Cyanide	ND	5.35	5.32	mg/kg	99	SWB46 9010A	11/22/04	4327472
			Work Order #...: GWNFG1EG		MS Lot-Sample #: F4K100333-002			
			Dilution Factor: 1					
Total Sulfide	ND	100	94.0	mg/kg	94	SWB46 9030	11/24/04	4334155
			Work Order #...: GWVDS1AQ		MS Lot-Sample #: F4K120155-001			
			Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.
 N Spiked analyte recovery is outside stated control limits.
 Results and reporting limits have been adjusted for dry weight.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: W04380

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Chloride	0.59 B	Work Order #: GWP6J1AA 2.0	mg/kg	MB Lot-Sample #: F4K110000-165 MCAWW 300.0A	11/10/04	4316165
		Dilution Factor: 1				
Chloride	0.61 B	Work Order #: GW5J01AA 2.0	mg/kg	MB Lot-Sample #: F4K170000-160 MCAWW 300.0A	11/16/04	4322160
		Dilution Factor: 1				
Fluoride	0.20 B	Work Order #: GWP5W1AA 1.0	mg/kg	MB Lot-Sample #: F4K110000-160 MCAWW 300.0A	11/10/04	4316160
		Dilution Factor: 1				
Fluoride	ND	Work Order #: GW5J41AA 1.0	mg/kg	MB Lot-Sample #: F4K170000-161 MCAWW 300.0A	11/16/04	4322161
		Dilution Factor: 1				
Hexavalent Chromium	ND	Work Order #: GWVQJ1AA 0.40	mg/kg	MB Lot-Sample #: F4K120000-200 SW846 7196A	11/11/04	4317200
		Dilution Factor: 1				
Nitrate	ND	Work Order #: GWP531AA 0.20	mg/kg	MB Lot-Sample #: F4K110000-161 MCAWW 300.0A	11/10/04	4316161
		Dilution Factor: 1				
Nitrate	ND	Work Order #: GW5J81AA 0.20	mg/kg	MB Lot-Sample #: F4K170000-162 MCAWW 300.0A	11/16/04	4322162
		Dilution Factor: 1				
Nitrate/Nitrite as N	ND	Work Order #: GW1GX1AA 0.50	mg/kg	MB Lot-Sample #: F4K150000-217 MCAWW 353.1	11/15/04	4320217
		Dilution Factor: 1				
Nitrite	ND	Work Order #: GWP541AA 0.20	mg/kg	MB Lot-Sample #: F4K110000-162 MCAWW 300.0A	11/10/04	4316162
		Dilution Factor: 1				
Nitrite	ND	Work Order #: GW5KG1AA 0.20	mg/kg	MB Lot-Sample #: F4K170000-163 MCAWW 300.0A	11/16/04	4322163
		Dilution Factor: 1				
Nitrogen, as Ammonia	ND	Work Order #: GWR6M1AA 0.50	mg/kg	MB Lot-Sample #: F4K110000-531 MCAWW 350.1	11/11/04	4316531
		Dilution Factor: 1				

(Continued on next page)

METHOD BLANK REPORT

General Chemistry

Client Lot #...: W04380

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Nitrogen, as Ammonia	ND	Work Order #: GW4L41AA 0.50	mg/kg	MB Lot-Sample #: F4K160000-483 MCAWW 350.1	11/16/04	4321483
		Dilution Factor: 1				
Oil and Grease (Gravimetric)	ND	Work Order #: GXQET1AA 200	mg/kg	MB Lot-Sample #: F4K230000-355 SW846 9071A	11/23-11/24/04	4328355
		Dilution Factor: 1				
Phosphate as P, Ortho	ND	Work Order #: GWP561AA 5.0	mg/kg	MB Lot-Sample #: F4K110000-163 MCAWW 300.0A	11/10/04	4316163
		Dilution Factor: 1				
Phosphate as P, Ortho	ND	Work Order #: GW5KN1AA 5.0	mg/kg	MB Lot-Sample #: F4K170000-164 MCAWW 300.0A	11/16/04	4322164
		Dilution Factor: 1				
Sulfate	ND	Work Order #: GWP6E1AA 5.0	mg/kg	MB Lot-Sample #: F4K110000-164 MCAWW 300.0A	11/10/04	4316164
		Dilution Factor: 1				
Sulfate	ND	Work Order #: GW5KW1AA 5.0	mg/kg	MB Lot-Sample #: F4K170000-165 MCAWW 300.0A	11/16/04	4322165
		Dilution Factor: 1				
Total Cyanide	ND	Work Order #: GXLDD1AA 0.50	mg/kg	MB Lot-Sample #: F4K220000-472 SW846 9010A	11/22/04	4327472
		Dilution Factor: 1				
Total Sulfide	ND	Work Order #: GXV791AA 10.0	mg/kg	MB Lot-Sample #: F4K290000-155 SW846 9030	11/24/04	4334155
		Dilution Factor: 1				

NOTE(S):

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

B Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE DATA REPORT

General Chemistry

Lot-Sample #...: W04380

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Chloride								
				WO#:GWP6J1AC-LCS/GWP6J1AD-LCSD LCS Lot-Sample#: F4K110000-165				
	10.0	9.04	mg/kg	90		MCAWW 300.0A	11/10/04	4316165
	10.0	9.69	mg/kg	97	6.9	MCAWW 300.0A	11/10/04	4316165
				Dilution Factor: 1				
Chloride								
				WO#:GW5J01AC-LCS/GW5J01AD-LCSD LCS Lot-Sample#: F4K170000-160				
	10.0	9.63	mg/kg	96		MCAWW 300.0A	11/16/04	4322160
	10.0	9.70	mg/kg	97	0.69	MCAWW 300.0A	11/16/04	4322160
				Dilution Factor: 1				
Fluoride								
				WO#:GWP5W1AC-LCS/GWP5W1AD-LCSD LCS Lot-Sample#: F4K110000-160				
	5.00	5.18	mg/kg	104		MCAWW 300.0A	11/10/04	4316160
	5.00	5.19	mg/kg	104	0.14	MCAWW 300.0A	11/10/04	4316160
				Dilution Factor: 1				
Fluoride								
				WO#:GW5J41AC-LCS/GW5J41AD-LCSD LCS Lot-Sample#: F4K170000-161				
	5.00	4.79	mg/kg	96		MCAWW 300.0A	11/16/04	4322161
	5.00	4.72	mg/kg	94	1.5	MCAWW 300.0A	11/16/04	4322161
				Dilution Factor: 1				
Nitrate								
				WO#:GWP531AC-LCS/GWP531AD-LCSD LCS Lot-Sample#: F4K110000-161				
	1.60	1.85	mg/kg	116		MCAWW 300.0A	11/10/04	4316161
	1.60	1.87	mg/kg	117	0.94	MCAWW 300.0A	11/10/04	4316161
				Dilution Factor: 1				
Nitrate								
				WO#:GW5J81AC-LCS/GW5J81AD-LCSD LCS Lot-Sample#: F4K170000-162				
	2.00	1.85	mg/kg	92		MCAWW 300.0A	11/16/04	4322162
	2.00	1.83	mg/kg	91	1.0	MCAWW 300.0A	11/16/04	4322162
				Dilution Factor: 1				
Nitrate/Nitrite as N								
				WO#:GW1GX1AC-LCS/GW1GX1AD-LCSD LCS Lot-Sample#: F4K150000-217				
	4.00	3.90	mg/kg	98		MCAWW 353.1	11/15/04	4320217
	4.00	3.89	mg/kg	97	0.25	MCAWW 353.1	11/15/04	4320217
				Dilution Factor: 1				
Nitrite								
				WO#:GWP541AC-LCS/GWP541AD-LCSD LCS Lot-Sample#: F4K110000-162				
	0.800	0.871	mg/kg	109		MCAWW 300.0A	11/10/04	4316162
	0.800	0.871	mg/kg	109	0.05	MCAWW 300.0A	11/10/04	4316162
				Dilution Factor: 1				

(Continued on next page)

LABORATORY CONTROL SAMPLE DATA REPORT

General Chemistry

Lot-Sample #...: W04380

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Nitrite	0.800	0.866	mg/kg	108		MCAWW 300.0A	11/16/04	4322163
	0.800	0.860	mg/kg	107	0.70	MCAWW 300.0A	11/16/04	4322163
Dilution Factor: 1								
Nitrogen, as Ammonia	40.0	39.0	mg/kg	98		MCAWW 350.1	11/11/04	4316531
	40.0	40.9	mg/kg	102	4.8	MCAWW 350.1	11/11/04	4316531
Dilution Factor: 1								
Nitrogen, as Ammonia	4.00	3.70	mg/kg	92		MCAWW 350.1	11/16/04	4321483
	4.00	3.72	mg/kg	93	0.53	MCAWW 350.1	11/16/04	4321483
Dilution Factor: 1								
Oil and Grease (Gravimetric)	3330	2700	mg/kg	81		SW846 9071A	11/23-11/24/04	4328355
	3330	2700	mg/kg	81	0.0	SW846 9071A	11/23-11/24/04	4328355
Dilution Factor: 1								
Phosphate as P, Ortho	40.0	38.5	mg/kg	96		MCAWW 300.0A	11/10/04	4316163
	40.0	38.7	mg/kg	97	0.72	MCAWW 300.0A	11/10/04	4316163
Dilution Factor: 1								
Phosphate as P, Ortho	40.0	39.0	mg/kg	98		MCAWW 300.0A	11/16/04	4322164
	40.0	39.5	mg/kg	99	1.3	MCAWW 300.0A	11/16/04	4322164
Dilution Factor: 1								
Sulfate	40.0	37.0	mg/kg	92		MCAWW 300.0A	11/10/04	4316164
	40.0	37.0	mg/kg	93	0.18	MCAWW 300.0A	11/10/04	4316164
Dilution Factor: 1								

(Continued on next page)

STL ST. LOUIS

LABORATORY CONTROL SAMPLE DATA REPORT

General Chemistry

Lot-Sample #....: W04380

Matrix.....: SOLID

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCNT</u> <u>RECVRY</u>	<u>RPD</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Sulfate								
			WO#:GW5KW1AC-LCS/GW5KW1AD-LCSD LCS Lot-Sample#: F4K170000-165					
	40.0	36.5	mg/kg	91		MCAWW 300.0A	11/16/04	4322165
	40.0	36.9	mg/kg	92	1.2	MCAWW 300.0A	11/16/04	4322165

Dilution Factor: 1

NOTE(S) :

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

LABORATORY CONTROL SAMPLE DATA REPORT

General Chemistry

Client Lot #....: W04380

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	7.00	7.01	No Units	100	SW846 9045C	11/16/04	4321162
Work Order #: GW3HW1AA LCS Lot-Sample#: F4K160000-162 Dilution Factor: 1							
Hexavalent Chromium	2.00	1.87	mg/kg	94	SW846 7196A	11/11/04	4317200
Work Order #: GWVQJ1AC LCS Lot-Sample#: F4K120000-200 Dilution Factor: 1							
Total Cyanide	5.00	5.20	mg/kg	104	SW846 9010A	11/22/04	4327472
Work Order #: GXLDD1AC LCS Lot-Sample#: F4K220000-472 Dilution Factor: 1							
Total Sulfide	100	96.0	mg/kg	96	SW846 9030	11/24/04	4334155
Work Order #: GXV791AC LCS Lot-Sample#: F4K290000-155 Dilution Factor: 1							

NOTE(S):

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

Date: 24 March 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-LW-1/LW-2 Characterization - Soil
Subject: Semivolatile - Data Package No. W04380



INTRODUCTION

This memo presents the results of data validation on Data Package No. W04380 prepared by Severn Trent (STL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B19188	10/20/04	Soil	C	See note 1
B19189	10/26/04	Soil	C	See note 1

1 -Semivolatiles by 8270 (tributylphosphate & phenol) and NWTPH-D.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan (DOE/RL-2001-66, Draft A, Redline, May 2002). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times/Sample Preservation**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the

000001

limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all results were qualified as estimates and flagged "J".

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike

Matrix spike/matrix spike duplicate and blank spike sample analyses are used to assess the analytical accuracy of the reported data. Matrix spike/matrix duplicate results are used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

000002

Due to the lack of a matrix spike and matrix spike duplicate analysis, all phenol and tributylphosphate results were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate and blank spike results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a matrix spike and matrix spike duplicate analysis, all phenol and tributylphosphate results were qualified as estimates and flagged "J".

All other MS/MSD RPD results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

000003

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required target quantitation limits (RTQL's) to ensure that laboratory detection levels meet the required criteria. All undetected results exceeded the RTQL. Under the FHI statement of work, no qualification is required. All other results met the analyte specific RTQL.

- **Completeness**

Data package No. W04380 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of a matrix spike and matrix spike duplicate analysis, all phenol and tributylphosphate results were qualified as estimates and flagged "J". Due to the holding time being exceeded by less than twice the limit, all results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected results exceeded the RTQL. Under the FHI statement of work, no qualification is required.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001-66, Draft A, Redline, *200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan*, May 2002.

Appendix 1

Glossary of Data Reporting Qualifiers

000005

Qualifiers which may be applied by data validators in compliance with the FHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

000007

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

SDG: W04380	REVIEWER: TLI	DATE: 3/24/05	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	All	Holding time
Phenol Tributylphosphate	J	All	No MS/MSD analysis

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: FLUOR-HANFORD					
Laboratory: Severn Trent					
Case:		SDG: W04380			
Sample Number		B19188	B19189		
Remarks					
Sample Date		10/20/04	10/26/04		
Analysis Date		11/17/04	11/18/04		
Semivolatile (8270B)/TPH	RTQL	Result	Q	Result	Q
Phenol	330	ND	UJ	ND	UJ
Tributyl phosphate	33000	ND	UJ	ND	UJ
TPH-D*	5	ND	UJ	ND	UJ
Kersosene*	5	ND	UJ	ND	UJ
* - Units are mg/kg					

000010

* - The reported detection limit is above the TQL

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

STL ST. LOUIS

FLUOR HANFORD IC

Client Sample ID: B19188

GC/MS Semivolatiles

Lot-Sample #....: F4K120109-001 Work Order #....: GWTXX1AE Matrix.....: SOLID
 Date Sampled....: 10/20/04 Date Received...: 11/11/04
 Prep Date.....: 11/15/04 Analysis Date...: 11/17/04
 Prep Batch #....: 4320242
 Dilution Factor: 1
 † Moisture.....: 5.3 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Phenol	ND <i>J</i>	1000	ug/kg	92
Tributyl phosphate	ND <i>J</i>	1000	ug/kg	350

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
2-Fluorophenol	65	(40 - 103)
Phenol-d5	67	(36 - 105)
Nitrobenzene-d5	65	(45 - 114)
2-Fluorobiphenyl	70	(49 - 120)
2,4,6-Tribromophenol	65	(39 - 114)
Terphenyl-d14	70	(42 - 108)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

W
 3/21/05

FLUOR HANFORD IC

Client Sample ID: B19189

GC/MS Semivolatiles

Lot-Sample #....: F4K100333-002 Work Order #....: GWNFG1CG Matrix.....: SOLID
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 Prep Date.....: 11/11/04 Analysis Date...: 11/18/04
 Prep Batch #....: 4316202
 Dilution Factor: 1
 % Moisture.....: 6.6 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Phenol	ND <i>J</i>	350	ug/kg	93
Tributyl phosphate	ND <i>J</i>	350	ug/kg	350

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
2-Fluorophenol	54	(40 - 103)
Phenol-d5	55	(36 - 105)
Nitrobenzene-d5	55	(45 - 114)
2-Fluorobiphenyl	56	(49 - 120)
2,4,6-Tribromophenol	48	(39 - 114)
Terphenyl-d14	50	(42 - 108)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

K
3/21/05

FLOOR HANFORD IC

Client Sample ID: B19188

GC Semivolatiles

Lot-Sample #....: F4K120109-001 Work Order #....: GWYX1AA Matrix.....: SOLID
 Date Sampled....: 10/20/04 Date Received...: 11/11/04
 Prep Date.....: 11/16/04 Analysis Date...: 11/16/04
 Prep Batch #....: 4321201
 Dilution Factor: 1
 % Moisture.....: 5.3 Method.....: SW846 8015 MOD

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Kerosene	ND <i>J</i>	13	mg/kg	26
TPH - Diesel Range - WTPH-D	ND <i>J</i>	13	mg/kg	2.0
<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>		
o-Terphenyl	45	(10 - 150)		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

R
3/21/05

FLOOR HANFORD IC

Client Sample ID: B19189

GC Semivolatiles

Lot-Sample #....: F4K100333-002 Work Order #....: GWNFG1CE Matrix.....: SOLID
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 Prep Date.....: 11/16/04 Analysis Date...: 11/16/04
 Prep Batch #....: 4321201
 Dilution Factor: 1
 % Moisture.....: 6.6 Method.....: SW846 8015 MOD

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Kerosene	ND <i>J</i>	27	mg/kg	27
TPH (as Diesel)	ND <i>J</i>	27	mg/kg	2.0
		PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS		
o-Terphenyl	43	(10 - 150)		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

R
 3/21/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000015

Case Narrative
SDG: W04380

This report contains the analytical results for the four samples received under chain of custody by STL St. Louis between November 10, 2004 and November 19, 2004. These samples are associated with your F03-025 SAF. The SDG was closed on 11/24/04.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Samples were received at the laboratory after the holding time had expired for several of the requested tests.

Volatiles

The LCS recoveries for batch 4317380 are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable LCS recoveries.

The MS/MSD recoveries are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable MS/MSD recoveries.

Case Narrative
SDG: W04380

Anions

The MS recovery for Nitrite was outside the QC limits. The anion matrix spike solution contains all routine anions. Spiking technique, sample preparation and method compliance is demonstrated by the remaining acceptable MS recoveries. Poor matrix spike recovery is attributed to matrix interference.

Nitrate

The MS recovery for Nitrate is outside the established QC limits. A matrix interference is physically evident in the sample. Method performance is demonstrated by acceptable LCS and LCS-Duplicate recoveries. No further action is required.

PCB

Due to its extremely high radiation readings, sample B19189 was analyzed at an initial ten fold dilution. The reporting limit has been adjusted for the dilution. Surrogates were diluted out.

The MS/MSD sample required at least a twenty fold dilution, making recoveries for the MS/MSD unreliable. There was no reportable data for the MS/MSD. LCS recoveries were acceptable.

Continuing Calibration Checks 200, 208 and 216 all failed low for Aroclor 1016 and 1260 on the confirmation channel (A). All recoveries were acceptable on Channel B, which is where these samples were reported from.

Mercury

Analysis of the sample designated for MS/MSD resulted in a sufficiently high concentration such that the MS/MSD are above the instrument's calibration range. MS/MSD results should be considered estimated values.

Semi-Volatiles

Due to sample matrix, limited volume and RAD levels, an MS/MSD was not run for method 8270 on a sample from this SDG.

There was insufficient volume of sample B19188 provided to perform the analysis at the method specified amount due to laboratory request to limit volume due to high RAD levels. A reduced sample amount was prepared. The reporting limit has been elevated accordingly.

Case Narrative
SDG: W04380

Metals

The MS/MSD recoveries for sample B19189 for Antimony, Chromium and Nickel are outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

The MS/MSD recovery in sample B191F1 for Chromium, Copper and Lead is outside the established QC limits. The concentration of these metals in the original sample is greater than four times the amount spiked, making percent recovery information ineffective. The MS/MSD recovery for Antimony, Nickel and Silver is outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

STL ST. LOUIS

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-057	PAGE 1 OF 2				
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days		
SAMPLING LOCATION 216-T-28; 22.5ft-25ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil				SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>			
ICE CHEST NO. GRP-04-003		FIELD LOGBOOK NO. HNF-N-356-i		COA 119143ES10		METHOD OF SHIPMENT Government Vehicle					
SHIPPED TO Waste Sampling & Characterization Severn Trent		OFFSITE PROPERTY NO. NA ST 11/09/04 See Shipment # D1020				BILL OF LADING/AIR BILL NO. NA ST 11/01/04 See Shipment # D1020					
MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A		PRESERVATION		Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
			TYPE OF CONTAINER		Gs*	gG	gG	Gs*	P	gG	gG
			NO. OF CONTAINER(S)		3	1	1	3	1	1	1
			VOLUME		40mL	120mL	120mL	40mL	500mL	250mL	120mL
	SPECIAL HANDLING AND/OR STORAGE Radioactive for to: R141C7		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	FCB - 8082;	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
19189	SOIL	10-26-04	0941	X	X	X	X	X	X	X	

250g, 3 X 120g, 6A1K D40

W04380

000019

STL ST. LOUIS

Floor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F03-025-057	PAGE 2 OF 2
COLLECTOR Pope/Pfister/Wiberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ		PRICE CODE 2A-EN ST 11/04/04	DATA TURNAROUND 24-Hours 45 days
SAMPLING LOCATION 216-T-28; 22.5ft-25ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GRP-04-003	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle			
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. ST 11/09/04 Shipment # DW020		BILL OF LADING/AIR BILL NO. ST 11/09/04 Shipment # DW020			
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1)VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Butanol) (2)Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA - 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3)Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol) (4)Gamma Spectroscopy (Caesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241; * ST 11/04/04 (5)ICP/MS - 200.8 (TAT) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6010A (Add-on) (Bismuth) (6)IC Anions / 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorous in phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Cyanide (Total) - 335.2; pH (Soil) - 9045;</p> <p>6010 A (Supertrace) ST 11/04/04</p>						

1017
FAX# 0033

SDG# W04380

000020

11
Q-6003-61 W(03/03)
F 97

STL ST. LOUIS

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-056	PAGE 1 OF 2			
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days	
SAMPLING LOCATION 216-T-28; 17.5N-20N		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil			SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>			
ICE CHEST NO. 04/04-040037		FIELD LOGBOOK NO. HNF-N-356-1		COA 119143ES10		METHOD OF SHIPMENT Fed Ex				
SHIPPED TO Waste Sampling & Characterization Severn Trent		OFFSITE PROPERTY NO. See Shipment # DJ021			BILL OF LADING/AIR BILL NO. See Shipment # DJ021					
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WT=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A	PRESERVATION		Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
		TYPE OF CONTAINER		Gs*	aG	aG	Gs*	P	aG	aG
		NO. OF CONTAINER(S)		3	1	1	3	1	1	1
		VOLUME		40mL	120mL	120mL	40mL	400mL	250mL	120mL
SPECIAL HANDLING AND/OR STORAGE N/A RADIOACTIVE Tie To B19106		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS (2)(3), (5)(6)	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	PCBs - 8082;	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME							
B19188	SOIL	10-20-04	1040	X	X	X	X	X	X	X

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
J. Spore/OSPW	10-20-04 1230	SITE RMA FRIDGE	10-20-04 1230
Site RMA Fridge	11/10/04 0810	Greg Thomas / Greg Thomas	11/10/04 0810
Greg Thomas / Greg Thomas	11/10/04 0815	Fed Ex	

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION	RECEIVED BY Jill Clark	DATE/TIME 11.12.04 0940	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD		DISPOSED BY	DATE/TIME

000021

LOT #	333	PRICE CODE	2A	PAGE 2	OF 2
COLLECTOR	Floor Hanford Inc. Pope/Pfeister/Mberg/Tyra	PROJECT COORDINATOR	TRENT, SJ	DATA	TURNAROUND
SAMPLING LOCATION	216-T-28; 17.5R-20R	SAP NO.	FO3-025	AIR QUALITY	24 Hours
VOICE CHEST NO.	04/04-010037	METHOD OF SHIPMENT	Government Vehicle	<input type="checkbox"/> Anions	
FIELD LOGBOOK NO.	HNF-N-350-1	COA	119149ES10		
OFFSITE PROPERTY NO.	See Shipment # D1021	BILL OF LADING/AIR BILL NO.	See Shipment # D1021		

SPECIAL INSTRUCTIONS

The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.

