



**Project Hanford Management System  
COMMENT RESOLUTION SHEET**

Sheet 1 of 2

**Document Number:** 60935

**Revision Number:** N/A

**Date:** Sept 5, 2006

**Document Title:**

Data Validation 200-UW-1 OU, Soil from Trench between 216-U-8 and 216-U-12 Cribs

**Reviewer:**

Bill Thackaberry

**Project/Organization:**

FH/GRP/QA

**Reviewers, if other than original:**

**Responsible Manager:**

Dana Farwick

**COMMENT(S)**

Initials (If other than listed reviewer)	Section/ Step	Comments/Discrepancies	Basis	Recommendation	Resolution
	Rad Chem	pg 25, Checklist item 6, first question "LCS/BSS analyzed within required frequency" was answered "Yes". This is inconsistent with the comment that there was no LCS for Pu 238, U 233/234, and U 235.			Corrected  9/14/06
	wet chem, VOA	No Comment			
	Semi VOA, Inorganic	No Comment			

Date: 1 September 2006  
To: Fluor Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 & 216-U-12 Cribs  
Subject: Radiochemistry - Data Package No. WSCF20060935 (60935)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. 60935 prepared by WSCF Analytical Laboratories (WSCF). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
B1KB52	8/16/06	Soil	C	See note 1

1 - Alpha spectroscopy, gamma spectroscopy, technetium-99, strontium-89/90, gross alpha & gross beta.

Data validation was conducted in accordance with the FHI validation statement of work and the Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit, DOE/RL-2005-75, Rev. 0. 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. 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.

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## · **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.

Due to method blank contamination, the radium-226, plutonium-239/240 and uranium-233/234 results were qualified as estimates and flagged "J".

All other 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 either 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, the plutonium-238, uranium-233/234 and uranium-235 results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (47%), all technetium-99 results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

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- **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 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.

Due to RPDs outside QC limits, all actinium-228 (42%) and radium-228 (42%) results were qualified as estimates and flagged "J".

All other 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. All analytes met the RTQL.

- **Completeness**

Data package SDG No. 60935 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.

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## MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, the radium-226, plutonium-239/240 and uranium-233/234 results were qualified as estimates and flagged "J".
- Due to the lack of an LCS analysis, the plutonium-238, uranium-233/234 and uranium-235 results were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (47%), all technetium-99 results were qualified as estimates and flagged "J".
- Due to RPDs outside QC limits, all actinium-228 (42%) and radium-228 (42%) 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.

## REFERENCES

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

DOE/RL-2005-75, Rev. 0, *Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit*, December 2005.

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**Appendix 1**

**Glossary of Data Reporting Qualifiers**

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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.

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**Appendix 2**

**Summary of Data Qualification**

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RADIOCHEMISTRY DATA QUALIFICATION SUMMARY\*

SDG: 60935	REVIEWER: TLI	Project: 200-UW-1	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Radium-226 Uranium-233/234 Plutonium-239/240	J	All	Method blank contamination
Radium-228 Actinium-228	J	All	RPD
Uranium-233/234 Uranium-235 Plutonium-238	J	All	No LCS analysis
Technetium-99	J	All	MS recovery

\* - 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**  
**Annotated Laboratory Reports**

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# WSCF ANALYTICAL RESULTS REPORT