(1) VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Buand)
 (2) Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA - 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G;
 (3) Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol)
 (4) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241;
 (5) ICP/MS - 200.8 (TAL) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6018A (Add-on) (Bismuth)
 (6) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Cyanide (Total) - 335.2; (IC) 904.5;

The MS recovery for Nitrate was outside the QC limits. The anion matrix spike solution contains all routine anions. Spiking technique, sample preparation and method compliance is demonstrated. The remaining acceptable MS recoveries. Poor matrix spike recovery is attributed to matrix.

Case Narrative
SDG: W04380

000022

Appendix 5

Data Validation Supporting Documentation

000023

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT:	200-LW-1/LW-2		DATA PACKAGE: W04380		
VALIDATOR:	TLI	LAB:	ST	DATE: 3/2/05	
			SDG: W04380		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	<u>SW-846 8270</u>	<u>TPH-D 8015B</u>	SW-846 8270 (TCLP)
SAMPLES/MATRIX					
B19188		B19189			
soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? Yes No N/A
 Initial calibrations acceptable? Yes No N/A
 Continuing calibrations acceptable? Yes No N/A
 Standards traceable? Yes No N/A
 Standards expired? Yes No N/A
 Calculation check acceptable? Yes No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ~~Yes~~ No N/A
Calibration blank results acceptable? (Levels D, E) ~~Yes~~ No N/A
Laboratory blanks analyzed? Yes No N/A
Laboratory blank results acceptable? Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A
Comments: NO FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? Yes No N/A
Surrogate/system monitoring compound recoveries acceptable? Yes No N/A
Surrogates traceable? (Levels D, E) Yes No N/A
Surrogates expired? (Levels D, E) Yes No N/A
MS/MSD samples analyzed? Yes No N/A
MS/MSD results acceptable? Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
MS/MSD standards? (Levels D, E) Yes No N/A
LCS/BSS samples analyzed? Yes No N/A
LCS/BSS results acceptable? Yes No N/A
Standards traceable? (Levels D, E) Yes No N/A
Standards expired? (Levels D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A
Performance audit sample(s) analyzed? Yes No N/A
Performance audit sample results acceptable? Yes No N/A
Comments: NO MS/MSD - J all - SVet NO pts

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? Yes No N/A
MS/MSD RPD values acceptable? Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
MS/MSD standards expired? (Levels D, E) Yes No N/A
Field duplicate RPD values acceptable? Yes No N/A
Field split RPD values acceptable? Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: NO SVO MS/MSD - J all
TPH ok

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? Yes No N/A
Internal standard areas acceptable? Yes No N/A
Internal standard retention times acceptable? Yes No N/A
Standards traceable? Yes No N/A
Standards expired? Yes No N/A
Transcription/calculation errors? Yes No N/A

Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? Yes No N/A
Sample holding times acceptable? Yes No N/A

Comments: all over less than 2X - J
all SV + TPH

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) Yes No N/A

Compound quantitation acceptable? (Levels D, E) Yes No N/A

Results reported for all requested analyses? Yes No N/A

Results supported in the raw data? (Levels D, E) Yes No N/A

Samples properly prepared? (Levels D, E) Yes No N/A

Laboratory properly identified and coded all TIC? (Levels D, E) Yes No N/A

Detection limits meet RDL? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: all Kerosene for check - Tributylphosphite can
all written over 3/21/01

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? Yes No N/A

GPC check performed? Yes No N/A

GPC check recoveries acceptable? Yes No N/A

GPC calibration performed? Yes No N/A

GPC calibration check performed? Yes No N/A

GPC calibration check retention times acceptable? Yes No N/A

Check/calibration materials traceable? Yes No N/A

Check/calibration materials Expired? Yes No N/A

Analytical batch QC given similar cleanup? Yes No N/A

Transcription/Calculation Errors? Yes No N/A

Comments: _____

Appendix 6

Additional Documentation Requested by Client

000028

METHOD BLANK REPORT

GC/MS Semivolatiles

Client Lot #...: W04380
MB Lot-Sample #: F4K110000-202
Analysis Date...: 11/17/04
Dilution Factor: 1

Work Order #...: GWP121AA
Prep Date.....: 11/11/04
Prep Batch #...: 4316202

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>
		<u>LIMIT</u>	<u>UNITS</u>	
Phenol	ND	330	ug/kg	SW846 8270C
Tributyl phosphate	ND	330	ug/kg	SW846 8270C

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
2-Fluorophenol	67	(40 - 103)
Phenol-d5	69	(36 - 105)
Nitrobenzene-d5	67	(45 - 114)
2-Fluorobiphenyl	71	(49 - 120)
2,4,6-Tribromophenol	59	(39 - 114)
Terphenyl-d14	63	(42 - 108)

NOTE(S):

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

000029

METHOD BLANK REPORT

GC/MS Semivolatiles

Client Lot #....: W04380 Work Order #....: GW1K71AA Matrix.....: SOLID
 MB Lot-Sample #: F4K150000-242
 Analysis Date...: 11/17/04 Prep Date.....: 11/15/04
 Dilution Factor: 1 Prep Batch #....: 4320242

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
Phenol	ND	990	ug/kg	SW846 8270C
Tributyl phosphate	ND	990	ug/kg	SW846 8270C

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
2-Fluorophenol	71	(40 - 103)
Phenol-d5	71	(36 - 105)
Nitrobenzene-d5	70	(45 - 114)
2-Fluorobiphenyl	75	(49 - 120)
2,4,6-Tribromophenol	69	(39 - 114)
Terphenyl-d14	74	(42 - 108)

NOTE (S) :

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

000030

METHOD BLANK REPORT

GC Semivolatiles

Client Lot #....: W04380
MB Lot-Sample #: F4K160000-201

Work Order #....: GW3GW1AA

Matrix.....: SOLID

Analysis Date...: 11/16/04
Dilution Factor: 1

Prep Date.....: 11/16/04
Prep Batch #....: 4321201

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>
		<u>LIMIT</u>	<u>UNITS</u>	
Kerosene	ND	25	mg/kg	SW846 8015 MOD
TPH - Diesel Range - WTPH	ND	25	mg/kg	SW846 8015 MOD
<u>SURROGATE</u>		<u>PERCENT</u>	<u>RECOVERY</u>	
		<u>RECOVERY</u>	<u>LIMITS</u>	
o-Terphenyl	84		(10 - 150)	

NOTE (S) :

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

MATRIX SPIKE SAMPLE DATA REPORT

GC Semivolatiles

Client Lot #....: W04380 Work Order #....: GWNFG1EH-MS Matrix.....: SOLID
 MS Lot-Sample #: F4K100333-002 GWNFG1EJ-MSD
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 Prep Date.....: 11/16/04 Analysis Date...: 11/16/04
 Prep Batch #....: 4321201
 Dilution Factor: 1 % Moisture.....: 6.6

PARAMETER	SAMPLE	SPIKE	MEASRD	UNITS	PERCNT		METHOD
	AMOUNT	AMT	AMOUNT		RECVRY	RPD	
TPH - Diesel Range - WIPH	0	88.6	68.4	mg/kg	77		SW846 8015 MOD
	0	102	82.3	mg/kg	81	18	SW846 8015 MOD

SURROGATE	PERCENT		RECOVERY
	RECOVERY	LIMITS	LIMITS
o-Terphenyl	61	(10 - 150)	(10 - 150)
	67	(10 - 150)	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters
 Results and reporting limits have been adjusted for dry weight.

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Semivolatiles

Client Lot #....: W04380 Work Order #....: GWP121AC Matrix.....: SOLID
 LCS Lot-Sample#: F4K110000-202
 Prep Date.....: 11/11/04 Analysis Date...: 11/17/04
 Prep Batch #....: 4316202
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE AMOUNT</u>	<u>MEASURED AMOUNT</u>	<u>UNITS</u>	<u>PERCENT RECOVERY</u>	<u>METHOD</u>
Phenol	3330	2050	ug/kg	62	SW846 8270C
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>		<u>RECOVERY LIMITS</u>	
2-Fluorophenol		64		(50 - 98)	
Phenol-d5		64		(51 - 95)	
Nitrobenzene-d5		65		(50 - 111)	
2-Fluorobiphenyl		70		(57 - 117)	
2,4,6-Tribromophenol		69		(53 - 108)	
Terphenyl-d14		66		(49 - 107)	

NOTE(S) :

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

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Semivolatiles

Client Lot #....: W04380 Work Order #....: GW1K71AC Matrix.....: SOLID
 LCS Lot-Sample#: F4K150000-242
 Prep Date.....: 11/15/04 Analysis Date...: 11/17/04
 Prep Batch #....: 4320242
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>METHOD</u>
Phenol	3330	2140	ug/kg	64	SW846 8270C
<u>SURROGATE</u>				<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
2-Fluorophenol				66	(50 - 98)
Phenol-d5				66	(51 - 95)
Nitrobenzene-d5				65	(50 - 111)
2-Fluorobiphenyl				74	(57 - 117)
2,4,6-Tribromophenol				79	(53 - 108)
Terphenyl-d14				72	(49 - 107)

NOTE(S):

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

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC Semivolatiles

Client Lot #...: W04380 Work Order #...: GW3GW1AC Matrix.....: SOLID
 LCS Lot-Sample#: F4K160000-201
 Prep Date.....: 11/16/04 Analysis Date...: 11/16/04
 Prep Batch #...: 4321201
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>METHOD</u>
TPH - Diesel Range - WTPH	83.3	65.9	mg/kg	79	SW846 8015 MO
<u>SURROGATE</u>		<u>PERCENT</u> <u>RECOVERY</u>		<u>RECOVERY</u> <u>LIMITS</u>	
o-Terphenyl		135		(78 - 150)	

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters

Date: 24 March 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-LW-1/LW-2 Characterization - Soil
Subject: PCB - Data Package No. W04380



INTRODUCTION

This memo presents the results of data validation on Data Package No. W04380 prepared by Severn Trent (STL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B19188	10/20/04	Soil	C	PCBs by 8082
B19189	10/26/04	Soil	C	PCBs by 8082

Data validation was conducted in accordance with the FHI validation statement of work and the 200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan (DOE/RL-2001-66, Draft A, Redline, May 2002). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by the Client

DATA QUALITY OBJECTIVES

- **Holding Times/Sample Preservation**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected

000001

sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all PCB results were qualified as estimates and flagged "J".

All other holding times were acceptable.

- **Method Blank**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than practical quantitation limit (PQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than PQL, the result is qualified as undetected and elevated to the PQL.

All method blank target compound results were acceptable.

Field Blanks

No equipment blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Blank Spike

Matrix spike and blank spike analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations and is done in duplicate. Matrix spike and blank spike analyses must be within control limits of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike and matrix spike duplicate analysis, all PCB results were qualified as estimates and flagged "J".

All other results were acceptable.

000002

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

Due to the surrogate being diluted out, all PCB results in sample B19189 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a matrix spike and matrix spike duplicate analysis, all PCB results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

000003

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required target quantitation limits to ensure that laboratory detection levels meet the required criteria. All undetected results exceeded the analyte specific RTQL. Under the FHI statement of work, no qualification is required.

- **Completeness**

Data Package No. W04380 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the holding time being exceeded by less than twice the limit, all PCB results were qualified as estimates and flagged "J". Due to the lack of a matrix spike and matrix spike duplicate analysis, all PCB results were qualified as estimates and flagged "J". Due to the surrogate being diluted out, all PCB results in sample B19189 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected results exceeded the analyte specific RTQL. Under the FHI statement of work, no qualification is required.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001-66, Draft A, Redline, *200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan*, May 2002.

000004

Appendix 1

Glossary of Data Reporting Qualifiers

000005

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

000006

Appendix 2
Summary of Data Qualification

000007

PCB DATA QUALIFICATION SUMMARY*

SDG: W04380	REVIEWER: TLI	DATE: 3/24/05	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	All	Holding time
All	J	B19189	Surrogate diluted out
All	J	All	No MS/MSD analysis

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: FLUOR-HANFORD					
Laboratory: Severn Trent					
Case:		SDG: W04380			
Sample Number		B19188		B19189	
Remarks					
Sample Date		10/20/04		10/26/04	
Analysis Date		11/16/04		11/16/04	
PCB	RTQI	Result	Q	Result	Q
Aroclor-1016	16.5	ND	UJ	ND	UJ
Aroclor-1221	16.5	ND	UJ	ND	UJ
Aroclor-1232	16.5	ND	UJ	ND	UJ
Aroclor-1242	16.5	ND	UJ	ND	UJ
Aroclor-1248	16.5	ND	UJ	ND	UJ
Aroclor-1254	16.5	240	J	ND	UJ
Aroclor-1260	16.5	ND	UJ	ND	UJ

000010

FLOOR HANFORD IC

Client Sample ID: B19188

GC Semivolatiles

Lot-Sample #....: F4K120109-001 Work Order #....: GWTXX1AD Matrix.....: SOLID
 Date Sampled....: 10/20/04 Date Received...: 11/11/04
 Prep Date.....: 11/15/04 Analysis Date...: 11/16/04
 Prep Batch #....: 4320270
 Dilution Factor: 1
 % Moisture.....: 5.3 Method.....: SW846 8082

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Aroclor 1016	ND	170	ug/kg	6.7
Aroclor 1221	ND	170	ug/kg	7.5
Aroclor 1232	ND	170	ug/kg	8.5
Aroclor 1242	ND	170	ug/kg	8.0
Aroclor 1248	ND	170	ug/kg	10
Aroclor 1254	240	170	ug/kg	8.3
Aroclor 1260	ND	170	ug/kg	7.9

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Decachlorobiphenyl	114	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

Handwritten: R
3/21/05

FLOOR HANFORD IC

Client Sample ID: B19189

GC Semivolatiles

Lot-Sample #....: F4K100333-002 Work Order #....: GWNFG1CL Matrix.....: SOLID
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 Prep Date.....: 11/11/04 Analysis Date...: 11/16/04
 Prep Batch #....: 4316300
 Dilution Factor: 10
 % Moisture.....: 6.6 Method.....: SW846 8082

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Aroclor 1016	ND	350	ug/kg	68
Aroclor 1221	ND	350	ug/kg	76
Aroclor 1232	ND	350	ug/kg	86
Aroclor 1242	ND	350	ug/kg	81
Aroclor 1248	ND	350	ug/kg	100
Aroclor 1254	ND	350	ug/kg	85
Aroclor 1260	ND	350	ug/kg	80

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Decachlorobiphenyl	0.0 DIL, *	(10 - 150)

NOTE(S) :

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

* Surrogate recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

Handwritten signature
3/21/05

000012

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000013

Case Narrative
SDG: W04380

This report contains the analytical results for the four samples received under chain of custody by STL St. Louis between November 10, 2004 and November 19, 2004. These samples are associated with your F03-025 SAF. The SDG was closed on 11/24/04.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Samples were received at the laboratory after the holding time had expired for several of the requested tests.

Volatiles

The LCS recoveries for batch 4317380 are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable LCS recoveries.

The MS/MSD recoveries are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable MS/MSD recoveries.

000014

Case Narrative
SDG: W04380

Anions

The MS recovery for Nitrite was outside the QC limits. The anion matrix spike solution contains all routine anions. Spiking technique, sample preparation and method compliance is demonstrated by the remaining acceptable MS recoveries. Poor matrix spike recovery is attributed to matrix interference.

Nitrate

The MS recovery for Nitrate is outside the established QC limits. A matrix interference is physically evident in the sample. Method performance is demonstrated by acceptable LCS and LCS-Duplicate recoveries. No further action is required.

PCB

Due to its extremely high radiation readings, sample B19189 was analyzed at an initial ten fold dilution. The reporting limit has been adjusted for the dilution. Surrogates were diluted out.

The MS/MSD sample required at least a twenty fold dilution, making recoveries for the MS/MSD unreliable. There was no reportable data for the MS/MSD. LCS recoveries were acceptable.

Continuing Calibration Checks 200, 208 and 216 all failed low for Aroclor 1016 and 1260 on the confirmation channel (A). All recoveries were acceptable on Channel B, which is where these samples were reported from.

Mercury

Analysis of the sample designated for MS/MSD resulted in a sufficiently high concentration such that the MS/MSD are above the instrument's calibration range. MS/MSD results should be considered estimated values.

Semi-Volatiles

Due to sample matrix, limited volume and RAD levels, an MS/MSD was not run for method 8270 on a sample from this SDG.

There was insufficient volume of sample B19188 provided to perform the analysis at the method specified amount due to laboratory request to limit volume due to high RAD levels. A reduced sample amount was prepared. The reporting limit has been elevated accordingly.

000015

Case Narrative
SDG: W04380

Metals

The MS/MSD recoveries for sample B19189 for Antimony, Chromium and Nickel are outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

The MS/MSD recovery in sample B191F1 for Chromium, Copper and Lead is outside the established QC limits. The concentration of these metals in the original sample is greater than four times the amount spiked, making percent recovery information ineffective. The MS/MSD recovery for Antimony, Nickel and Silver is outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-057		PAGE 1 OF 2			
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N DATA TURNAROUND 45 Days / 45 Days			
SAMPLING LOCATION 216-T-28; 22.5ft-25ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil				SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>			
ICE CHEST NO. GRP-04-003		FIELD LOGBOOK NO. HNF-N-356-1		COA 119143E510		METHOD OF SHIPMENT Government Vehicle					
SHIPPED TO Waste Sampling & Characterization Severn Trent		OFFSITE PROPERTY NO. See Shipment # D1020				BILL OF LADING/AIR BILL NO. See Shipment # D1020					
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WJ=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A	PRESERVATION		Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None	
		TYPE OF CONTAINER		Gs*	gG	gG	Gs*	P	gG	gG	
		NO. OF CONTAINER(S)		3	1	1	3	1	1	1	
		VOLUME		40mL	120mL	120mL	40mL	500mL	250mL	120mL	
SPECIAL HANDLING AND/OR STORAGE Radioactive tre to: R191C7		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	PCB - 8082	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
19189	SOIL	10-26-04	0941	X	X	X	X	X	X	X	
CHAIN OF POSSESSION				SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM T.S. Pope/Pfister		DATE/TIME 10-26-04 1230		RECEIVED BY/STORED IN Site Frick		DATE/TIME 10-26-04 1230		W04380			
RELINQUISHED BY/REMOVED FROM Site Frick		DATE/TIME 11/04/04 0950		RECEIVED BY/STORED IN Greg Thomas Greg Thomas		DATE/TIME 11/04/04 0950					
RELINQUISHED BY/REMOVED FROM Greg Thomas Greg Thomas		DATE/TIME 11/04/04 1135		RECEIVED BY/STORED IN MO-026 Frig #3		DATE/TIME 11/04/04 1135					
RELINQUISHED BY/REMOVED FROM MO-026 Frig #3		DATE/TIME 11/09/04 0820		RECEIVED BY/STORED IN Greg Thomas Greg Thomas		DATE/TIME 11/09/04 0820					
RELINQUISHED BY/REMOVED FROM Greg Thomas Greg Thomas		DATE/TIME 11/09/04 0835		RECEIVED BY/STORED IN Fed Ex		DATE/TIME					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
LABORATORY SECTION		RECEIVED BY B-D-C		DATE/TIME 11/10/04 0900		TITLE		DATE/TIME			
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD				DISPOSED BY		DATE/TIME			

LOT 0410333

SDG# B1W04380

000017

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-025-057	PAGE 2 OF 2
COLLECTOR Pope/Pfister/Wiberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ	PRICE CODE 2A EN ST 11/09/04	DATA TURNAROUND 24-HOURS 45 days
SAMPLING LOCATION 216-T-28; 22.5ft-25ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GRP-04-003	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle		
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. ST 11/09/04 Shipment # DJ020		BILL OF LADING/AIR BILL NO. ST 11/09/04 Shipment # DJ020		
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1) VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Butanol) (2) Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA - 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3) Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol) (4) Gamma Spectroscopy (Caesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241; Plutonium-239 ST 11/04/04 (5) ICP/MS - 200.8 (TAC) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6010A (Add-on) (Bismuth) (6) IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorous in phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Cyanide (Total) - 335.2; pH (Soil) - 9045;</p> <p>6010 A (Supertrace) ST 11/04/04</p>					

10/11/03 00333

SDG# W04380

000018

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-056	PAGE 1 OF 2		
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days	
SAMPLING LOCATION 216-T-28; 17.5ft-20ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil			SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>		
ICE CHEST NO. 04/04-080037		FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10		METHOD OF SHIPMENT Government Vehicle Fed Ex				
SHIPPED TO Waste Sampling & Characterization Severn Trent		OFFSITE PROPERTY NO. See Shipment # DJ021			BILL OF LADING/AIR BILL NO. See Shipment # DJ021				
MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WT=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A	PRESERVATION	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
		TYPE OF CONTAINER	Gs*	aG	aG	Gs*	P	aG	aG
		NO. OF CONTAINER(S)	3	1	1	3	1	1	1
		VOLUME	40mL	120mL	120mL	40mL	500mL	250mL	120mL
		SPECIAL HANDLING AND/OR STORAGE N/A RADIOACTIVE Tie To B19106	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (2), (3), (5), (6)	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	PCBs - 8082;	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME						
19188	SOIL	10-20-04	1040	X	X	X	X	X	
CHAIN OF POSSESSION				SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME						
J.S. POPE / OSAW	10-20-04 1230	SITE RMA FRIDGE	10-20-04 1230						
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME						
J. R. RMA Fridge	11/10/04 0810	Greg Thomas / Greg Thomas	11/10/04 0810						
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME						
Greg Thomas / Greg Thomas	11/10/04 0815	Fed Ex							
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME						
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME						
LABORATORY SECTION	RECEIVED BY Jill Clark	DATE/TIME 11.12.04 0940	TITLE						
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME						

000019

FORM 1303

SDG# 4804380

1304

STL ST. LOUIS

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-025-056	PAGE 2 OF 2
COLLECTOR Pope/Plister/Wilberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ	PRICE CODE 2A	DATA TURNAROUND 24 Hours
SAMPLING LOCATION D 216-T-28; 17.5ft-20ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. 04/04-010037	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle Fed Ex		
SHIPPED TO Waste Sampling & Characterization <i>See Trent</i>	OFFSITE PROPERTY NO. <i>MS 47 11/10/04 See Shipment # DJ021</i>		BILL OF LADING/AIR BILL NO. <i>See Shipment # DJ021</i>		
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1)VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Butanol) (2)Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA - 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3)Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol) (4)Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma.Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241; (5)ICP/MS - 200.8 (TAL) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6010A (Add-on) (Bismuth) (6)IC Anions - 300.0 (Chloride, Fluoride, Nitrogen In Nitrate, Nitrogen In Nitrite, Phosphorous In phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen In ammonium) Cyanide (Total) - 335.2; pH (Soil) - 9045;</p>					

LOT# 000033

SDG# M04380

000020

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Appendix 5
Data Validation Supporting Documentation

000021

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-LW-1/LW-2		DATA PACKAGE: W04380		
VALIDATOR:	TLI	LAB:	ST	DATE: 3/21/05	
			SDG:	W04380	
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
B19188		B19189			
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable? Yes No N/A
 Continuing calibrations acceptable? Yes No N/A
 Standards traceable? Yes No N/A
 Standards expired? Yes No N/A
 Calculation check acceptable? Yes No N/A
 DDT and endrin breakdowns acceptable? Yes No N/A

Comments: _____

PCB DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) Yes No N/A
Calibration blank results acceptable? (Levels D, E) Yes No N/A
Laboratory blanks analyzed? Yes No N/A
Laboratory blank results acceptable? Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A
Comments: No FB

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed? Yes No N/A
Surrogate recoveries acceptable? Yes No N/A
Surrogates traceable? (Levels D, E) Yes No N/A
Surrogates expired? (Levels D, E) Yes No N/A
MS/MSD samples analyzed? Yes No N/A
MS/MSD results acceptable? Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
MS/MSD standards expired? (Levels D, E) Yes No N/A
LCS/BSS samples analyzed? Yes No N/A
LCS/BSS results acceptable? Yes No N/A
Standards traceable? (Levels D, E) Yes No N/A
Standards expired? (Levels D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A
Performance audit sample(s) analyzed? Yes No N/A
Performance audit sample results acceptable? Yes No N/A
Comments: 89 - surr diluted out - J NO PAF
NO MS/MSD - J all

PCB DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

- Duplicate RPD values acceptable? Yes No N/A
- Duplicate results acceptable? Yes No N/A
- MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
- MS/MSD standards expired? (Levels D, E) Yes No N/A
- Field duplicate RPD values acceptable? Yes No N/A
- Field split RPD values acceptable? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: no ms/msd - J all

6. SYSTEM PERFORMANCE (Levels D and E)

- Chromatographic performance acceptable? Yes No N/A
- Positive results resolved acceptably? Yes No N/A

Comments: _____

7. HOLDING TIMES (all levels)

- Samples properly preserved? Yes No N/A
- Sample holding times acceptable? Yes No N/A

Comments: HT - 15 days J all

PCB DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) Yes No N/A
Compound quantitation acceptable? (Levels D, E) Yes No N/A
Results reported for all requested analyses? Yes No N/A
Results supported in the raw data? (Levels D, E) Yes No N/A
Samples properly prepared? (Levels D, E) Yes No N/A
Detection limits meet RDL? Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A
Comments: 4/1/04 - all over

9. SAMPLE CLEANUP (Levels D and E)

Fluorilil ® (or other absorbent) cleanup performed? Yes No N/A
Lot check performed? Yes No N/A
Check recoveries acceptable? Yes No N/A
GPC cleanup performed? Yes No N/A
GPC check performed? Yes No N/A
GPC check recoveries acceptable? Yes No N/A
GPC calibration performed? Yes No N/A
GPC calibration check performed? Yes No N/A
GPC calibration check retention times acceptable? Yes No N/A
Check/calibration materials traceable? Yes No N/A
Check/calibration materials Expired? Yes No N/A
Analytical batch QC given similar cleanup? Yes No N/A
Transcription/Calculation Errors? Yes No N/A
Comments: _____

Appendix 6

Additional Documentation Requested by Client

000026

METHOD BLANK REPORT

GC Semivolatiles

Client Lot #....: W04380 Work Order #....: GWQNG1AA Matrix.....: SOLID
 MB Lot-Sample #: F4K110000-300
 Analysis Date...: 11/15/04 Prep Date.....: 11/11/04
 Dilution Factor: 1 Prep Batch #....: 4316300

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>
		<u>LIMIT</u>	<u>UNITS</u>	
Aroclor 1016	ND	33	ug/kg	SW846 8082
Aroclor 1221	ND	33	ug/kg	SW846 8082
Aroclor 1232	ND	33	ug/kg	SW846 8082
Aroclor 1242	ND	33	ug/kg	SW846 8082
Aroclor 1248	ND	33	ug/kg	SW846 8082
Aroclor 1254	ND	33	ug/kg	SW846 8082
Aroclor 1260	ND	33	ug/kg	SW846 8082

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Decachlorobiphenyl	101	(10 - 150)

NOTE(S) :

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

000027

METHOD BLANK REPORT

GC Semivolatiles

Client Lot #...: W04380
 MB Lot-Sample #: F4K150000-270

Work Order #...: GW1NA1AA

Matrix.....: SOLID

Analysis Date...: 11/16/04
 Dilution Factor: 1

Prep Date.....: 11/15/04
 Prep Batch #...: 4320270

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		
		<u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
Aroclor 1016	ND	160	ug/kg	SW846 8082
Aroclor 1221	ND	160	ug/kg	SW846 8082
Aroclor 1232	ND	160	ug/kg	SW846 8082
Aroclor 1242	ND	160	ug/kg	SW846 8082
Aroclor 1248	ND	160	ug/kg	SW846 8082
Aroclor 1254	ND	160	ug/kg	SW846 8082
Aroclor 1260	ND	160	ug/kg	SW846 8082

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Decachlorobiphenyl	122	(10 - 150)

NOTE(S):

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

000028

LABORATORY CONTROL SAMPLE DATA REPORT

GC Semivolatiles

Client Lot #....: W04380 Work Order #....: GWQNG1AC Matrix.....: SOLID
 LCS Lot-Sample#: F4K110000-300
 Prep Date.....: 11/11/04 Analysis Date...: 11/15/04
 Prep Batch #....: 4316300
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>METHOD</u>
Aroclor 1016	167	158	ug/kg	95	SWB46 8082
Aroclor 1260	167	156	ug/kg	94	SWB46 8082
<u>SURROGATE</u>		<u>PERCENT</u> <u>RECOVERY</u>		<u>RECOVERY</u> <u>LIMITS</u>	
Decachlorobiphenyl		108		(68 - 150)	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters

000029

LABORATORY CONTROL SAMPLE DATA REPORT

GC Semivolatiles

Client Lot #....: W04380 Work Order #....: GW1NA1AC Matrix.....: SOLID
 LCS Lot-Sample#: F4K150000-270
 Prep Date.....: 11/15/04 Analysis Date...: 11/16/04
 Prep Batch #....: 4320270
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE AMOUNT</u>	<u>MEASURED AMOUNT</u>	<u>UNITS</u>	<u>PERCENT RECOVERY</u>	<u>METHOD</u>
Aroclor 1016	167	197	ug/kg	118	SW846 8082
Aroclor 1260	167	192	ug/kg	115	SW846 8082

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Decachlorobiphenyl	122	(68 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters

000030

Date: 24 March 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-LW-1/LW-2 Characterization - Soil
Subject: Radiochemistry - Data Package No. W04380



INTRODUCTION

This memo presents the results of data validation on Data Package No. W04380 prepared by Severn Trent (STL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B193K1	10/26/04	Soil	C	See note 1

1 - Gamma spectroscopy, thorium-232 (aspec), tritium, technetium-99, nickel-63, carbon-14, strontium-90.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan (DOE/RL-2001-66, Draft A, Redline, May 2002). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Laboratory (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the required detection limit (RDL), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All laboratory blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 65-135% or 70-130%, depending on the analyte. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of an LCS analysis, all thorium-232 results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than +/- 35 percent, the results are acceptable. If

000002

either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against the required target quantitation limits (RTQLs) to ensure that laboratory detection levels meet the required criteria. Five analytes exceeded the RTQL. Under the FHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific RTQL.

- **Completeness**

Data package SDG No. W04380 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of an LCS analysis, all thorium-232 results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Five analytes exceeded the RTQL. Under the FHI statement of work, no qualification is required.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001-66, Draft A, Redline, *200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan*, May 2002.

Appendix 1

Glossary of Data Reporting Qualifiers

000005

Qualifiers which may be applied by data validators in compliance with the FHI statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

000006

Appendix 2

Summary of Data Qualification

000007

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: W04380	REVIEWER: TLI	DATE: 3/24/05	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Thorium-232	J	All	No LCS analysis

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: FLUOR-HANFORD			
Laboratory: Severn Trent			
Case:	SDG: W04380		
Sample Number	B193K1		
Remarks			
Sample Date	10/26/04		
Radiochemistry	RTQL	Result	Q
Technetium-99	15	18.6	U*
Tritium	400	2.79	U
Cobalt-60	0.05	1.77	
Cesium-137	0.1	6560	
Europium 152	0.1	0.383	U*
Europium 154	0.1	1.17	U*
Europium 155	0.1	-0.346	U*
Strontium-90	1	4490	U*
Carbon-14	50	1.32	U
Nickel-63	30	14.9	
Thorium-232	1	0.503	UJ
* - RTQL exceeded			

000010

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

FORM I

Date: 29-Dec-04

SAMPLE RESULTS

Lab Name: STL Richland

SDG: W04380

Collection Date: 10/26/2004 9:41:00 AM

Lot-Sample No.: J4K190450-1

Report No.: 27562

Received Date: 11/19/2004 12:00:00 PM

Client Sample ID: B193K1

COC No.:

Matrix: SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
ch: 4327401	TC99_ETVDSK_LSC				Work Order: GXGX91AE		Report DB ID: 9GXGX910					
TC-99	1.86E+01	U	1.09E+01	2.12E+01	2.50E+01	pCi/g	100%	0.74	12/18/04 03:45 a		0.05	LSC6
							1.20E+01	1.50E+01			G	
								(1.8)				
ch: 4327402	906.0_H3_LSC				Work Order: GXGX91AF		Report DB ID: 9GXGX910					
H-3	2.79E+00	U	6.78E+00	7.62E+00	1.66E+01	pCi/g	100%	0.17	12/23/04 06:32 a		1.007	LSC3
							7.64E+00	4.00E+02			G	
								0.73				
ch: 4327403	GAMMA_GS				Work Order: GXGX91AG		Report DB ID: 9GXGX910					
CO-60	1.77E+00		3.28E-01	3.28E-01	8.46E-02	pCi/g		(20.9)	12/8/04 03:15 p		35.5	GER1\$
							5.00E-02	(10.8)			g	
CS-137	6.56E+03		7.75E+02	7.75E+02	8.66E-01	pCi/g		(7581.4)	12/8/04 03:15 p		35.5	GER1\$
							1.00E-01	(16.9)			g	
EU-152	3.83E-01	U	1.78E+00	1.78E+00	2.94E+00	pCi/g		0.13	12/8/04 03:15 p		35.5	GER1\$
							1.00E-01	0.43			g	
EU-154	1.17E+00	U	3.79E-01	3.79E-01	4.79E-01	pCi/g		(2.4)	12/8/04 03:15 p		35.5	GER1\$
							1.00E-01	(6.2)			g	
EU-155	-3.46E-01	U	1.24E+00	1.24E+00	2.04E+00	pCi/g		-0.17	12/8/04 03:15 p		35.5	GER1\$
							1.00E-01	-0.56			g	
ch: 4327405	SRTOT_SEP_PRECIP_GPC				Work Order: GXGX91AA		Report DB ID: 9GXGX910					
STRONTIUM	4.49E+03	U	8.69E+01	6.34E+03	1.56E+01	pCi/g	96%	(287.5)	12/15/04 05:53 p		0.05	GPC27I
							7.26E+00	(1.4)			G	
ch: 4327406	C14_LSC				Work Order: GXGX91AH		Report DB ID: 9GXGX910					

Richland MDC|MDA,Lc - Detection, Decision Level based on Instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

FLRchSample U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

J A97

FORM I

Date: 29-Dec-04

SAMPLE RESULTS

Lab Name: STL Richland

SDG: W04380

Collection Date: 10/26/2004 9:41:00 AM

Lot-Sample No.: J4K190450-1

Report No.: 27562

Received Date: 11/19/2004 12:00:00 PM

Client Sample ID: B193K1

COC No.:

Matrix: SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Allquot Size	Primary Detector
C-14	-6.35E-01	U	1.32E+00	1.62E+00	3.27E+00	pCi/g	100%	-0.19	12/23/04 10:04 a		0.505	LSC3
							1.57E+00	5.00E+01			G	
ich: 4327409	NI63LSC				Work Order: GXGX91AC			Report DB ID: 9GXGX910				
NI-63	1.40E+02		1.49E+01	1.02E+02	2.79E+01	pCi/g	86%	(5.)	12/17/04 07:48 a		0.05	LSC5
							1.35E+01	3.00E+01			G	
ch: 4327412	THISO_IE_PRECIP_AEA				Work Order: GXGX91AD			Report DB ID: 9GXGX910				
TH-232	3.56E-01	U	5.03E-01	7.06E-01	4.82E-01	pCi/g	92%	0.74	12/22/04 08:14 p		0.05	ALP17
							1.00E+00	(1.)			G	

No. of Results: 11 Comments:

R
3/21/05

Richland MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

TLRchSample U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

0 A97

0000012

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000013

STL Richland
2800 George Washington Way
Richland, WA 99354

Tel: 509 375 3131 Fax: 509 375 5590
www.stl-inc.com

Certificate of Analysis

Fluor Hanford
P.O. Box 1000, T6-03
Richland, WA 99352

December 29, 2004

Attention: Steve Trent

SAF Number	:	F03-025
Date SDG Closed	:	November 19, 2004
Number of Samples	:	One (1)
Sample Type	:	Soil
SDG Number	:	W04380
Data Deliverable	:	45-Day / Summary

AMENDED CASE NARRATIVE

I. Introduction

On November 19, 2004, one soil sample was received at STL Richland (STLR) for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Fluor Hanford (FH) specific ID:

<u>FH ID#</u>	<u>STLR ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
B193K1	GXGX9	SOIL	11/19/04

II. Sample Receipt

The sample was received in good condition and no anomalies were noted during check-in. [Note: the sample was received at STL ST. Louis on November 10, 2004 and returned to STL Richland on November 19, 2004.]

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analysis was:

Alpha Spectroscopy
Thorium-232 by method RICHRC5084
Gas Proportional Counting
Total Strontium by method RICHRC5006

Gamma Spectroscopy
Gamma by method RICHRC5017
Liquid Scintillation Counting
Carbon-14 by method RICHRC5022
Nickel-63 by method RICHRC5069
Technetium-99 by method RICHRC5078
Tritium by method RICHRC5037

IV. Quality Control

The analytical results for each analysis performed under SDG W04380 includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

V. Comments

Alpha Spectroscopy

Thorium-232 by method RICHRC5084

The LCS, batch blank, sample and sample duplicate (B193K1) results are within contractual requirements.

Gas Proportional Counting

Total Strontium by method RICHRC5006

The achieved MDAs for samples B193K1 and B193K1 duplicate are greater than the CRDL due to sample matrix effects; reduced volumes analyzed based on elevated screen results. The detected activity significantly exceeds the achieved MDAs, therefore the results are accepted for reporting. Except as noted, the LCS, batch blank, sample and sample duplicate (B193K1) results are within contractual requirements.

Gamma Spectroscopy

Gamma by method RICHRC5017:

There was insufficient sample volume received to prepare a sample duplicate analysis. The precision determination was achieved by recounting the sample on a second detector. The achieved MDAs for samples B193K1 and B193K1 duplicate are greater than the CRDL due to sample matrix effects; reduced volumes analyzed based on elevated screen results. The detected activities for Co-60, Cs-137 and Eu-154 significantly exceed the achieved MDAs, therefore the results are accepted for reporting. The Eu-154 results for samples B193K1 and B193K1 duplicate may be false positive values; the key-line activity is greater than the achieved MDA, but the identification of the nuclide is rejected based on abundance criteria. Am-241 is detected in samples B193K1 and B193K1 duplicate. Except as noted, the LCS, batch blank, sample and sample duplicate (B193K1) results are within contractual requirements.

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Liquid Scintillation Counting
Carbon-14 by method RICHRC5022

The LCS, batch blank, sample and sample duplicate (B193K1) results are within contractual requirements.

Nickel-63 by method RICHRC5069

The LCS, batch blank, sample and sample duplicate (B193K1) results are within contractual requirements.

Tritium by method RICHRC5037

The LCS, batch blank, sample and sample duplicate (B193K1) results are within contractual requirements.

Technetium-99 by method RICHRC5078

The achieved MDAs for the LCS, batch blank and samples B193K1, B193K1 matrix spike and B193K1 duplicate are greater than the CRDL due to sample matrix effects; reduced volumes analyzed based on elevated screen results. The QC were analyzed using a volume comparable to the sample dilutions. The results are accepted for reporting with the MDAs achieved. Except as noted, the LCS, batch blank, sample, sample duplicate (B193K1) and sample matrix spike (B193K1) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:



for
Beverly I. Giroir
Project Manager

000016

Appendix 5

Data Validation Supporting Documentation

3. Continuing Calibration (Levels D, E)

N/A

Calibration checked within required frequency? Yes No N/A

Calibration check acceptable? Yes No N/A

Calibration check standards traceable? Yes No N/A

Calibration check standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

4. Background Counts (Levels D, E)

N/A

Background Counts checked within required frequency? Yes No N/A

Background Counts acceptable? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

5. Blanks (Levels B, C, D, E) N/A

Method blank analyzed within required frequency? Yes No N/A

Method blank results acceptable? Yes No N/A

Analytes detected in method blank? Yes No N/A

Field blank(s) analyzed? Yes No N/A

Field blank results acceptable? Yes No N/A

Analytes detected in field blank(s)? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: no FEB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) N/A

LCS /BSS analyzed within required frequency? Yes No N/A

LCS/BSS recoveries acceptable? Yes No N/A

LCS/BSS traceable? (Levels D,E) Yes No N/A

LCS/BSS expired? (Levels D,E) Yes No N/A

LCS/BSS levels correct? (Levels D,E) Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: no sh 232 LCS - J all

7. Chemical Carrier Recovery (Levels C, D, E) N/A

Chemical carrier added? Yes No N/A

Chemical recovery acceptable? Yes No N/A

Chemical carrier traceable? (Levels D, E) Yes No N/A

Chemical carrier expired? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

Comments: _____

8. Tracer Recovery (Levels C, D, E) N/A

Tracer added?..... Yes No N/A

Tracer recovery acceptable? Yes No N/A

Tracer traceable? (Levels D, E) Yes No N/A

Tracer expired? (Levels D, E)..... Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

Comments: _____

9. Matrix Spikes (Levels C, D, E)..... N/A

Matrix spike analyzed? Yes No N/A

Spike recoveries acceptable? Yes No N/A

Spike source traceable? (Levels D, E) Yes No N/A

Spike source expired? Levels D, E)..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E)..... Yes No N/A

Comments: _____

TC-99 - MS all other used yield
per FHI

10. Duplicates (Levels C, D, E)..... N/A

Duplicates Analyzed at required frequency? Yes No N/A

RPD Values Acceptable? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: _____

11. Field QC Samples (Levels C, D E)..... N/A

Field duplicate sample(s) analyzed? Yes No N/A

Field duplicate RPD values acceptable? Yes No N/A

Field split sample(s) analyzed? Yes No N/A

Field split RPD values acceptable? Yes No N/A

Performance audit sample(s) analyzed? Yes No N/A

Performance audit sample results acceptable? Yes No N/A

Comments: _____

12. Holding Times (All levels)

Are sample holding times acceptable? Yes No N/A

Comments: _____

13. Results and Detection Limits (All Levels)..... N/A

Results reported for all required sample analyses?..... Yes No N/A

Results supported in raw data?(Levels D, E)..... Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: TC-99, EU-154, SR-90 over
EU152 + 155

Appendix 6

Additional Documentation Requested by Client

000025

FORM II

Date: 29-Dec-04

DUPLICATE RESULTS

Lab Name: STL Richland

SDG: W04380

Collection Date: 10/26/2004 9:41:00 AM

Lot-Sample No.: J4K190450-1

Report No.: 27562

Received Date: 11/19/2004 12:00:00 PM

Client Sample ID: B193K1 DUP

COC No.:

Matrix: SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
ch: 4327401	TC99_ETVDSK_LSC				Work Order: GXGX91AK	Report DB ID: GXGX91KR			Orig Sa DB ID: 9GXGX910			
TC-99	1.95E+01	U	1.10E+01	2.11E+01	2.52E+01	pCi/g	100%	0.77	12/18/04 05:50 a		0.05	LSC6
	1.86E+01	U	RPD 4.4			1.50E+01		(1.8)			G	
ch: 4327402	906.0_H3_LSC				Work Order: GXGX91AL	Report DB ID: GXGX91LR			Orig Sa DB ID: 9GXGX910			
H-3	3.38E+00	U	6.79E+00	7.63E+00	1.64E+01	pCi/g	100%	0.21	12/23/04 07:14 a		1.005	LSC3
	2.79E+00	U	RPD 18.9			4.00E+02		0.88			G	
ch: 4327403	GAMMA_GS				Work Order: GXGX91AM	Report DB ID: GXGX91MR			Orig Sa DB ID: 9GXGX910			
CO-60	1.64E+00		2.61E-01	2.61E-01	8.06E-02	pCi/g		(20.3)	12/9/04 11:01 a		35.5	GER4\$1
	1.77E+00		RPD 7.9			5.00E-02		(12.6)			g	
CS-137	6.36E+03		7.44E+02	7.44E+02	7.99E-01	pCi/g		(7963.8)	12/9/04 11:01 a		35.5	GER4\$1
	6.58E+03		RPD 3.1			1.00E-01		(17.1)			g	
EU-152	2.85E-01	U	1.52E+00	1.52E+00	2.50E+00	pCi/g		0.11	12/9/04 11:01 a		35.5	GER4\$1
	3.83E-01	U	RPD 29.2			1.00E-01		0.38			g	
EU-154	1.46E+00	U	3.92E-01	3.92E-01	4.42E-01	pCi/g		(3.3)	12/9/04 11:01 a		35.5	GER4\$1
	1.17E+00	U	RPD 22.1			1.00E-01		(7.4)			g	
EU-155	1.05E+00	U	1.07E+00	1.07E+00	1.76E+00	pCi/g		0.6	12/9/04 11:01 a		35.5	GER4\$1
	-3.46E-01	U	RPD 395.0			1.00E-01		(2.)			g	
ch: 4327405	SRTOT_SEP_PRECIP_GPC				Work Order: GXGX91AN	Report DB ID: GXGX91NR			Orig Sa DB ID: 9GXGX910			
STRONTIUM	4.38E+03	U	8.64E+01	6.18E+03	1.58E+01	pCi/g	95%	(277.8)	12/15/04 05:53 p		0.05	GPC27C
	4.49E+03	U	RPD 2.5					(1.4)			G	

Richland RPD - Relative Percent Difference.

TLRchDupV4.1 MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

17 U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

000026

FORM II

Date: 29-Dec-04

DUPLICATE RESULTS

Lab Name: STL Richland

SDG: W04380

Collection Date: 10/26/2004 9:41:00 AM

Lot-Sample No.: J4K190450-1

Report No.: 27562

Received Date: 11/19/2004 12:00:00 PM

Client Sample ID: B193K1 DUP

COC No.:

Matrix: SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
ch: 4327406	C14_LSC				Work Order: GXGX91AP	Report DB ID: GXGX91PR			Orig Sa DB ID: 9GXGX910			
C-14	1.04E-01	U	1.35E+00	1.65E+00	3.26E+00	pCi/g	100%	0.03	12/23/04 10:46 a		0.506	LSC3
	-6.35E-01	U	RPD	-277.9		5.00E+01		0.13			G	
ch: 4327409	Ni63LSC				Work Order: GXGX91AQ	Report DB ID: GXGX91QR			Orig Sa DB ID: 9GXGX910			
Ni-63	1.31E+02		1.45E+01	9.47E+01	2.73E+01	pCi/g	88%	(4.8)	12/17/04 07:48 a		0.05	LSC5
	1.40E+02		RPD	6.6		3.00E+01		(2.8)			G	
ch: 4327412	THISO_JE_PRECIP_AEA				Work Order: GXGX91AR	Report DB ID: GXGX91RR			Orig Sa DB ID: 9GXGX910			
TH-232	1.66E-01	U	3.31E-01	4.04E-01	4.49E-01	pCi/g	96%	0.37	12/22/04 08:14 p		0.05	ALP172
	3.56E-01	U	RPD	72.9		1.00E+00		0.82			G	

Alpha Spec Result Sum = 1.7E-01

o. of Results: 11 Comments:

Richland RPD - Relative Percent Difference.

TLRchDupV4.1 MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

17 U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

000027

FORM II
BLANK RESULTS

Date: 29-Dec-04

Lab Name: STL Richland
Matrix: SOIL

SDG: W04380
Report No.: 27562

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Allquot Size	Primary Detector
ch: 4327406	C14_LSC											
C-14	1.77E-02	U	1.37E-01	1.67E-01	3.30E-01	pCi/g	100%	0.05	12/23/04 08:39 a		5.0	LSC3
					1.58E-01	5.00E+01		0.21			G	
ch: 4327412	THISO_IE_PRECIP_AEA.											
TH-232	0.00E+00	U	0.00E+00	8.35E-01	9.24E-01	pCi/g	60%	0.	12/22/04 08:14 p		0.05	ALP173
						1.00E+00		0.			G	
ch: 4327409	NI63LSC											
NI-63	1.58E+00	U	2.37E+00	4.00E+00	5.63E+00	pCi/g	85%	0.28	12/17/04 07:48 a		0.25	LSC5
					2.73E+00	3.00E+01		0.79			G	
ch: 4327401	TC99_ETVDSK_LSC											
TC-99	2.19E+01	U	1.11E+01	2.20E+01	2.55E+01	pCi/g	100%	0.86	12/18/04 06:52 a		0.05	LSC8
					1.22E+01	2.00E+01		(2.)			G	
ch: 4327402	906.0_H3_LSC											
H-3	1.44E-01	U	1.43E-01	1.60E-01	3.36E-01	pCi/g	100%	0.43	12/23/04 05:07 a		10.0	LSC3
					1.55E-01	4.00E+02		(1.8)			G	
ch: 4327403	GAMMA_GS											
CO-60	1.76E-03	U	1.86E-02	1.86E-02	3.27E-02	pCi/g		0.05	12/8/04 03:16 p		52.0	GER4\$1
						5.00E-02		0.19			g	
CS-137	-2.00E-03	U	1.63E-02	1.63E-02	2.73E-02	pCi/g		-0.07	12/8/04 03:16 p		52.0	GER4\$1
						1.00E-01		-0.25			g	
EU-152	-1.31E-02	U	3.90E-02	3.90E-02	6.61E-02	pCi/g		-0.2	12/8/04 03:16 p		52.0	GER4\$1
						1.00E-01		-0.67			g	

Richland MDC|MDA, Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

TLRchBlank U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

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FORM II
BLANK RESULTS

Date: 29-Dec-04

Lab Name: STL Richland

SDG: W04380

Matrix: SOIL

Report No.: 27562

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Alliquot Size	Primary Detector
EU-154	-2.64E-02	U	5.18E-02	5.18E-02	8.68E-02	pCi/g		-0.3	12/8/04 03:16 p		52.0	GER4\$1
						1.00E-01		-(1.)			g	
EU-155	1.96E-02	U	3.18E-02	3.18E-02	5.59E-02	pCi/g		0.35	12/8/04 03:16 p		52.0	GER4\$1
						1.00E-01		(1.2)			g	
tch: 4327405	SRTOT_SEP_PRECIP_GPC			Work Order: GXK591AA		Report DB ID: GXK591AB						
STRONTIUM	3.35E+00	U	6.79E+00	8.27E+00	1.52E+01	pCi/g	94%	0.22	12/15/04 05:53 p		0.05	GPC27D
					7.05E+00			0.81			G	

No. of Results: 11

Comments:

Richland MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

TLRchBlank U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

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FORM II

Date: 29-Dec-04

MATRIX SPIKE RESULTS

Lab Name: STL Richland

SDG: W04380

Lot-Sample No.: J4K190450-1

Report No.: 27562

Matrix: SOIL

Parameter	SpikeResult, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rec- overy	Exp- ected	Exp Uncert	Analysis, Prep Date	Aliquot Size	Primary Detector
tciv: 4327401	TC99_ETVDSK_LSC												
				Work Order: GXGX91AJ		Report DB ID: GXGX91JW				Orig Sa DB ID: 9GXGX910			
TC-99	4.76E+03		6.04E+01	3.32E+03	2.48E+01	pCi/g	100%	52.29%	9.10E+03	.16E+01	12/18/04 04:47 a	0.05	LSC6
	1.86E+01	RPD	2.9									G	

No. of Results: 1 Comments:

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Richland RER - Replicate Error Ratio = $(S-D)/[\text{sqrt}(\text{sq}(\text{TPUs})+\text{sq}(\text{TPUd}))]$ as defined by ICPT BOA.
 TLrchMs Bias - $(\text{Result}/\text{Expected})-1$ as defined by ANSI N13.30.
 0 A97

Date: 24 March 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-LW-1/LW-2 Characterization - Soil
Subject: Volatiles - Data Package No. W04380



INTRODUCTION

This memo presents the results of data validation on Data Package No. W04380 prepared by Severn Trent (STL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B19188	10/20/04	Soil	C	See note 1
B19189	10/26/04	Soil	C	See note 1

1 - Volatile by 8260A and TPH-G.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan (DOE/RL-2001-66, Draft A, Redline, May 2002). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

• Holding Times/Sample Preservation

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 14 days of the date of sample collection.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the

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limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all volatile organic results in sample B19189 were qualified as estimates and flagged "J".

Due to the holding time being exceeded by greater than twice the limit, all detected volatile organic results in sample B19188 were qualified as estimates and flagged "J".

Due to the holding time being exceeded by greater than twice the limit, all undetected volatile organic results in sample B19188 were rejected and flagged "R".

Due to the holding time being exceeded by greater than twice the limit, all TPH-G results were rejected and flagged "R".

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the project quantitation limit (MDL) and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the MDL, qualified as undetected and flagged "U".

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike

Matrix spike/matrix spike duplicate and blank spike analyses are used to assess the analytical accuracy of the reported data. The matrix spike/matrix spike duplicate are

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used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within 50-150%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to matrix spike (24%) and matrix spike duplicate (21%) results outside QC limits, the 1,1,2,2-tetrachloroethane results in sample B19189 was qualified as an estimate and flagged "J".

Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic and TPH-G results in sample B19188 were qualified as estimates and flagged "J".

Due to an LCS (76%) recovery outside QC limits, all styrene results in sample B19189 were qualified as estimates and flagged "J".

All other accuracy and blank spike results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

All surrogate recovery results were acceptable.

• Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of

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duplicate matrix spike analyses performed on a sample. Sample results must be within RPD limits of +/- 35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in sample B19188 were qualified as estimates and flagged "J".

All other MS/MSD RPD results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Detection Limits**

Reported analytical detection levels are compared against the required target quantitation limits (RTQLs) to ensure that laboratory detection levels meet the required criteria. All volatile organic analytes except 1,1-dichloroethane exceeded the RTQL. Under the FHI statement of work, no qualification is required.

- **Completeness**

Data package No. W04380 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 51%.

MAJOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all undetected volatile organic results in sample B19188 were rejected and flagged "R". Due to the holding time being exceeded by greater than twice the limit, all TPH-G results were rejected and flagged "R". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

Due to the holding time being exceeded by less than twice the limit, all volatile organic results in sample B19189 were qualified as estimates and flagged "J". Due to the holding time being exceeded by greater than twice the limit, all detected

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volatile organic results in sample B19188 were qualified as estimates and flagged "J". Due to matrix spike (24%) and matrix spike duplicate (21%) results outside QC limits, the 1,1,2,2-tetrachloroethane results in sample B19189 was qualified as an estimate and flagged "J". Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic and TPH-G results in sample B19188 were qualified as estimates and flagged "J". Due to an LCS (76%) recovery outside QC limits, all styrene results in sample B19189 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All volatile organic analytes except 1,1-dichloroethane exceeded the RTQL. Under the FHI statement of work, no qualification is required.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001-66, Draft A, Redline, *200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan*, May 2002.

Appendix 1

Glossary of Data Reporting Qualifiers

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Qualifiers which may be applied by data validator in compliance with the BHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

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Appendix 2

Summary of Data Qualification

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VOLATILE DATA QUALIFICATION SUMMARY*

SDG: W04380	REVIEWER: TLI	DATE: 3/24/05	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All detected analytes	J	B19189	Holding time
Methylene chloride	J	B19188	Holding time
All but methylene chloride	R	B19188	Holding time
TPH-G	R	All	Holding time
1,1,2,2-Tetrachloroethane	J	B19189	MS/MSD recovery
Styrene	J	B19189	LCS recovery
All	J	B19188	No MS/MSD analysis

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: FLUOR-HANFORD							
Laboratory: Severn Trent							
Case:		SDG: W04380					
Sample Number		B19188		B19189			
Remarks							
Sample Date		10/20/04		10/26/04			
VOA	RTQL	Result	Q	Result	Q	Result	Q
Chloromethane		ND	UR	ND	UJ		
Bromomethane		ND	UR	ND	UJ		
Chloroethane		ND	UR	ND	UJ		
Acetone	20	ND	UR	ND	UJ		
1,1-Dichloroethene		ND	UR	ND	UJ		
Acetonitrile		ND	UR	ND	UJ		
Methylene Chloride	5		3.7 J		3.2 J		
Carbon Disulfide		ND	UR	ND	UJ		
1,1-Dichloroethane	10	ND	UR	ND	UJ		
2-Butanone	10	ND	UR	ND	UJ		
1,2-Dichloroethene (total)		ND	UR	ND	UJ		
Chloroform	5	ND	UR	ND	UJ		
1,1,1-Trichloroethane	5	ND	UR	ND	UJ		
Carbon Tetrachloride	5	ND	UR	ND	UJ		
1,2-Dichloroethane	5	ND	UR	ND	UJ		
Benzene	5	ND	UR	ND	UJ		
Trichloroethene		ND	UR	ND	UJ		
1,2-Dichloropropane		ND	UR	ND	UJ		
Dibromochloromethane		ND	UR	ND	UJ		
4-Methyl-2-pentanone		ND	UR	ND	UJ		
cis-1,3-Dichloropropene		ND	UR	ND	UJ		
Toluene	5	ND	UR	ND	UJ		
trans-1,3-Dichloropropene		ND	UR	ND	UJ		
1,1,2-Trichloroethane	5	ND	UR	ND	UJ		
2-Hexanone		ND	UR	ND	UJ		
Tetrachloroethene		ND	UR	ND	UJ		
Dibromochloromethane		ND	UR	ND	UJ		
Chlorobenzene	5	ND	UR	ND	UJ		
Ethylbenzene	5	ND	UR	ND	UJ		
Vinyl Chloride		ND	UR	ND	UJ		
Xylenes (total)	5	ND	UR	ND	UJ		
Styrene		ND	UR	ND	UJ		
Bromoform		ND	UR	ND	UJ		
1,1,2,2-Tetrachloroethane		ND	UR	ND	UJ		
1,2,4-Trimethylbenzene		ND	UR	ND	UJ		
n-Hexane		ND	UR	ND	UJ		
1-Butanol	5000	ND	UR	ND	UJ		
TPH-G	500	ND	UR	ND	UR		

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation of results. All other qualifiers shown were applied during validation.

FLOOR HANFORD IC

Client Sample ID: B19188

GC/MS Volatiles

Lot-Sample #....: F4K120109-001 Work Order #....: GWTXX1AC Matrix.....: SOLID
 Date Sampled....: 10/20/04 Date Received...: 11/11/04
 Prep Date.....: 11/22/04 Analysis Date...: 11/22/04
 Prep Batch #....: 4329192
 Dilution Factor: 1
 % Moisture.....: 5.3 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Chloromethane	ND	11	ug/kg	0.24
Bromomethane	ND	11	ug/kg	0.94
Chloroethane	ND	11	ug/kg	0.59
Acetone	ND	21	ug/kg	1.4
1,1-Dichloroethene	ND	5.3	ug/kg	0.72
Acetonitrile	ND	53	ug/kg	5.6
Methylene chloride	3.7% ^{sp}	5.3	ug/kg	2.8
Carbon disulfide	ND	5.3	ug/kg	0.28
1,1-Dichloroethane	ND	5.3	ug/kg	0.22
2-Butanone	ND	21	ug/kg	1.2
1,2-Dichloroethene (total)	ND	11	ug/kg	0.64
Chloroform	ND	5.3	ug/kg	0.13
1,1,1-Trichloroethane	ND	5.3	ug/kg	0.12
Carbon tetrachloride	ND	5.3	ug/kg	0.15
1,2-Dichloroethane	ND	5.3	ug/kg	0.15
Benzene	ND	5.3	ug/kg	0.12
Trichloroethene	ND	5.3	ug/kg	0.063
1,2-Dichloropropane	ND	5.3	ug/kg	0.11
Bromodichloromethane	ND	5.3	ug/kg	0.074
4-Methyl-2-pentanone	ND	21	ug/kg	0.95
cis-1,3-Dichloropropene	ND	5.3	ug/kg	0.16
Toluene	ND	5.3	ug/kg	0.62
trans-1,3-Dichloropropene	ND	5.3	ug/kg	0.56
1,1,2-Trichloroethane	ND	5.3	ug/kg	0.81
2-Hexanone	ND	21	ug/kg	1.3
Tetrachloroethene	ND	5.3	ug/kg	0.21
Dibromochloromethane	ND	5.3	ug/kg	0.62
Chlorobenzene	ND	5.3	ug/kg	0.13
Ethylbenzene	ND	5.3	ug/kg	0.40
Vinyl chloride	ND	5.3	ug/kg	0.68
Xylenes (total)	ND	11	ug/kg	0.87
Styrene	ND	5.3	ug/kg	0.21
Bromoform	ND	5.3	ug/kg	0.65
1,1,2,2-Tetrachloroethane	ND	5.3	ug/kg	0.77
1,2,4-Trimethylbenzene	ND	5.3	ug/kg	0.58
n-Hexane	ND	11	ug/kg	0.87

(Continued on next page)

FLUOR HANFORD IC

Client Sample ID: B19188

GC/MS Volatiles

Lot-Sample #....: F4K120109-001 Work Order #....: GWTXX1AC Matrix.....: SOLID

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Toluene-d8	94	(80 - 130)
Dibromofluoromethane	99	(78 - 130)
1,2-Dichloroethane-d4	103	(72 - 134)
4-Bromofluorobenzene	92	(68 - 150)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

VR
3/21/05

FLOOR HANFORD IC

Client Sample ID: B19189

GC/MS Volatiles

Lot-Sample #...: F4K100333-002 Work Order #...: GWNFG1CF Matrix.....: SOLID
 Date Sampled...: 10/26/04 Date Received...: 11/10/04
 Prep Date.....: 11/11/04 Analysis Date...: 11/11/04
 Prep Batch #...: 4317380
 Dilution Factor: 1
 † Moisture.....: 6.6 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Chloromethane	ND	11	ug/kg	0.25
Bromomethane	ND	11	ug/kg	0.95
Chloroethane	ND	11	ug/kg	0.60
Acetone	ND	21	ug/kg	1.4
1,1-Dichloroethene	ND	5.4	ug/kg	0.73
Acetonitrile	ND	54	ug/kg	5.7
Methylene chloride	3.2 ND	5.4	ug/kg	2.8
Carbon disulfide	ND ^{>2x}	5.4	ug/kg	0.29
1,1-Dichloroethane	ND	5.4	ug/kg	0.22
2-Butanone	ND	21	ug/kg	1.2
1,2-Dichloroethene (total)	ND	11	ug/kg	0.65
Chloroform	ND	5.4	ug/kg	0.13
1,1,1-Trichloroethane	ND	5.4	ug/kg	0.12
Carbon tetrachloride	ND	5.4	ug/kg	0.15
1,2-Dichloroethane	ND	5.4	ug/kg	0.15
Benzene	ND	5.4	ug/kg	0.12
Trichloroethene	ND	5.4	ug/kg	0.064
1,2-Dichloropropane	ND	5.4	ug/kg	0.11
Bromodichloromethane	ND	5.4	ug/kg	0.075
4-Methyl-2-pentanone	ND	21	ug/kg	0.96
cis-1,3-Dichloropropene	ND	5.4	ug/kg	0.16
Toluene	ND	5.4	ug/kg	0.63
trans-1,3-Dichloropropene	ND	5.4	ug/kg	0.57
1,1,2-Trichloroethane	ND	5.4	ug/kg	0.82
2-Hexanone	ND	21	ug/kg	1.3
Tetrachloroethene	ND	5.4	ug/kg	0.21
Dibromochloromethane	ND	5.4	ug/kg	0.63
Chlorobenzene	ND	5.4	ug/kg	0.13
Ethylbenzene	ND	5.4	ug/kg	0.41
Vinyl chloride	ND	5.4	ug/kg	0.68
Xylenes (total)	ND	11	ug/kg	0.88
Styrene	ND	5.4	ug/kg	0.21
Bromoform	ND	5.4	ug/kg	0.66
1,1,2,2-Tetrachloroethane	ND	5.4	ug/kg	0.78
1,2,4-Trimethylbenzene	ND	5.4	ug/kg	0.59
n-Hexane	ND	11	ug/kg	0.88
1-Butanol	ND	110	ug/kg	35

Handwritten notes: "US" at the top, a vertical arrow pointing down, and "ND" written next to the Methylene chloride result.

(Continued on next page)

Handwritten signature and date: "R 3/21/05"

FLOOR HANFORD IC

Client Sample ID: B19189

GC/MS Volatiles

Lot-Sample #....: F4K100333-002 Work Order #....: GWNFG1CF Matrix.....: SOLID

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Toluene-d8	93	(80 - 130)
Dibromofluoromethane	83	(78 - 130)
1,2-Dichloroethane-d4	88	(72 - 134)
4-Bromofluorobenzene	75	(68 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

Handwritten signature and date: 3/21/02

PLUOR HANFORD IC

Client Sample ID: B19188

GC Volatiles

Lot-Sample #...: F4K120109-001 Work Order #...: GWTXXIAP Matrix.....: SOLID
 Date Sampled...: 10/20/04 Date Received...: 11/11/04
 Prep Date.....: 12/10/04 Analysis Date...: 12/10/04
 Prep Batch #...: 4348103
 Dilution Factor: 1
 * Moisture.....: 5.3 Method.....: SW846 8015 MOD

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Volatile Petroleum Hydrocarbons	ND <i>UR</i>	0.11	mg/kg	0.021

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	81	(28 - 124)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

PK
3/21/05

FLUOR HANFORD IC

Client Sample ID: B19189

GC Volatiles

Lot-Sample #....: F4K100333-002 Work Order #....: GWNFG1CK Matrix.....: SOLID
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 Prep Date.....: 11/29/04 Analysis Date...: 11/29/04
 Prep Batch #....: 4335264
 Dilution Factor: 1
 % Moisture.....: 6.6 Method.....: SWB46 8015 MOD

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Volatile Petroleum Hydrocarbons	ND UR	0.11	mg/kg	0.021

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	79	(28 - 124)

NOTE(S) :
 Results and reporting limits have been adjusted for dry weight.

Handwritten:
 W
 3/21/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000018

Case Narrative
SDG: W04380

This report contains the analytical results for the four samples received under chain of custody by STL St. Louis between November 10, 2004 and November 19, 2004. These samples are associated with your F03-025 SAF. The SDG was closed on 11/24/04.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Samples were received at the laboratory after the holding time had expired for several of the requested tests.

Volatiles

The LCS recoveries for batch 4317380 are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable LCS recoveries.

The MS/MSD recoveries are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable MS/MSD recoveries.

Case Narrative
SDG: W04380

Anions

The MS recovery for Nitrite was outside the QC limits. The anion matrix spike solution contains all routine anions. Spiking technique, sample preparation and method compliance is demonstrated by the remaining acceptable MS recoveries. Poor matrix spike recovery is attributed to matrix interference.

Nitrate

The MS recovery for Nitrate is outside the established QC limits. A matrix interference is physically evident in the sample. Method performance is demonstrated by acceptable LCS and LCS-Duplicate recoveries. No further action is required.

PCB

Due to its extremely high radiation readings, sample B19189 was analyzed at an initial ten fold dilution. The reporting limit has been adjusted for the dilution. Surrogates were diluted out.

The MS/MSD sample required at least a twenty fold dilution, making recoveries for the MS/MSD unreliable. There was no reportable data for the MS/MSD. LCS recoveries were acceptable.

Continuing Calibration Checks 200, 208 and 216 all failed low for Aroclor 1016 and 1260 on the confirmation channel (A). All recoveries were acceptable on Channel B, which is where these samples were reported from.

Mercury

Analysis of the sample designated for MS/MSD resulted in a sufficiently high concentration such that the MS/MSD are above the instrument's calibration range. MS/MSD results should be considered estimated values.

Semi-Volatiles

Due to sample matrix, limited volume and RAD levels, an MS/MSD was not run for method 8270 on a sample from this SDG.

There was insufficient volume of sample B19188 provided to perform the analysis at the method specified amount due to laboratory request to limit volume due to high RAD levels. A reduced sample amount was prepared. The reporting limit has been elevated accordingly.

Case Narrative
SDG: W04380

Metals

The MS/MSD recoveries for sample B19189 for Antimony, Chromium and Nickel are outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

The MS/MSD recovery in sample B191F1 for Chromium, Copper and Lead is outside the established QC limits. The concentration of these metals in the original sample is greater than four times the amount spiked, making percent recovery information ineffective. The MS/MSD recovery for Antimony, Nickel and Silver is outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

STL ST. LOUIS

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-057		PAGE 1 OF 2			
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE BN DATA TURNAROUND 45 Days / 45 Days			
SAMPLING LOCATION 216-T-28; 22.5ft-25ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil			SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>				
ICE CHEST NO. GRP-04-003		FIELD LOGBOOK NO. HNF-N-356-1		COA 119143E510		METHOD OF SHIPMENT Government Vehicle					
SHIPPED TO Waste Sampling & Characterization Severn Trent		OFFSITE PROPERTY NO. ST 11/09/04 See Shipment # D1020			BILL OF LADING/AIR BILL NO. ST 11/09/04 See Shipment # D1020						
MATRIX* A=Air DL=Drum L=Liquids DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A		PRESERVATION		Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
			TYPE OF CONTAINER		Gs*	gG	gG	Gs*	P	gG	gG
			NO. OF CONTAINER(S)		3	1	1	3	1	1	1
			VOLUME		40mL	120mL	120mL	40mL	500mL	250mL	120mL
SPECIAL HANDLING AND/OR STORAGE Radioactive tie to: B141C7		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	PCIS - 8082;	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.		MATRIX*		SAMPLE DATE		SAMPLE TIME					
19189		SOIL		10-26-04		0941		X	X	X	X
CHAIN OF POSSESSION				SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME		SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS			
T.S. Pope/Pfister		10-26-04 1230		Site Frike		10-26-04 1230		W04380			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
Site Frike		11/04/04 0950		Greg Thomas / Greg Thomas		11/04/04 0950					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
Greg Thomas / Greg Thomas		11/09/04 1135		MO-026 Frig #3		11/04/04 1135					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
MO-026 Frig #3		11/09/04 0820		Greg Thomas / Greg Thomas		11/09/04 0820					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
Greg Thomas / Greg Thomas		11/09/04 0835		Fed Ex							
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
LABORATORY SECTION		RECEIVED BY		TITLE		DATE/TIME					
10 OF		B-D-F		11/10/04 0900							
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD		DISPOSED BY		DATE/TIME					

10110333

SDG#B1W04380

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LOT# 141100333

SDG# M04380

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Floor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-025-057	PAGE 2 OF 2
COLLECTOR Pope/Pfister/Wlberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ	PRICE CODE 24 EN ST 11/04/04	DATA TURNAROUND 24-Hours 45 days
SAMPLING LOCATION 216-T-28; 22.5ft-25ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GRP-04-003	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle		
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. ST 11/04/04 Shipment # DJ020		BILL OF LADING/AIR BILL NO. ST 11/04/04 Shipment # DJ020		
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1)VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Butanol} (2)Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA - 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3)Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol) (4)Gamma Spectroscopy (Caesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241; Plutonium-239 ST 11/04/04 (5)ICP/MS - 200.8 (TAT) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6010A (Add-on) (Bismuth) (6)IC Anions 300.0 (Chloride, Fluoride, Nitrogen In Nitrate, Nitrogen in Nitrite, Phosphorous In phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Cyanide (Total) - 335.2; pH (Soil) - 9045;</p> <p>6010 A (Supertrace) ST 11/04/04</p>					

STL ST. LOUIS

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-056		PAGE 1 OF 2							
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N							
SAMPLING LOCATION 216-T-28; 17.5ft-20ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil				SAF NO. F03-025		DATA TURNAROUND 45 Days / 45 Days							
ICE CHEST NO. 04/04-040037		FIELD LOGBOOK NO. HNF-N-356-1		COA 119143ES10		METHOD OF SHIPMENT Government Vehicle Fed Ex		AIR QUALITY <input type="checkbox"/>							
SHIPPED TO Waste Sampling & Characterization Severn Trent		OFFSITE PROPERTY NO. See Shipment # DJ021				BILL OF LADING/AIR BILL NO. See Shipment # DJ021									
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WT=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A		PRESERVATION Cool 4C		Cool 4C	Cool 4C	Cool 4C	None	None	None					
	TYPE OF CONTAINER		GS*	LG	LG	GS*	P	LG	LG						
	NO. OF CONTAINER(S)		3	1	1	3	1	1	1						
	VOLUME		40mL	120mL	120mL	40mL	250mL	250mL	120mL						
SPECIAL HANDLING AND/OR STORAGE N/A Radioactive Tie To B19106		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS (2),(3), (5)(6)	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	PCBs - 8082;	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS					
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME												
B19188	SOIL	10-20-04	1040	X	X	X	X	X	X	X					
CHAIN OF POSSESSION				SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS							
RELINQUISHED BY/REMOVED FROM J. Spore/OS 10-20-04				DATE/TIME 1230				RECEIVED BY/STORED IN SITE RMA FRIDGE 10-20-04				DATE/TIME 1230			
RELINQUISHED BY/REMOVED FROM Site RMA Fridge				DATE/TIME 11/10/04 0910				RECEIVED BY/STORED IN Greg Thomas / Mrs. Thomas				DATE/TIME 11/10/04 0810			
RELINQUISHED BY/REMOVED FROM Greg Thomas / Mrs. Thomas				DATE/TIME 11/10/04 0915				RECEIVED BY/STORED IN Fed Ex				DATE/TIME			
RELINQUISHED BY/REMOVED FROM				DATE/TIME				RECEIVED BY/STORED IN				DATE/TIME			
RELINQUISHED BY/REMOVED FROM				DATE/TIME				RECEIVED BY/STORED IN				DATE/TIME			
RELINQUISHED BY/REMOVED FROM				DATE/TIME				RECEIVED BY/STORED IN				DATE/TIME			
LABORATORY SECTION		RECEIVED BY Jill Clark		DATE/TIME 11.12.04 0940		TITLE		DATE/TIME							
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD		DATE/TIME		DISPOSED BY		DATE/TIME							

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STL ST. LOUIS

Fluor Manford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F03-025-056	PAGE 2 OF 2
COLLECTOR Pope/Pfister/Wiberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ		PRICE CODE 2A	DATA TURNAROUND
SAMPLING LOCATION 216-T-28; 17.5ft-20ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil		SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>	24 Hours
ICE CHEST NO. 04/04-010037	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle Fed Ex			
SHIPPED TO Waste Sampling & Characterization Severn Trent	OFFSITE PROPERTY NO. 24547 11/10/04 See Shipment # D1021		BILL OF LADING/AIR BILL NO. DIA 11/10/04 See Shipment # D1021			
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1)VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Butanol) (2)Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA -- 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3)Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol) (4)Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma.Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241; (5)ICP/MS - 200.8 (TAL) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6010A (Add-on) (Bismuth) (6)IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorous in phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Cyanide (Total) - 335.2; pH (Soil) - 9045;</p>						

LOT# FA10000333

SDG# W04380

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6003-618(03/03)
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Appendix 5

Data Validation Supporting Documentation

000026

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-LW-1/LW-2		DATA PACKAGE: W04380		
VALIDATOR:	TCT	LAB: ST	DATE: 3/21/05		
			SDG:	W04380	
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270	TPH-9 8015	SW-846 8270 (TCLP)
SAMPLES/MATRIX					
B19189 B19188					
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? Yes No N/A
 Initial calibrations acceptable? Yes No N/A
 Continuing calibrations acceptable? Yes No N/A
 Standards traceable? Yes No N/A
 Standards expired? Yes No N/A
 Calculation check acceptable? Yes No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) Yes No N/A
 Calibration blank results acceptable? (Levels D, E) Yes No N/A
 Laboratory blanks analyzed? Yes No N/A
 Laboratory blank results acceptable? Yes No N/A
 Field/trip blanks analyzed? (Levels C, D, E) Yes No N/A
 Field/trip blank results acceptable? (Levels C, D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: NO FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? Yes No N/A
 Surrogate/system monitoring compound recoveries acceptable? Yes No N/A
 Surrogates traceable? (Levels D, E) Yes No N/A
 Surrogates expired? (Levels D, E) Yes No N/A
 MS/MSD samples analyzed? Yes No N/A
 MS/MSD results acceptable? Yes No N/A
 MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
 MS/MSD standards? (Levels D, E) Yes No N/A
 LCS/BSS samples analyzed? Yes No N/A
 LCS/BSS results acceptable? Yes No N/A
 Standards traceable? (Levels D, E) Yes No N/A
 Standards expired? (Levels D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable? Yes No N/A

Comments: 1,1,2,2-tetrachloroethane - low MS/MSD - J an 89

LCS - 189 - lab flagged - J styrene

No MS for B19188 - J all (SU+TPH-G)

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? Yes No N/A

MS/MSD RPD values acceptable? Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A

MS/MSD standards expired? (Levels D, E) Yes No N/A

Field duplicate RPD values acceptable? Yes No N/A

Field split RPD values acceptable? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: NO MS/MSD - 188 all UOT + +PH

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? Yes No N/A

Internal standard areas acceptable? Yes No N/A

Internal standard retention times acceptable? Yes No N/A

Standards traceable? Yes No N/A

Standards expired? Yes No N/A

Transcription/calculation errors? Yes No N/A

Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? Yes No N/A

Sample holding times acceptable? Yes No N/A

Comments: ~~3/21/98~~ ~~3/21/98~~ under 24 - 89 - Jall - UOT

~~3/21/98~~ over 24 - 88 - R - all - UOT undetected

J - all detected

IPH-G - 88 - under 24

TPH-G - 88 + 89 over 24 - R undetected

J detected

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes	No	N/A
Compound quantitation acceptable? (Levels D, E)	Yes	No	N/A
Results reported for all requested analyses?	Yes	No	N/A
Results supported in the raw data? (Levels D, E)	Yes	No	N/A
Samples properly prepared? (Levels D, E)	Yes	No	N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: _____

VOA - all but dichloroethane over

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments: _____

Appendix 6

Additional Documentation Requested by Client

000031

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: W04380
 MB Lot-Sample #: F4K120000-380

Work Order #...: GWKGLAA

Matrix.....: SOLID

Analysis Date...: 11/11/04
 Dilution Factor: 1

Prep Date.....: 11/11/04

Prep Batch #...: 4317380

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	METHOD
Chloromethane	ND	10	ug/kg	SW846 8260B
Bromomethane	ND	10	ug/kg	SW846 8260B
Chloroethane	ND	10	ug/kg	SW846 8260B
Acetone	ND	20	ug/kg	SW846 8260B
1,1-Dichloroethene	ND	5.0	ug/kg	SW846 8260B
Acetonitrile	ND	50	ug/kg	SW846 8260B
Methylene chloride	ND	5.0	ug/kg	SW846 8260B
Carbon disulfide	ND	5.0	ug/kg	SW846 8260B
1,1-Dichloroethane	ND	5.0	ug/kg	SW846 8260B
2-Butanone	ND	20	ug/kg	SW846 8260B
1,2-Dichloroethene (total)	ND	10	ug/kg	SW846 8260B
Chloroform	ND	5.0	ug/kg	SW846 8260B
1,1,1-Trichloroethane	ND	5.0	ug/kg	SW846 8260B
Carbon tetrachloride	ND	5.0	ug/kg	SW846 8260B
1,2-Dichloroethane	ND	5.0	ug/kg	SW846 8260B
Benzene	ND	5.0	ug/kg	SW846 8260B
Trichloroethene	ND	5.0	ug/kg	SW846 8260B
1,2-Dichloropropane	ND	5.0	ug/kg	SW846 8260B
Bromodichloromethane	ND	5.0	ug/kg	SW846 8260B
4-Methyl-2-pentanone	ND	20	ug/kg	SW846 8260B
cis-1,3-Dichloropropene	ND	5.0	ug/kg	SW846 8260B
Toluene	ND	5.0	ug/kg	SW846 8260B
trans-1,3-Dichloropropene	ND	5.0	ug/kg	SW846 8260B
1,1,2-Trichloroethane	ND	5.0	ug/kg	SW846 8260B
2-Hexanone	ND	20	ug/kg	SW846 8260B
Tetrachloroethene	ND	5.0	ug/kg	SW846 8260B
Dibromochloromethane	ND	5.0	ug/kg	SW846 8260B
Chlorobenzene	ND	5.0	ug/kg	SW846 8260B
Ethylbenzene	ND	5.0	ug/kg	SW846 8260B
Vinyl chloride	ND	5.0	ug/kg	SW846 8260B
Xylenes (total)	ND	10	ug/kg	SW846 8260B
Styrene	ND	5.0	ug/kg	SW846 8260B
Bromoform	ND	5.0	ug/kg	SW846 8260B
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	SW846 8260B
1,2,4-Trimethylbenzene	ND	5.0	ug/kg	SW846 8260B
n-Hexane	ND	10	ug/kg	SW846 8260B
1-Butanol	ND	100	ug/kg	SW846 8260B

(Continued on next page)

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: W04380

Work Order #...: GWWKGLAA

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>		
	<u>RECOVERY</u>	<u>LIMITS</u>		
Toluene-d8	110	(80 - 130)		
Dibromofluoromethane	91	(78 - 130)		
1,2-Dichloroethane-d4	96	(72 - 134)		
4-Bromofluorobenzene	78	(68 - 150)		

NOTE (S) :

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

MATRIX SPIKE SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #....: W04380 Work Order #....: GWNFG1EK-MS Matrix.....: SOLID
 MS Lot-Sample #: F4K100333-002 GWNFG1EL-MSD
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 Prep Date.....: 11/11/04 Analysis Date...: 11/11/04
 Prep Batch #....: 4317380
 Dilution Factor: 1 % Moisture.....: 6.6

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD
Chloromethane	ND	53.6	58.8	ug/kg	110		SW846 8260B
	ND	53.9	55.5	ug/kg	103	5.8	SW846 8260B
Bromomethane	ND	53.6	42.7	ug/kg	80		SW846 8260B
	ND	53.9	45.7	ug/kg	85	6.7	SW846 8260B
Chloroethane	ND	53.6	57.1	ug/kg	107		SW846 8260B
	ND	53.9	59.6	ug/kg	111	4.2	SW846 8260B
Acetone	ND	53.6	69.0	ug/kg	129		SW846 8260B
	ND	53.9	76.1	ug/kg	141	9.7	SW846 8260B
1,1-Dichloroethene	ND	53.6	54.5	ug/kg	102		SW846 8260B
	ND	53.9	55.0	ug/kg	102	0.89	SW846 8260B
Methylene chloride	3.2	53.6	40.9	ug/kg	70		SW846 8260B
	3.2	53.9	45.0	ug/kg	78	9.5	SW846 8260B
Carbon disulfide	ND	53.6	72.5	ug/kg	135		SW846 8260B
	ND	53.9	74.3	ug/kg	138	2.4	SW846 8260B
1,1-Dichloroethane	ND	53.6	51.6	ug/kg	96		SW846 8260B
	ND	53.9	51.4	ug/kg	95	0.35	SW846 8260B
2-Butanone	ND	53.6	59.0	ug/kg	110		SW846 8260B
	ND	53.9	60.9	ug/kg	113	3.1	SW846 8260B
1,2-Dichloroethene (total)	ND	107	112	ug/kg	105		SW846 8260B
	ND	108	112	ug/kg	103	0.66	SW846 8260B
Chloroform	ND	53.6	50.7	ug/kg	95		SW846 8260B
	ND	53.9	51.5	ug/kg	95	1.6	SW846 8260B
1,1,1-Trichloroethane	ND	53.6	51.3	ug/kg	96		SW846 8260B
	ND	53.9	53.8	ug/kg	100	4.8	SW846 8260B
Carbon tetrachloride	ND	53.6	51.1	ug/kg	95		SW846 8260B
	ND	53.9	54.0	ug/kg	100	5.5	SW846 8260B
1,2-Dichloroethane	ND	53.6	53.2	ug/kg	99		SW846 8260B
	ND	53.9	51.8	ug/kg	96	2.6	SW846 8260B
Benzene	ND	53.6	50.1	ug/kg	93		SW846 8260B
	ND	53.9	51.7	ug/kg	96	3.3	SW846 8260B
Trichloroethene	ND	53.6	69.7	ug/kg	130		SW846 8260B
	ND	53.9	78.4	ug/kg	145	12	SW846 8260B
1,2-Dichloropropane	ND	53.6	50.9	ug/kg	95		SW846 8260B
	ND	53.9	49.0	ug/kg	91	3.9	SW846 8260B
Bromodichloromethane	ND	53.6	49.7	ug/kg	93		SW846 8260B
	ND	53.9	47.7	ug/kg	88	4.2	SW846 8260B
4-Methyl-2-pentanone	ND	53.6	42.4	ug/kg	79		SW846 8260B
	ND	53.9	41.3	ug/kg	77	2.8	SW846 8260B

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #...: W04380 Work Order #...: GWNFG1EK-MS Matrix.....: SOLID
 MS Lot-Sample #: F4K100333-002 GWNFG1EL-MSD

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD
cis-1,3-Dichloropropene	ND	53.6	47.9	ug/kg	89		SW846 8260B
	ND	53.9	47.3	ug/kg	88	1.2	SW846 8260B
Toluene	ND	53.6	58.7	ug/kg	109		SW846 8260B
	ND	53.9	58.9	ug/kg	109	0.34	SW846 8260B
trans-1,3-Dichloropropene	ND	53.6	66.9	ug/kg	125		SW846 8260B
	ND	53.9	62.7	ug/kg	116	6.5	SW846 8260B
1,1,2-Trichloroethane	ND	53.6	56.9	ug/kg	106		SW846 8260B
	ND	53.9	55.5	ug/kg	103	2.6	SW846 8260B
2-Hexanone	ND	53.6	55.7	ug/kg	104		SW846 8260B
	ND	53.9	53.2	ug/kg	99	4.7	SW846 8260B
Tetrachloroethene	ND	53.6	47.7	ug/kg	89		SW846 8260B
	ND	53.9	48.4	ug/kg	90	1.5	SW846 8260B
Dibromochloromethane	ND	53.6	53.1	ug/kg	99		SW846 8260B
	ND	53.9	55.1	ug/kg	102	3.7	SW846 8260B
Chlorobenzene	ND	53.6	53.3	ug/kg	100		SW846 8260B
	ND	53.9	51.0	ug/kg	95	4.4	SW846 8260B
Ethylbenzene	ND	53.6	54.0	ug/kg	101		SW846 8260B
	ND	53.9	57.6	ug/kg	107	6.4	SW846 8260B
Vinyl chloride	ND	53.6	59.4	ug/kg	111		SW846 8260B
	ND	53.9	60.9	ug/kg	113	2.6	SW846 8260B
Styrene	ND	53.6	44.0	ug/kg	82		SW846 8260B
	ND	53.9	54.9	ug/kg	102	22	SW846 8260B
Bromoform	ND	53.6	39.8	ug/kg	74		SW846 8260B
	ND	53.9	40.3	ug/kg	75	1.3	SW846 8260B
1,1,2,2-Tetrachloroethane	ND	53.6	13.0	ug/kg	24 a		SW846 8260B
	ND	53.9	11.4	ug/kg	21 a	13	SW846 8260B
n-Hexane	ND	53.6	38.8	ug/kg	72		SW846 8260B
	ND	53.9	46.7	ug/kg	86	18	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	112	(80 - 130)
	105	(80 - 130)
Dibromofluoromethane	81	(78 - 130)
	82	(78 - 130)
1,2-Dichloroethane-d4	94	(72 - 134)
	92	(72 - 134)
4-Bromofluorobenzene	78	(68 - 150)
	79	(68 - 150)

NOTE(S):

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

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

a Spiked analyte recovery is outside stated control limits.

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #....: W04380 Work Order #....: GWWKGLAC Matrix.....: SOLID
 LCS Lot-Sample#: F4K120000-380
 Prep Date.....: 11/11/04 Analysis Date...: 11/11/04
 Prep Batch #....: 4317380
 Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
Chloromethane	50.0	60.0	ug/kg	120	SW846 8260B
Bromomethane	50.0	42.6	ug/kg	85	SW846 8260B
Chloroethane	50.0	57.5	ug/kg	115	SW846 8260B
Acetone	50.0	54.6	ug/kg	109	SW846 8260B
1,1-Dichloroethene	50.0	52.6	ug/kg	105	SW846 8260B
Methylene chloride	50.0	42.9	ug/kg	86	SW846 8260B
Carbon disulfide	50.0	76.6 a	ug/kg	153	SW846 8260B
1,1-Dichloroethane	50.0	57.7	ug/kg	115	SW846 8260B
2-Butanone	50.0	55.6	ug/kg	111	SW846 8260B
1,2-Dichloroethene (total)	100	109	ug/kg	109	SW846 8260B
Chloroform	50.0	47.9	ug/kg	96	SW846 8260B
1,1,1-Trichloroethane	50.0	48.1	ug/kg	96	SW846 8260B
Carbon tetrachloride	50.0	48.6	ug/kg	97	SW846 8260B
1,2-Dichloroethane	50.0	48.8	ug/kg	98	SW846 8260B
Benzene	50.0	46.6	ug/kg	93	SW846 8260B
Trichloroethene	50.0	42.2	ug/kg	84	SW846 8260B
1,2-Dichloropropane	50.0	49.6	ug/kg	99	SW846 8260B
Bromodichloromethane	50.0	47.0	ug/kg	94	SW846 8260B
4-Methyl-2-pentanone	50.0	41.0	ug/kg	82	SW846 8260B
cis-1,3-Dichloropropene	50.0	46.3	ug/kg	93	SW846 8260B
Toluene	50.0	48.6	ug/kg	97	SW846 8260B
trans-1,3-Dichloropropene	50.0	57.0	ug/kg	114	SW846 8260B
1,1,2-Trichloroethane	50.0	48.4	ug/kg	97	SW846 8260B
2-Hexanone	50.0	47.1	ug/kg	94	SW846 8260B
Tetrachloroethene	50.0	41.8	ug/kg	84	SW846 8260B
Dibromochloromethane	50.0	49.8	ug/kg	100	SW846 8260B
Chlorobenzene	50.0	49.9	ug/kg	100	SW846 8260B
Ethylbenzene	50.0	52.2	ug/kg	104	SW846 8260B
Vinyl chloride	50.0	60.4	ug/kg	121	SW846 8260B
Styrene	50.0	38.1 a	ug/kg	76	SW846 8260B
Bromoform	50.0	35.6	ug/kg	71	SW846 8260B
1,1,2,2-Tetrachloroethane	50.0	33.2	ug/kg	66	SW846 8260B
n-Hexane	50.0	48.6	ug/kg	97	SW846 8260B

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LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #...: W04380 Work Order #...: GWWKGLAC Matrix.....: SOLID
LCS Lot-Sample#: F4K120000-380

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Toluene-d8	104	(88 - 115)
Dibromofluoromethane	95	(84 - 120)
1,2-Dichloroethane-d4	96	(78 - 122)
4-Bromofluorobenzene	90	(80 - 120)

NOTE(S):

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

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: W04380
MB Lot-Sample #: F4K240000-192

Work Order #...: GXQTW1AA

Matrix.....: SOLID

Analysis Date...: 11/22/04
Dilution Factor: 1Prep Date.....: 11/22/04
Prep Batch #...: 4329192

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	METHOD
Chloromethane	ND	10	ug/kg	SW846 8260B
Bromomethane	ND	10	ug/kg	SW846 8260B
Chloroethane	ND	10	ug/kg	SW846 8260B
Acetone	ND	20	ug/kg	SW846 8260B
1,1-Dichloroethene	ND	5.0	ug/kg	SW846 8260B
Acetonitrile	ND	50	ug/kg	SW846 8260B
Methylene chloride	ND	5.0	ug/kg	SW846 8260B
Carbon disulfide	ND	5.0	ug/kg	SW846 8260B
1,1-Dichloroethane	ND	5.0	ug/kg	SW846 8260B
2-Butanone	ND	20	ug/kg	SW846 8260B
1,2-Dichloroethene (total)	ND	10	ug/kg	SW846 8260B
Chloroform	ND	5.0	ug/kg	SW846 8260B
1,1,1-Trichloroethane	ND	5.0	ug/kg	SW846 8260B
Carbon tetrachloride	ND	5.0	ug/kg	SW846 8260B
1,2-Dichloroethane	ND	5.0	ug/kg	SW846 8260B
Benzene	ND	5.0	ug/kg	SW846 8260B
Trichloroethene	ND	5.0	ug/kg	SW846 8260B
1,2-Dichloropropane	ND	5.0	ug/kg	SW846 8260B
Bromodichloromethane	ND	5.0	ug/kg	SW846 8260B
4-Methyl-2-pentanone	ND	20	ug/kg	SW846 8260B
cis-1,3-Dichloropropene	ND	5.0	ug/kg	SW846 8260B
Toluene	ND	5.0	ug/kg	SW846 8260B
trans-1,3-Dichloropropene	ND	5.0	ug/kg	SW846 8260B
1,1,2-Trichloroethane	ND	5.0	ug/kg	SW846 8260B
2-Hexanone	ND	20	ug/kg	SW846 8260B
Tetrachloroethene	ND	5.0	ug/kg	SW846 8260B
Dibromochloromethane	ND	5.0	ug/kg	SW846 8260B
Chlorobenzene	ND	5.0	ug/kg	SW846 8260B
Ethylbenzene	ND	5.0	ug/kg	SW846 8260B
Vinyl chloride	ND	5.0	ug/kg	SW846 8260B
Xylenes (total)	ND	10	ug/kg	SW846 8260B
Styrene	ND	5.0	ug/kg	SW846 8260B
Bromoform	ND	5.0	ug/kg	SW846 8260B
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	SW846 8260B
1,2,4-Trimethylbenzene	ND	5.0	ug/kg	SW846 8260B
n-Hexane	ND	10	ug/kg	SW846 8260B

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Toluene-d8	95	(80 - 130)

(Continued on next page)

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: W04380

Work Order #...: GXQ1W1AA

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
Dibromofluoromethane	105	(78 - 130)		
1,2-Dichloroethane-d4	102	(72 - 134)		
4-Bromofluorobenzene	91	(68 - 150)		

NOTE(S) :

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

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #...: W04380 Work Order #...: GXQTW1AC Matrix.....: SOLID
 LCS Lot-Sample#: F4K240000-192
 Prep Date.....: 11/22/04 Analysis Date...: 11/22/04
 Prep Batch #...: 4329192
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE AMOUNT</u>	<u>MEASURED AMOUNT</u>	<u>UNITS</u>	<u>PERCENT RECOVERY</u>	<u>METHOD</u>
Chloromethane	50.0	44.5	ug/kg	89	SW846 8260B
Bromomethane	50.0	36.2	ug/kg	72	SW846 8260B
Chloroethane	50.0	49.0	ug/kg	98	SW846 8260B
Acetone	50.0	39.8	ug/kg	80	SW846 8260B
1,1-Dichloroethene	50.0	47.9	ug/kg	96	SW846 8260B
Methylene chloride	50.0	39.2	ug/kg	78	SW846 8260B
Carbon disulfide	50.0	68.3	ug/kg	137	SW846 8260B
1,1-Dichloroethane	50.0	51.8	ug/kg	104	SW846 8260B
2-Butanone	50.0	50.1	ug/kg	100	SW846 8260B
1,2-Dichloroethene (total)	100	102	ug/kg	102	SW846 8260B
Chloroform	50.0	49.1	ug/kg	98	SW846 8260B
1,1,1-Trichloroethane	50.0	50.2	ug/kg	100	SW846 8260B
Carbon tetrachloride	50.0	50.1	ug/kg	100	SW846 8260B
1,2-Dichloroethane	50.0	49.1	ug/kg	98	SW846 8260B
Benzene	50.0	47.5	ug/kg	95	SW846 8260B
Trichloroethene	50.0	48.3	ug/kg	97	SW846 8260B
1,2-Dichloropropane	50.0	50.6	ug/kg	101	SW846 8260B
Bromodichloromethane	50.0	51.6	ug/kg	103	SW846 8260B
4-Methyl-2-pentanone	50.0	54.3	ug/kg	109	SW846 8260B
cis-1,3-Dichloropropene	50.0	53.1	ug/kg	106	SW846 8260B
Toluene	50.0	48.0	ug/kg	96	SW846 8260B
trans-1,3-Dichloropropene	50.0	58.9	ug/kg	118	SW846 8260B
1,1,2-Trichloroethane	50.0	50.0	ug/kg	100	SW846 8260B
2-Hexanone	50.0	57.0	ug/kg	114	SW846 8260B
Tetrachloroethene	50.0	35.9	ug/kg	72	SW846 8260B
Dibromochloromethane	50.0	51.3	ug/kg	103	SW846 8260B
Chlorobenzene	50.0	49.9	ug/kg	100	SW846 8260B
Ethylbenzene	50.0	49.4	ug/kg	99	SW846 8260B
Vinyl chloride	50.0	45.5	ug/kg	91	SW846 8260B
Styrene	50.0	51.5	ug/kg	103	SW846 8260B
Bromoform	50.0	56.3	ug/kg	113	SW846 8260B
1,1,2,2-Tetrachloroethane	50.0	54.8	ug/kg	110	SW846 8260B
n-Hexane	50.0	41.4	ug/kg	83	SW846 8260B

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LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #...: W04380 Work Order #...: GXQTLAC Matrix.....: SOLID
LCS Lot-Sample#: F4K240000-192

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Toluene-d8	96	(88 - 115)
Dibromofluoromethane	98	(84 - 120)
1,2-Dichloroethane-d4	101	(78 - 122)
4-Bromofluorobenzene	102	(80 - 120)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.
Bold print denotes control parameters

METHOD BLANK REPORT

GC Volatiles

Client Lot #....: W04380 Work Order #....: GOWDJ1AA Matrix.....: SOLID
MB Lot-Sample #: F4L130000-103 Prep Date.....: 12/10/04
Analysis Date...: 12/10/04 Prep Batch #....: 4348103
Dilution Factor: 1

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
Volatile Petroleum Hydrocarbons	ND	0.10	mg/kg	SW846 8015 MOD

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	87	(28 - 124)

NOTE(S):

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

000042

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: F4K100333 Work Order #...: GXX3L1AA Matrix.....: SOLID
MB Lot-Sample #: F4K300000-264
Prep Date.....: 11/29/04
Analysis Date...: 11/29/04 Prep Batch #...: 4335264
Dilution Factor: 1

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
Volatile Petroleum Hydrocarbons	ND	0.10	mg/kg	SW846 8015 MOD

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Trifluorotoluene	85	(28 - 124)

NOTE(S):

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

MATRIX SPIKE SAMPLE DATA REPORT

GC Volatiles

Client Lot #....: F4K100333 Work Order #....: GWNFG1ET-MS Matrix.....: SOLID
 MS Lot-Sample #: F4K100333-002 GWNFG1EU-MSD
 Date Sampled....: 10/26/04 Date Received...: 11/10/04
 Prep Date.....: 11/29/04 Analysis Date...: 11/29/04
 Prep Batch #....: 4335264
 Dilution Factor: 1 % Moisture.....: 6.6

PARAMETER	SAMPLE	SPIKE	MEASRD	UNITS	PERCNT		METHOD
	AMOUNT	AMT	AMOUNT		RECVRY	RPD	
Volatile Petroleum Hydrocarbons	ND	1.07	0.877	mg/kg	82		SW846 8015 MOD
	ND	1.07	0.991	mg/kg	93	12	SW846 8015 MOD

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Trifluorotoluene	91	(28 - 124)
	98	(28 - 124)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters
 Results and reporting limits have been adjusted for dry weight.

LABORATORY CONTROL SAMPLE DATA REPORT

GC Volatiles

Client Lot #...: W04380 Work Order #...: GOWDJLAC Matrix.....: SOLID
 LCS Lot-Sample#: F4L130000-103
 Prep Date.....: 12/10/04 Analysis Date...: 12/10/04
 Prep Batch #...: 4348103
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE AMOUNT</u>	<u>MEASURED AMOUNT</u>	<u>UNITS</u>	<u>PERCENT RECOVERY</u>	<u>METHOD</u>
Volatile Petroleum Hydrocarbons	1.00	0.974	mg/kg	97	SW846 8015 MO

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	105	(85 - 108)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters

000045

LABORATORY CONTROL SAMPLE DATA REPORT

GC Volatiles

Client Lot #...: F4K100333 Work Order #...: GXX3L1AC Matrix.....: SOLID
 LCS Lot-Sample#: F4K300000-264
 Prep Date.....: 11/29/04 Analysis Date...: 11/29/04
 Prep Batch #...: 4335264
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>METHOD</u>
Volatile Petroleum Hydrocarbons	1.00	0.875	mg/kg	87	SW846 8015 MO

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Trifluorotoluene	98	(85 - 108)

NOTE(S) :

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

Bold print denotes control parameters

Date: 24 March 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-LW-1/LW-2 Characterization - Soil
Subject: Inorganics - Data Package No. W04380 & W04380A (SDG W04380)

INTRODUCTION

This memo presents the results of data validation on Data Package No. W04380 prepared by Severn Trent (STL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B19188	10/20/04	Soil	C	See note 1
B19189	10/26/04	Soil	C	See note 1
B191F1	10/26/04	Soil	C	See note 1 & 2

- 1 - ICP by 6010B and mercury by 7471A
2 - TCLP (lead & chromium) by 6010B (SDG W04380A).

Data validation was conducted in accordance with the FHI validation statement of work and the 200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan (DOE/RL-2001-66, Draft A, Redline, May 2002). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.



000001

- **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & Matrix Spike Duplicate

Matrix spike (MS), matrix spike duplicate (MSD) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 74% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to a MS recovery outside QC limits (0%) and a MSD recovery outside QC limits (0%), all chromium results in sample B19189 and B19188 were qualified as estimates and flagged "J".

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Due to a MS recovery outside QC limits (57%) and a MSD recovery outside QC limits (55%), all antimony results in sample B19189 and B19188 were qualified as estimates and flagged "J".

Due to a MS recovery outside QC limits (28%) and a MSD recovery outside QC limits (24%), all nickel results in sample B19189 and B19188 were qualified as estimates and flagged "J".

Due to a MS recovery outside QC limits (49%) and a MSD recovery outside QC limits (50%), the antimony result in sample B191F1 was qualified as estimate and flagged "J".

Due to a MS recovery outside QC limits (70%) and a MSD recovery outside QC limits (62%), the nickel result in sample B191F1 was qualified as estimate and flagged "J".

Due to a MS recovery outside QC limits (134%) and a MSD recovery outside QC limits (131%), the silver result in sample B191F1 was qualified as estimate and flagged "J".

Due to the lack of a matrix spike/matrix spike duplicate analysis, all TCLP results were qualified as estimates and flagged "J".

All other MS/MSD results were acceptable.

Laboratory Control Sample

The LCS is used to monitor the overall performance of all steps in the analysis. Recoveries must fall within the range of 80% to 120% for LCS analysis. Samples with a recovery of less than 50% are rejected and flagged "UR". Samples with a recovery of 50% to 79% and a sample recovery below the IDL are qualified "UJ". Samples with a recovery of greater than 120% or less than 80% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 120% and a sample result less than the IDL, no qualification is required.

Due to an LCS recovery of 72%, all antimony results in samples B19189 and B19188 were qualified as estimates and flagged "J".

All other LCS results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike and matrix spike duplicate (MSD) analyses performed

000003

on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than +/- 35%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to the lack of a matrix spike/matrix spike duplicate analysis, all TCLP results were qualified as estimates and flagged "J".

Due to an RPD (sample/MS) outside QC limits (86%), the mercury result in sample B191F1 were qualified as an estimate and flagged "J".

Due to the lack of matrix spike/matrix spike duplicate recovery, all chromium results in samples B19189 and B19188 were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

No field duplicate results were submitted for analysis.

- **Analytical Detection Limits**

Reported analytical detection levels are compared against the required target quantitation limits (RTQLs) to ensure that laboratory detection levels meet the required criteria. Two cadmium results were reported above the RTQL. Under the FHI statement of work, no qualification is required. All other undetected results met the analyte specific RTQL.

- **Completeness**

Data package No. W04380 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to a MS recovery outside QC limits (0%) and a MSD recovery outside QC limits (0%), all chromium results in sample B19189 and B19188 were qualified as estimates and flagged "J".
- Due to a MS recovery outside QC limits (57%) and a MSD recovery outside QC limits (55%), all antimony results in sample B19189 and B19188 were qualified as estimates and flagged "J".
- Due to a MS recovery outside QC limits (28%) and a MSD recovery outside QC limits (24%), all nickel results in sample B19189 and B19188 were qualified as estimates and flagged "J".
- Due to a MS recovery outside QC limits (49%) and a MSD recovery outside QC limits (50%), the antimony result in sample B191F1 was qualified as estimate and flagged "J".
- Due to a MS recovery outside QC limits (70%) and a MSD recovery outside QC limits (62%), the nickel result in sample B191F1 was qualified as estimate and flagged "J".
- Due to a MS recovery outside QC limits (134%) and a MSD recovery outside QC limits (131%), the silver result in sample B191F1 was qualified as estimate and flagged "J".
- Due to the lack of a matrix spike/matrix spike duplicate analysis, all TCLP results were qualified as estimates and flagged "J".
- Due to an LCS recovery of 72%, all antimony results in samples B19189 and B19188 were qualified as estimates and flagged "J".
- Due to an RPD (sample/MS) outside QC limits (86%), the mercury result in sample B191F1 were qualified as an estimate and flagged "J".
- Due to the lack of matrix spike/matrix spike duplicate recovery, all chromium results in samples B19189 and B19188 were qualified as estimates and flagged "J".

Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Two cadmium results were reported above the RTQL. Under the FHI statement of work, no qualification is required.

000005

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001-66, Draft A, Redline, *200-LW-1/200-LW-2 Chemical Laboratory Waste Group OUs RI/FS Work Plan*, May 2002.

Appendix 1
Glossary of Data Reporting Qualifiers

000007

Qualifiers which may be applied by data validators in compliance with FHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

000008

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: W04380	REVIEWER: TLI	DATE: 3/24/05	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chromium Antimony Nickel	J	B19189, B19188	MS/MSD recovery
Antimony Nickel Silver	J	B191F1	MS/MSD recovery
TCLP chromium TCLP lead	J	All	No MS/MSD analysis
Mercury	J	B191F1	RPD
Antimony	J	B19189, B19188	LCS analysis

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000011

Project: FLUOR-HANFORD							
Laboratory: Severn Trent							
Case:		SDG: W04380					
Sample Number		B19188		B19189		B191F1	
Remarks							
Sample Date		10/20/04		10/26/04		8/18/04	
Inorganics	RTQL	Result	Q	Result	Q	Result	Q
Bismuth	10	156		202		NA	
Antimony	6	0.60 J		1.4 J		2.9 J	
Arsenic	1	0.74		1.2		1.2	
Barium	20	98.4		87.3		127	
Beryllium	0.5	0.23		0.27		0.27	
Cadmium	0.5	ND*	U	ND*	U	0.28	
Chromium	1	6.1 J		81.7 J		259	
Copper	2.5	15.1		19.7		122	
Lead	1	16.7		4.3		489	
Nickel	4	8.9 J		52.7 J		55.0 J	
Selenium	10	ND	U	ND	U	ND	U
Silver	0.5	1.3		2.0		6.0 J	
Uranium	1	34.7		104		202	
Mercury	0.2	6.5		5.10		69.2 J	
TCLP lead		NA		NA		0.20 J	
TCLP chromium		NA		NA		ND	UJ
* - RTQL exceeded							

000012

FLUOR HANFORD IC

Client Sample ID: B19189

TOTAL Metals

Lot-Sample #....: F4K100333-002
 Date Sampled....: 10/26/04
 % Moisture.....: 6.6

Date Received...: 11/10/04

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 4322056						
Bismuth	202	21.4	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AC
		Dilution Factor: 1		MDL.....: 2.1		
Antimony	1.4 J	1.1	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AH
		Dilution Factor: 1		MDL.....: 0.21		
Arsenic	1.2	1.1	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AJ
		Dilution Factor: 1		MDL.....: 0.19		
Barium	87.3 J	21.4	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AK
		Dilution Factor: 1		MDL.....: 0.047		
Beryllium	0.27 B	0.54	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AL
		Dilution Factor: 1		MDL.....: 0.041		
Cadmium	ND	0.54	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AM
		Dilution Factor: 1		MDL.....: 0.024		
Chromium	81.7 J	1.1	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AP
		Dilution Factor: 1		MDL.....: 0.60		
Copper	19.7	2.7	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AR
		Dilution Factor: 1		MDL.....: 0.40		
Lead	4.3	0.54	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AU
		Dilution Factor: 1		MDL.....: 0.21		
Nickel	52.7 J	4.3	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AX
		Dilution Factor: 1		MDL.....: 0.14		
Selenium	ND	0.54	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1AO
		Dilution Factor: 1		MDL.....: 0.32		
Silver	2.0	1.1	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1A1
		Dilution Factor: 1		MDL.....: 0.62		
Uranium	104	53.5	mg/kg	SW846 6010B	11/17-11/18/04	GWNFG1R6
		Dilution Factor: 1		MDL.....: 14.9		
Prep Batch #....: 4322095						
Mercury	5.1	0.36	mg/kg	SW846 7471A	11/17/04	GWNFG1CJ
		Dilution Factor: 10		MDL.....: 0.077		

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FLUOR HANFORD IC

Client Sample ID: B19188

TOTAL Metals

Lot-Sample #...: F4K120109-001
 Date Sampled...: 10/20/04
 % Moisture.....: 5.3

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	4322056					
Bismuth	156	21.1	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AH
		Dilution Factor: 1		MDL.....: 2.1		
Antimony	0.60 ^K _{2/28} J	1.1	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AN
		Dilution Factor: 1		MDL.....: 0.21		
Arsenic	0.74 B	1.1	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AP
		Dilution Factor: 1		MDL.....: 0.19		
Barium	98.4 J	21.1	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AQ
		Dilution Factor: 1		MDL.....: 0.046		
Beryllium	0.23 B	0.53	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AR
		Dilution Factor: 1		MDL.....: 0.040		
Cadmium	ND	0.53	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AT
		Dilution Factor: 1		MDL.....: 0.023		
Chromium	6.1 J	1.1	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AV
		Dilution Factor: 1		MDL.....: 0.59		
Copper	15.1	2.6	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AX
		Dilution Factor: 1		MDL.....: 0.39		
Lead	16.7	0.53	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AI
		Dilution Factor: 1		MDL.....: 0.21		
Nickel	8.9 J	4.2	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AA
		Dilution Factor: 1		MDL.....: 0.14		
Selenium	ND	0.53	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AA5
		Dilution Factor: 1		MDL.....: 0.32		
Silver	1.3	1.1	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AA6
		Dilution Factor: 1		MDL.....: 0.61		
Uranium	34.7 B	52.8	mg/kg	SW846 6010B	11/17-11/18/04	GWTXX1AA7
		Dilution Factor: 1		MDL.....: 14.7		
Prep Batch #...:	4322095					
Mercury	6.5 ^K _{10/1/04}	0.35	mg/kg	SW846 7471A	11/17/04	GWTXX1AA8
		Dilution Factor: 10		MDL.....: 0.076		

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FLUOR HANFORD IC

Client Sample ID: B191F1

TOTAL Metals

Lot-Sample #....: F4K180368-001
 Date Sampled....: 08/18/04
 % Moisture.....: 6.9

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 4336050						
Antimony	2.9 J	1.1	mg/kg	SW846 6010B	12/01/04	GXCC51AD
		Dilution Factor: 1		MDL.....: 0.21		
Arsenic	1.2	1.1	mg/kg	SW846 6010B	12/01/04	GXCC51AE
		Dilution Factor: 1		MDL.....: 0.19		
Barium	127 J	21.5	mg/kg	SW846 6010B	12/01/04	GXCC51AF
		Dilution Factor: 1		MDL.....: 0.047		
Beryllium	0.27 B	0.54	mg/kg	SW846 6010B	12/01/04	GXCC51AG
		Dilution Factor: 1		MDL.....: 0.041		
Cadmium	0.28 B	0.54	mg/kg	SW846 6010B	12/01/04	GXCC51AH
		Dilution Factor: 1		MDL.....: 0.024		
Chromium	259	1.1	mg/kg	SW846 6010B	12/01/04	GXCC51AJ
		Dilution Factor: 1		MDL.....: 0.60		
Copper	122	2.7	mg/kg	SW846 6010B	12/01/04	GXCC51AK
		Dilution Factor: 1		MDL.....: 0.40		
Lead	489	0.54	mg/kg	SW846 6010B	12/01/04	GXCC51AL
		Dilution Factor: 1		MDL.....: 0.21		
Nickel	55.0 J	4.3	mg/kg	SW846 6010B	12/01/04	GXCC51AM
		Dilution Factor: 1		MDL.....: 0.14		
Selenium	ND	0.54	mg/kg	SW846 6010B	12/01/04	GXCC51AN
		Dilution Factor: 1		MDL.....: 0.32		
Silver	6.0 J	1.1	mg/kg	SW846 6010B	12/01/04	GXCC51AP
		Dilution Factor: 1		MDL.....: 0.62		
Bismuth	202	21.5	mg/kg	SW846 6010B	12/01/04	GXCC51AQ
		Dilution Factor: 1		MDL.....: 2.2		
Prep Batch #....: 4348439						
Mercury	69.2 J	1.8	mg/kg	SW846 7471A	12/13-12/14/04	GXCC51AC
		Dilution Factor: 50		MDL.....: 0.39		

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STL ST. LOUIS

FLUOR HANFORD IC

Client Sample ID: B191F1

TCLP Metals

Lot-Sample #...: F5B070203-001
Date Sampled...: 08/18/04
Leach Date.....: 02/08/05

Date Received...: 02/07/05
Leach Batch #...: P503912

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...	5040226						
Chromium	ND <i>J</i>	0.025	mg/L	SW846 6010B	02/09-02/10/05	G3XV41AA	
		Dilution Factor: 2.5		MDL.....: 0.018			
Lead	0.20 <i>3/1/05 J</i>	0.25	mg/L	SW846 6010B	02/09-02/10/05	G3XV41AC	
		Dilution Factor: 2.5		MDL.....: 0.20			

NOTE(S):

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching Procedure Method 1311
B Estimated result. Result is less than RL.

J
3/21/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Case Narrative

SDG: W04380

This report contains the analytical results for the four samples received under chain of custody by STL St. Louis between November 10, 2004 and November 19, 2004. These samples are associated with your F03-025 SAF. The SDG was closed on 11/24/04.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Samples were received at the laboratory after the holding time had expired for several of the requested tests.

Volatiles

The LCS recoveries for batch 4317380 are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable LCS recoveries.

The MS/MSD recoveries are outside QC limits for less than 10% of the compounds spiked. Laboratory QC practices, based on federal guidance documents, allow for up to 10% of the spike compounds to be outside QC criteria without necessitating re-preparation/re-analysis. Sample purge efficiency and compliance is demonstrated by the remaining acceptable MS/MSD recoveries.

Case Narrative
SDG: W04380

Anions

The MS recovery for Nitrite was outside the QC limits. The anion matrix spike solution contains all routine anions. Spiking technique, sample preparation and method compliance is demonstrated by the remaining acceptable MS recoveries. Poor matrix spike recovery is attributed to matrix interference.

Nitrate

The MS recovery for Nitrate is outside the established QC limits. A matrix interference is physically evident in the sample. Method performance is demonstrated by acceptable LCS and LCS-Duplicate recoveries. No further action is required.

PCB

Due to its extremely high radiation readings, sample B19189 was analyzed at an initial ten fold dilution. The reporting limit has been adjusted for the dilution. Surrogates were diluted out.

The MS/MSD sample required at least a twenty fold dilution, making recoveries for the MS/MSD unreliable. There was no reportable data for the MS/MSD. LCS recoveries were acceptable.

Continuing Calibration Checks 200, 208 and 216 all failed low for Aroclor 1016 and 1260 on the confirmation channel (A). All recoveries were acceptable on Channel B, which is where these samples were reported from.

Mercury

Analysis of the sample designated for MS/MSD resulted in a sufficiently high concentration such that the MS/MSD are above the instrument's calibration range. MS/MSD results should be considered estimated values.

Semi-Volatiles

Due to sample matrix, limited volume and RAD levels, an MS/MSD was not run for method 8270 on a sample from this SDG.

There was insufficient volume of sample B19188 provided to perform the analysis at the method specified amount due to laboratory request to limit volume due to high RAD levels. A reduced sample amount was prepared. The reporting limit has been elevated accordingly.

STL ST. LOUIS

Case Narrative

SDG: W04380

Metals

The MS/MSD recoveries for sample B19189 for Antimony, Chromium and Nickel are outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

The MS/MSD recovery in sample B191F1 for Chromium, Copper and Lead is outside the established QC limits. The concentration of these metals in the original sample is greater than four times the amount spiked, making percent recovery information ineffective. The MS/MSD recovery for Antimony, Nickel and Silver is outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. No further action is required.

Case Narrative
LOT NUMBER: F5B070203
SDG: W04380A

This report contains the analytical results for the sample received under chain of custody by STL St. Louis on February 7, 2005. This sample is associated with your F03-025 SAF.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

TCLP Metals

TCLP non-volatiles preparation requires 100 grams of sample. There was insufficient sample provided to perform analysis at the method specified amount. A reduced sample amount was used. There was insufficient volume to run an MS/MSD on the sample.

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-057	PAGE 1 OF 2				
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N	DATA TURNAROUND		
SAMPLING LOCATION 216-T-28; 22.5R-25ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil			SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>	45 Days / 45 Days			
ICE CHEST NO. GRP-04-003		FIELD LOGBOOK NO. HNF-N-356-1		COA 119143E510		METHOD OF SHIPMENT Government Vehicle					
SHIPPED TO Waste Sampling & Characterization Severn Trent		OFFSITE PROPERTY NO. NA ST 11/09/04 See Shipment # D1020			BILL OF LADING/AIR BILL NO. NA ST 11/09/04 See Shipment # D1020						
MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A	PRESERVATION		Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None	
		TYPE OF CONTAINER		G6*	aG	aG	G6*	P	aG	aG	
		NO. OF CONTAINER(S)		3	1	1	3	1	1	1	
		VOLUME		40mL	120mL	120mL	40mL	500mL	250mL	120mL	
SPECIAL HANDLING AND/OR STORAGE Radioactive fire to: R191C7		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	PCNs - 002;	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B19189	SOIL	10-26-04	0941	X	X	X	X	X	X	X	
CHAIN OF POSSESSION				SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME		SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS W04380			
J.S. Pope / J. Tyra		10-26-04 1230		Site Fridge		10-26-04 1230					
Site Fridge		11/04/04 0950		Greg Thomas / Greg Thomas		11/04/04 0950					
Greg Thomas / Greg Thomas		11/09/04 1135		MO-026 Frig #3		11/04/04 1135					
MO-026 Frig #3		11/09/04 0820		Greg Thomas / Greg Thomas		11/09/04 0820					
Greg Thomas / Greg Thomas		11/09/04 0835		Fed Ex							
LABORATORY SECTION	RECEIVED BY	DATE/TIME		TITLE				DATE/TIME			
	B. D. ...	11/10/04 0910									
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD			DISPOSED BY				DATE/TIME			

000022

SDG# W04380

Floor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-025-057	PAGE 2 OF 2
COLLECTOR Pope/Pfister/Wiberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ	PRICE CODE 2A EN ST 11/04/04	DATA TURNAROUND 24-Hours 45 days
SAMPLING LOCATION 216-T-28; 22.5ft-25ft	PROJECT DESIGNATION Z00-LW-1/LW-2 Characterization - Soil	SAF NO. F03-025	AIR QUALITY <input type="checkbox"/>		
ICE CHEST NO. GRP-04-003	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle		
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. JVA ST 11/09/04 Shipment # DW020	BILL OF LADING/AIR BILL NO. JVA ST 11/09/04 Shipment # DW020			
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1)VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Butanol) (2)Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA - 8270A (Add-On) (Tributyl phosphate) TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3)Alcohols, Glycols, & Ketones - 8015 (Ethylene glycol) (4)Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Gamma Spec - Add-on (Antimony-125, Cesium-134) Isotopic Plutonium, Isotopic Uranium, Neptunium-237, Americium-241; ST 11/04/04 (5)ICP/MS - 200.8 (TAL) (Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium) ICP Metals - 6010A (Add-on) (Bismuth) (6)IC Anions 300.0 (Chloride, Fluoride, Nitrogen In Nitrate, Nitrogen In Nitrite, Phosphorous in phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Cyanide (Total) - 335.2; pH (Soil) - 9045;</p> <p>6010 A (Supertrace) ST 11/04/04</p>					

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SDG# W04380

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STL ST. LOUIS

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-056		PAGE 1 OF 2			
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N DATA TURNAROUND 45 Days / 45 Days			
SAMPLING LOCATION 216-T-28; 17.5R-20R		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil				SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>			
ICE CHEST NO. 04/04-080037		FIELD LOGBOOK NO. HNF-N-356-1		COA 119143E510		METHOD OF SHIPMENT 11/10/04 Government Vehicle Fed Ex					
SHIPPED TO Waste Sampling & Characterization Severn Trent 11/10/04		OFFSITE PROPERTY NO. 11/10/04 See Shipment # DJ021				BILL OF LADING/AIR BILL NO. 11/10/04 See Shipment # DJ021					
MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/REMARKS N/A		PRESERVATION		Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
			TYPE OF CONTAINER		Gs*	aG	aG	Gs*	P	aG	aG
			NO. OF CONTAINER(S)		3	1	1	3	1	1	1
			VOLUME		40mL	120mL	120mL	40mL	200mL	250mL	120mL
SPECIAL HANDLING AND/OR STORAGE N/A Radioactive Tie To B19106		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS (2),(3), (5),(6)	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	PCBs - 8042;	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
19188	SOIL	10-20-04	1040	X	X	X	X	X	X	X	
CHAIN OF POSSESSION				SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME		SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS			
J. Spore / O. Spore		10-20-04 1230		SITE RMA FRIDGE		10-20-04 1230					
SITE RMA FRIDGE		11/10/04 0810		Greg Thomas / Greg Thomas		11/10/04 0810					
Greg Thomas / Greg Thomas		11/10/04 0815		Fed Ex							
LABORATORY SECTION		RECEIVED BY Jill Clark		DATE/TIME 11-12-04 0940		TITLE		DATE/TIME			
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD		DISPOSED BY		DATE/TIME					

000024

SDG# B19188

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-025-056	PAGE 2 OF 2
COLLECTOR Pope/Pfister/Wiberg/Tyra	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ	PRICE CODE 2A	DATA TURNAROUND
SAMPLING LOCATION 216-T-28; 17.5ft-20ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil	SAF NO. F03-025	AIR QUALITY <input type="checkbox"/>	24 Hours	
ICE CHEST NO. 04/04-010037	FIELD LOGBOOK NO. HNF-N-356-1	COA 119143ES10	METHOD OF SHIPMENT Government Vehicle Fed Ex		
SHIPPED TO Waste Sampling & Characterization Severn Trent	OFFSITE PROPERTY NO. MS#7 11/10/04 See Shipment # DJ021	BILL OF LADING/AIR BILL NO. DIA ST 11/10/04 See Shipment # DJ021			
<p>SPECIAL INSTRUCTIONS</p> <p>The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis.</p> <p>(1)VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Butanol} (2)Semi-VOA - 8270A (TCL) {Phenol} Semi-VOA - 8270A (Add-On) {Tributyl phosphate} TPH-Diesel Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G; (3)Alcohols, Glycols, & Ketones - 8015 {Ethylene glycol} (4)Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155} Gamma.Spec - Add-on {Antimony-125, Cesium-134} Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Americium-241; (5)ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Copper, Nickel, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Mercury, Selenium, Uranium} ICP Metals - 6010A (Add-on) {Bismuth} (6)IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorous in phosphate, Sulfate} Cations (IC) - 300.7 {Nitrogen in ammonium} Cyanide (Total) - 335.2; pH (Soil) - 9045;</p>					

LOT# FA 0033

SDG# W04380

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LOT # FSB070203

W04380A

000028

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Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					F03-025-094		PAGE 3 OF 5	
COLLECTOR Pope/Pfister/Wiberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 80		DATA TURNAROUND 60 Days / 60 Days
SAMPLING LOCATION 218-S-20; 29.5-32.0 ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil			SAF NO. F03-025		AIR QUALITY <input type="checkbox"/>			
ICE CHEST NO. N/A		FIELD LOGBOOK NO.		COA 119143ES10		METHOD OF SHIPMENT Government Vehicle				
SHIPPED TO 222-S Lab Operations		OFFSITE PROPERTY NO. N/A			BILL OF LADING/AIR BILL NO. N/A					
MATRIX* A-Air DL-Drum L-Liquid DS-Drum S-Solids L-Liquid O-Oil SE-Sediment T-Tissue V-Vegetation W-Water W-Wipe X-Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A W04380	PRESERVATION	Cool 4C	Cool 4C	Cool 4C	None				
		TYPE OF CONTAINER	4000	4000	4000	G				
		NO. OF CONTAINER(S)	5	1	1	1				
		VOLUME	40ml	60mL	60mL	120mL				
	SPECIAL HANDLING AND/OR STORAGE N/A	SAMPLE ANALYSIS	VOA - 8270A - Complete	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	PCB - 8082	SEE ITEM (2) IN SPECIAL INSTRUCTIONS				
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME							
B191F1	SOIL	9/18/04	08580							
CHAIN OF POSSESSION		SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS				
RELINQUISHED BY/REMOVED FROM J. Pfister		DATE/TIME 11-2-04 1400		RECEIVED BY/STORED IN M. D. ...		DATE/TIME 11-2-04 1400		The lab is to analyze pH within 24 hours of sample receipt. The lab is to report kerosene range organics from the WTPH-D analysis. FH acknowledges that the analytical holding time for Nitrate, Nitrite and Phosphate by EPA Method 300.0 will not be met. (1) Semi-VOA - 8270A (TCL) (Phenol) Semi-VOA -- 8270A (Add-On) (Tributyl phosphate) (2) IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate) Cations (IC) - 300.7 (Nitrogen in ammonium) Total Cyanide - 9010; Sulfides - 9030; pH(Soil) - 9045; * Sample date & time taken from original COC notebook 11/17/04 OIL condensed on pg 4 of 4		
RELINQUISHED BY/REMOVED FROM M. D. ...		DATE/TIME 11/17/04 0846		RECEIVED BY/STORED IN M. D. ...		DATE/TIME 11/17/04 0846				
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME				
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME				
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME				
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME				
LABORATORY SECTION	RECEIVED BY	TITLE				DATE/TIME				
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY				DATE/TIME				

ST. LOUIS

LOT # F5B070203

MO4388A
0000229

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Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-025-173	PAGE 4 OF 20	
COLLECTOR Pope/Pfister/Wberg/Tyra		COMPANY CONTACT TRENT, STEVE		TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ		PRICE CODE BN	
SAMPLING LOCATION 216-S-20; 29.5-32.0 ft		PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil			SAP NO. F03-025	DATA TURNAROUND 45 Days / 45 Days		
ICE CHEST NO. GFP-03-029		FIELD LOGBOOK NO. HNF-N-355 1	COA 119143E510		METHOD OF SHIPMENT Federal Express			
SHIPPED TO Severn Trent St. Louis		OFFSITE PROPERTY NO. See PTR 14452			BILL OF LADING/AIRBILL NO. See PTR 14452			
MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Solid L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS N/A	PRESERVATION	None					
		TYPE OF CONTAINER	G/P					
		NO. OF CONTAINER(S)	1					
		VOLUME	250ml					
SPECIAL HANDLING AND/OR STORAGE N/A		SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS					
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME					
B191F1	SOIL	8/18/04	0858	X				
CHAIN OF POSSESSION		SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver) ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Bismuth, Copper, Nickel) Mercury - 7471 - (CV);				
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME				
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME				

STL ST LOUIS

07/17/04

4 4

Appendix 5

Data Validation Supporting Documentation

000030

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-LW-1/LW-2		DATA PACKAGE: W04380		
VALIDATOR:	TLI	LAB:	ST	DATE: 3/21/05	
			SDG: W04380 + W04380A		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
	B19189	B19188	B191F1		
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? Yes No N/A

Initial calibrations acceptable? Yes No N/A

ICP interference checks acceptable? Yes No N/A

ICV and CCV checks performed on all instruments? Yes No N/A

ICV and CCV checks acceptable? Yes No N/A

Standards traceable? Yes No N/A

Standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)..... Yes No N/A
 ICB and CCB results acceptable? (Levels D, E) Yes No N/A
 Laboratory blanks analyzed? Yes No N/A
 Laboratory blank results acceptable?..... Yes No N/A
 Field blanks analyzed? (Levels C, D, E) Yes No N/A
 Field blank results acceptable? (Levels C, D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: 88/89-ok FI-ok

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed?..... Yes No N/A
 MS/MSD results acceptable?..... Yes No N/A
 MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
 MS/MSD standards expired? (Levels D, E) Yes No N/A
 LCS/BSS samples analyzed?..... Yes No N/A
 LCS/BSS results acceptable?..... Yes No N/A
 Standards traceable? (Levels D, E)..... Yes No N/A
 Standards expired? (Levels D, E)..... Yes No N/A
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable?..... Yes No N/A

Comments: antimony 57/55 90 - J all
chromium 0/0 90 - J all } 89, 88
nickel - 28/24 90 - J all
mercury - 140/0 90 - 3rd ok } (TCLP - CR+load - no MS/MSD - J all)

antimony - 49/50 - J
nickel - 629 MSD - J } FI
silver - 134/131 - J } NO PAS
Hg - 0/0 - ok
LCS - antimony 7790 - J 88/89 } yes - see page 3/21

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

- Duplicate RPD values acceptable? Yes No N/A
- Duplicate results acceptable? Yes No N/A
- MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
- MS/MSD standards expired? (Levels D, E) Yes No N/A
- Field duplicate RPD values acceptable? Yes No N/A
- Field split RPD values acceptable? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: Hg - 0% MSD - J all } 89,888
CR - 0% μ s/MSD - J all
Hg - 8670 ~~Hg - 0%~~ - FI - J all (Sample/MS)
CLP NO μ s/MSD - J all

6. ICP QUALITY CONTROL (Levels D and E)

- ICP serial dilution samples analyzed? Yes No N/A
- ICP serial dilution %D values acceptable? Yes No N/A
- ICP post digestion spike required? Yes No N/A
- ICP post digestion spike values acceptable? Yes No N/A
- Standards traceable? Yes No N/A
- Standards expired? Yes No N/A
- Transcription/calculation errors? Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required?	Yes	No	N/A
Duplicate injection %RSD values acceptable?	Yes	No	N/A
Analytical spikes performed as required?	Yes	No	N/A
Analytical spike recoveries acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
MSA performed as required?	Yes	No	N/A
MSA results acceptable?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments: _____

8. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	No	N/A
Sample holding times acceptable?	Yes	No	N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

- Results reported for all requested analyses? Yes No N/A
- Results supported in the raw data? (Levels D, E)..... Yes No N/A
- Samples properly prepared? (Levels D, E)..... Yes No N/A
- Detection limits meet RDL? Yes No N/A
- Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: CR - over in 88/89

Appendix 6

Additional Documentation Requested by Client

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: W04380
 Date Sampled...: 10/26/04

Date Received...: 11/10/04

Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
-----------	---------------	-----------	---------------	-------	---------------	-----	--------	----------------------------	--------------

MS Lot-Sample #: F4K100333-002 Prep Batch #...: 4322056

% Moisture.....: 6.6

Bismuth

202	214	372	mg/kg	79			SW846 6010B	11/17-11/18/04	GWNFG1C5
202	214	377	mg/kg	82	1.4		SW846 6010B	11/17-11/18/04	GWNFG1C6

Dilution Factor: 1

Antimony

1.4	53.5	31.8 N	mg/kg	57			SW846 6010B	11/17-11/18/04	GWNFG1DG
1.4	53.5	30.8 N	mg/kg	55	3.3		SW846 6010B	11/17-11/18/04	GWNFG1DH

Dilution Factor: 1

Arsenic

1.2	214	210	mg/kg	97			SW846 6010B	11/17-11/18/04	GWNFG1DJ
1.2	214	211	mg/kg	98	0.61		SW846 6010B	11/17-11/18/04	GWNFG1DK

Dilution Factor: 1

Barium

87.3	214	301	mg/kg	100			SW846 6010B	11/17-11/18/04	GWNFG1DL
87.3	214	325	mg/kg	111	7.9		SW846 6010B	11/17-11/18/04	GWNFG1DM

Dilution Factor: 1

Beryllium

0.27	5.35	5.64	mg/kg	100			SW846 6010B	11/17-11/18/04	GWNFG1DN
0.27	5.35	5.70	mg/kg	101	0.98		SW846 6010B	11/17-11/18/04	GWNFG1DP

Dilution Factor: 1

Cadmium

ND	5.35	4.10	mg/kg	77			SW846 6010B	11/17-11/18/04	GWNFG1DQ
ND	5.35	4.11	mg/kg	77	0.36		SW846 6010B	11/17-11/18/04	GWNFG1DR

Dilution Factor: 1

Chromium

81.7	21.4	38.5 N	mg/kg	0.0			SW846 6010B	11/17-11/18/04	GWNFG1DV
81.7	21.4	34.0 N	mg/kg	0.0	0.0		SW846 6010B	11/17-11/18/04	GWNFG1DW

Dilution Factor: 1

Copper

19.7	26.8	45.5	mg/kg	96			SW846 6010B	11/17-11/18/04	GWNFG1D1
19.7	26.8	47.4	mg/kg	104	4.1		SW846 6010B	11/17-11/18/04	GWNFG1D2

Dilution Factor: 1

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: W04380
Date Sampled...: 10/26/04

Date Received...: 11/10/04

Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Lead									
	4.3	53.5	56.6	mg/kg	98		SW846 6010B	11/17-11/18/04	GWNFG1D5
	4.3	53.5	57.4	mg/kg	99	1.6	SW846 6010B	11/17-11/18/04	GWNFG1D6
Dilution Factor: 1									
Nickel									
	52.7	53.5	67.7 N	mg/kg	28		SW846 6010B	11/17-11/18/04	GWNFG1EC
	52.7	53.5	65.7 N	mg/kg	24	3.0	SW846 6010B	11/17-11/18/04	GWNFG1ED
Dilution Factor: 1									
Selenium									
	ND	214	208	mg/kg	97		SW846 6010B	11/17-11/18/04	GWNFG1CM
	ND	214	209	mg/kg	97	0.33	SW846 6010B	11/17-11/18/04	GWNFG1CN
Dilution Factor: 1									
Silver									
	2.0	5.35	7.20	mg/kg	98		SW846 6010B	11/17-11/18/04	GWNFG1CP
	2.0	5.35	7.58	mg/kg	105	5.2	SW846 6010B	11/17-11/18/04	GWNFG1CQ
Dilution Factor: 1									
Uranium									
	104	214	314	mg/kg	98		SW846 6010B	11/17-11/18/04	GWNFG1E7
	104	214	325	mg/kg	103	3.6	SW846 6010B	11/17-11/18/04	GWNFG1E8
Dilution Factor: 1									

MS Lot-Sample #: F4K100333-002 Prep Batch #...: 4322095

‡ Moisture.....: 6.6

Mercury									
	5.1	0.178	5.35	mg/kg	140		SW846 7471A	11/17/04	GWNFG1EQ
	5.1	0.178	4.23 N	mg/kg	0.0	0.0	SW846 7471A	11/17/04	GWNFG1ER
Dilution Factor: 1									

NOTE(S):

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

Results and reporting limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #....: W04380
 Date Sampled....: 08/18/04

Date Received...: 11/18/04

Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
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MS Lot-Sample #: F4K180368-001 Prep Batch #....: 4336050

% Moisture.....: 6.9

Antimony

2.9	53.7	29.1 N	mg/kg	49			SW846 6010B	12/01/04	GXCC51AU
2.9	53.7	29.8 N	mg/kg	50	2.3		SW846 6010B	12/01/04	GXCC51AV

Dilution Factor: 1

Arsenic

1.2	215	209	mg/kg	97			SW846 6010B	12/01/04	GXCC51AW
1.2	215	209	mg/kg	97	0.01		SW846 6010B	12/01/04	GXCC51AX

Dilution Factor: 1

Barium

127	215	336	mg/kg	97			SW846 6010B	12/01/04	GXCC51A0
127	215	364	mg/kg	110	8.0		SW846 6010B	12/01/04	GXCC51A1

Dilution Factor: 1

Beryllium

0.27	5.37	5.67	mg/kg	100			SW846 6010B	12/01/04	GXCC51A2
0.27	5.37	5.67	mg/kg	101	0.01		SW846 6010B	12/01/04	GXCC51A3

Dilution Factor: 1

Cadmium

0.28	5.37	5.84	mg/kg	103			SW846 6010B	12/01/04	GXCC51A4
0.28	5.37	5.70	mg/kg	101	2.4		SW846 6010B	12/01/04	GXCC51A5

Dilution Factor: 1

Chromium

259	21.5	308 N	mg/kg	227			SW846 6010B	12/01/04	GXCC51A6
259	21.5	273 N	mg/kg	66	12		SW846 6010B	12/01/04	GXCC51A7

Dilution Factor: 1

Copper

122	26.9	174 N	mg/kg	195			SW846 6010B	12/01/04	GXCC51A8
122	26.9	161 N	mg/kg	146	7.8		SW846 6010B	12/01/04	GXCC51A9

Dilution Factor: 1

Lead

489	53.7	773 N	mg/kg	527			SW846 6010B	12/01/04	GXCC51CA
489	53.7	715 N	mg/kg	420	7.8		SW846 6010B	12/01/04	GXCC51CC

Dilution Factor: 1

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MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #....: W04380
 Date Sampled....: 08/18/04

Date Received...: 11/18/04

Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Nickel									
	55.0	53.7	92.7 N	mg/kg	70		SW846 6010B	12/01/04	GXCC51CD
	55.0	53.7	88.4 N	mg/kg	62	4.7	SW846 6010B	12/01/04	GXCC51CE
Dilution Factor: 1									
Selenium									
ND		215	207	mg/kg	97		SW846 6010B	12/01/04	GXCC51CF
ND		215	206	mg/kg	96	0.47	SW846 6010B	12/01/04	GXCC51CG
Dilution Factor: 1									
Silver									
	6.0	5.37	13.2 N	mg/kg	134		SW846 6010B	12/01/04	GXCC51CH
	6.0	5.37	13.1 N	mg/kg	131	0.99	SW846 6010B	12/01/04	GXCC51CJ
Dilution Factor: 1									
Bismuth									
	202	215	383	mg/kg	84		SW846 6010B	12/01/04	GXCC51CK
	202	215	396	mg/kg	90	3.4	SW846 6010B	12/01/04	GXCC51CL
Dilution Factor: 1									

MS Lot-Sample #: F4K180368-001 Prep Batch #....: 4348439

% Moisture.....: 6.9

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Mercury									
	69.2	0.179	27.6 N	mg/kg	0.0		SW846 7471A	12/13-12/14/04	GXCC51CM
	69.2	0.179	28.3 N	mg/kg	0.0	0.0	SW846 7471A	12/13-12/14/04	GXCC51CN
Dilution Factor: 1									

NOTE(S):

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

N Spiked analyte recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: W04380

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: F4K170000-056 Prep Batch #...: 4322056						
Bismuth	ND	20.0	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AA
		Dilution Factor: 1				
Antimony	ND	1.0	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AC
		Dilution Factor: 1				
Arsenic	ND	1.0	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AD
		Dilution Factor: 1				
Barium	0.050 B	20.0	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AE
		Dilution Factor: 1				
Beryllium	ND	0.50	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AF
		Dilution Factor: 1				
Cadmium	ND	0.50	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AG
		Dilution Factor: 1				
Chromium	ND	1.0	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AH
		Dilution Factor: 1				
Copper	ND	2.5	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AJ
		Dilution Factor: 1				
Lead	ND	0.50	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AK
		Dilution Factor: 1				
Nickel	ND	4.0	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AL
		Dilution Factor: 1				
Selenium	ND	0.50	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AM
		Dilution Factor: 1				
Silver	ND	1.0	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AN
		Dilution Factor: 1				
Uranium	ND	50.0	mg/kg	SW846 6010B	11/17-11/18/04	GW5CF1AP
		Dilution Factor: 1				

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METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: W04380

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: F4K170000-095 Prep Batch #...: 4322095						
Mercury	ND	0.033	mg/kg	SW846 7471A	11/17/04	GW5R61AA
		Dilution Factor: 1				
MB Lot-Sample #: F4L010000-050 Prep Batch #...: 4336050						
Antimony	ND	1.0	mg/kg	SW846 6010B	12/01/04	GX1K01AA
		Dilution Factor: 1				
Arsenic	ND	1.0	mg/kg	SW846 6010B	12/01/04	GX1K01AC
		Dilution Factor: 1				
Barium	0.079 B	20.0	mg/kg	SW846 6010B	12/01/04	GX1K01AD
		Dilution Factor: 1				
Beryllium	ND	0.50	mg/kg	SW846 6010B	12/01/04	GX1K01AE
		Dilution Factor: 1				
Cadmium	ND	0.50	mg/kg	SW846 6010B	12/01/04	GX1K01AF
		Dilution Factor: 1				
Chromium	ND	1.0	mg/kg	SW846 6010B	12/01/04	GX1K01AG
		Dilution Factor: 1				
Copper	ND	2.5	mg/kg	SW846 6010B	12/01/04	GX1K01AH
		Dilution Factor: 1				
Lead	ND	0.50	mg/kg	SW846 6010B	12/01/04	GX1K01AJ
		Dilution Factor: 1				
Nickel	ND	4.0	mg/kg	SW846 6010B	12/01/04	GX1K01AK
		Dilution Factor: 1				
Selenium	ND	0.50	mg/kg	SW846 6010B	12/01/04	GX1K01AL
		Dilution Factor: 1				
Silver	ND	1.0	mg/kg	SW846 6010B	12/01/04	GX1K01AM
		Dilution Factor: 1				
Bismuth	ND	20.0	mg/kg	SW846 6010B	12/01/04	GX1K01AN
		Dilution Factor: 1				

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STL ST. LOUIS

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: W04380

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
MB Lot-Sample #: F4L130000-439 Prep Batch #...: 4348439						
Mercury	ND	0.033	mg/kg	SW846 7471A	12/13-12/14/04	GOXJW1AA
		Dilution Factor: 1				

NOTE(S) :

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

B Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: W04380

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #	
LCS Lot-Sample#: F4K170000-056 Prep Batch #...: 4322056								
Bismuth	200	197	mg/kg	99	SW846 6010B	11/17-11/18/04	GW5CF1AQ	
			Dilution Factor: 1					
Antimony	60.9	43.6	mg/kg	72	SW846 6010B	11/17-11/18/04	GW5CF1AR	
			Dilution Factor: 1					
Arsenic	161	168	mg/kg	104	SW846 6010B	11/17-11/18/04	GW5CF1AT	
			Dilution Factor: 1					
Barium	252	258	mg/kg	102	SW846 6010B	11/17-11/18/04	GW5CF1AU	
			Dilution Factor: 1					
Beryllium	94.4	98.8	mg/kg	105	SW846 6010B	11/17-11/18/04	GW5CF1AV	
			Dilution Factor: 1					
Cadmium	128	132	mg/kg	103	SW846 6010B	11/17-11/18/04	GW5CF1AW	
			Dilution Factor: 1					
Chromium	69.5	70.1	mg/kg	101	SW846 6010B	11/17-11/18/04	GW5CF1AX	
			Dilution Factor: 1					
Copper	148	162	mg/kg	110	SW846 6010B	11/17-11/18/04	GW5CF1AO	
			Dilution Factor: 1					
Lead	142	146	mg/kg	103	SW846 6010B	11/17-11/18/04	GW5CF1A1	
			Dilution Factor: 1					
Nickel	147	157	mg/kg	107	SW846 6010B	11/17-11/18/04	GW5CF1A2	
			Dilution Factor: 1					
Selenium	64.2	66.1	mg/kg	103	SW846 6010B	11/17-11/18/04	GW5CF1A3	
			Dilution Factor: 1					
Silver	130	148	mg/kg	114	SW846 6010B	11/17-11/18/04	GW5CF1A4	
			Dilution Factor: 1					
Uranium	200	193	mg/kg	96	SW846 6010B	11/17-11/18/04	GW5CF1A5	
			Dilution Factor: 1					

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LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: W04380

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #	
LCS Lot-Sample#: F4K170000-095 Prep Batch #...: 4322095								
Mercury	4.04	4.12	mg/kg	102	SW846 7471A	11/17/04	GW5E61AC	
			Dilution Factor: 5					
LCS Lot-Sample#: F4L010000-050 Prep Batch #...: 4336050								
Antimony	60.9	51.3	mg/kg	84	SW846 6010B	12/01/04	GX1K01AP	
			Dilution Factor: 1					
Arsenic	161	171	mg/kg	106	SW846 6010B	12/01/04	GX1K01AQ	
			Dilution Factor: 1					
Barium	252	267	mg/kg	106	SW846 6010B	12/01/04	GX1K01AR	
			Dilution Factor: 1					
Beryllium	94.4	99.8	mg/kg	106	SW846 6010B	12/01/04	GX1K01AT	
			Dilution Factor: 1					
Cadmium	128	133	mg/kg	104	SW846 6010B	12/01/04	GX1K01AU	
			Dilution Factor: 1					
Chromium	69.5	72.2	mg/kg	104	SW846 6010B	12/01/04	GX1K01AV	
			Dilution Factor: 1					
Copper	148	159	mg/kg	108	SW846 6010B	12/01/04	GX1K01AW	
			Dilution Factor: 1					
Lead	142	155	mg/kg	109	SW846 6010B	12/01/04	GX1K01AX	
			Dilution Factor: 1					
Nickel	147	157	mg/kg	107	SW846 6010B	12/01/04	GX1K01A0	
			Dilution Factor: 1					
Selenium	64.2	68.0	mg/kg	106	SW846 6010B	12/01/04	GX1K01A1	
			Dilution Factor: 1					
Silver	130	153	mg/kg	117	SW846 6010B	12/01/04	GX1K01A2	
			Dilution Factor: 1					
Bismuth	200	199	mg/kg	100	SW846 6010B	12/01/04	GX1K01A3	
			Dilution Factor: 1					

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LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: W04380

Matrix.....: SOLID

<u>PARAMETER</u>	<u>SPIKE AMOUNT</u>	<u>MEASURED AMOUNT</u>	<u>UNITS</u>	<u>PERCENT RECVRY</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
LCS Lot-Sample#: F4L130000-439 Prep Batch #...: 4348439							
Mercury	4.04	4.05	mg/kg	100	SW846 7471A	12/13-12/14/04	G0XJWLAC

Dilution Factor: 5

NOTE(S) :

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

METHOD BLANK REPORT

TCLP Metals

Client Lot #...: F5B070203

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
MB Lot-Sample #: F5B080000-421				Prep Batch #...: 5040226		
Leach Date.....: 02/08/05				Leach Batch #...: P503912		
Chromium	ND	0.025	mg/L	SW846 6010B	02/09-02/10/05	G31RE1AA
		Dilution Factor: 2.5				
Lead	ND	0.25	mg/L	SW846 6010B	02/09-02/10/05	G31RE1AC
		Dilution Factor: 2.5				

NOTE(S) :

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

LABORATORY CONTROL SAMPLE DATA REPORT

TCLP Metals

Client Lot #....: F5B070203

Matrix.....: SOLID

<u>PARAMETER</u>	<u>SPIKE AMOUNT</u>	<u>MEASURED AMOUNT</u>	<u>UNITS</u>	<u>PERCNT RECVRY</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
LCS Lot-Sample#: F5B090000-226 Prep Batch #....: 5040226							
Chromium	2.50	2.41	mg/L	96	SW846 6010B	02/09-02/10/05	G33FE1AE
				Dilution Factor: 2.5			
Lead	2.50	2.42	mg/L	97	SW846 6010B	02/09-02/10/05	G33FE1AF
				Dilution Factor: 2.5			

NOTE(S):

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