Attention: D. L. Klages H8-40 Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	14596-10-2	Americium-241	SOIL	LA-508-471	U	-0.0130	pCi/g	1.00	0.047	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	Am-241 by AEA Total Cntg Error	SOIL	LA-508-471		++ 0.023	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	14596-10-2	Americium-241	SOIL	LA-508-481	U	0.103	pCi/g	1.00	0.17	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Am-241 Rel Count Error (GEA)	SOIL	LA-508-481		++ 0.11	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	14234-35-6	Antimony-125	SOIL	LA-508-481	U	0.0181	pCi/g	1.00	0.067	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Sb-125 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 0.039	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	13981-41-4	Ba-133 by GEA	SOIL	LA-508-481	U	5.11e-03	pCi/g	1.00	0.030	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Ba-133 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 0.020	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	14762-78-8	Cerium-144	SOIL	LA-508-481	U	-0.0281	pCi/g	1.00	0.17	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Ce-144 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 0.10	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	CE/PR-144	Cerium/Praseodymium-144	SOIL	LA-508-481	U	-0.0562	pCi/g	1.00	0.35	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	CePr-144 Rel. Count Error	SOIL	LA-508-481		++ 0.21	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	10198-40-0	Cobalt-60	SOIL	LA-508-481	U	2.74e-04	pCi/g	1.00	0.025	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Co-60 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 2.7e-03	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	13967-70-9	Cesium-134	SOIL	LA-508-481	U	8.94e-03	pCi/g	1.00	0.027	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Cs-134 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 0.015	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	10045-97-3	Cesium-137	SOIL	LA-508-481	U	9.55e-03	pCi/g	1.00	0.027	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Cs-137 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 0.016	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	14883-23-9	Europium 152	SOIL	LA-508-481	U	0.0178	pCi/g	1.00	0.072	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Eu-152 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 0.054	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	15585-10-1	Europium-154	SOIL	LA-508-481	U	1.53e-03	pCi/g	1.00	0.069	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Eu-154 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 0.016	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	14391-16-3	Europium-155	SOIL	LA-508-481	U	0.0384	pCi/g	1.00	0.095	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Eu-155 Rel. Count Error (GEA)	SOIL	LA-508-481		++ 0.055	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	13966-00-2	Potassium-40	SOIL	LA-508-481	U	1.53	pCi/g	1.00	0.23	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	K-40 Rel. % Count Error (GEA)	SOIL	LA-508-481		++ 0.44	pCi/g	1.00	0.0	08/19/06	08/17/06

E - Analyte is an estimate, has potentially larger errors  
 U - Analyzed for but not detected above limiting criteria.

C - The Analyte was found in the Associated Blank.  
 J - Analyte is an estimate, has potentially larger errors  
 X - Other flags and notes described in the comments/narrative.

MDL=Minimum Detection Limit  
 RQ=Result Qualifier

DF=Dilution Factor  
 \* - Indicates results that have NOT been validated.  
 + - Indicates more than six qualifier symbols  
 Report WGPP/ver. 1.3  
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✓ 9/5/06

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*KLages*

9/5/06

000010

# WSCF ANALYTICAL RESULTS REPORT

Attention: D.L. Klages H8-40      Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	14681-63-1	Niobium-94	SOIL	LA-508-481	U	-1.05e-03	pCi/g	1.00	0.023	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Nb-94 Rel. Count Error (GEA)	SOIL	LA-508-481	J	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	13982-63-3	Radium-226	SOIL	LA-508-481	J	0.360	pCi/g	1.00	0.051	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Ra-226 Rel. Count Error (GEA)	SOIL	LA-508-481	J	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	15262-20-1	Radium-228	SOIL	LA-508-481	J	0.470	pCi/g	1.00	0.076	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Ra-228 Rel. Count Error (GEA)	SOIL	LA-508-481	J	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	13967-48-1	Ruthenium-106	SOIL	LA-508-481	U	-0.0670	pCi/g	1.00	0.21	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Ru-106 Rel. Count Error (GEA)	SOIL	LA-508-481	U	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	15832-50-5	Tin-112	SOIL	LA-508-481	U	-9.12e-03	pCi/g	1.00	0.078	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Sn-112 Rel. Count Error (GEA)	SOIL	LA-508-481	U	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	15117-96-1	Uranium-235	SOIL	LA-508-481	U	0.0494	pCi/g	1.00	0.19	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	U-235 Rel. Count Error (GEA)	SOIL	LA-508-481	U	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	13982-39-3	Zinc-65	SOIL	LA-508-481	U	-5.08e-03	pCi/g	1.00	0.051	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Zn-65 Rel. Count Error (GEA)	SOIL	LA-508-481	J	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	14331-83-0	Actinium-228	SOIL	LA-508-481	J	0.470	pCi/g	1.00	0.076	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Ac-228 Rel. Count Error (GEA)	SOIL	LA-508-481	U	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	13968-53-1	Ruthenium-103	SOIL	LA-508-481	U	-6.25e-04	pCi/g	1.00	0.023	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Ru-103 Rel. Count Error (GEA)	SOIL	LA-508-481	U	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	13966-06-8	Tin-113	SOIL	LA-508-481	U	0.0124	pCi/g	1.00	0.031	08/19/06	08/17/06
W060002500	B1KB52	E.T.C	Sn-113 Rel. Count Error (GEA)	SOIL	LA-508-481	U	+	pCi/g	1.00	0.0	08/19/06	08/17/06
W060002500	B1KB52	12587-46-1	Gross alpha	SOIL	LA-508-415	J	0.140	pCi/g	1.00	0.027	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	Gross Alpha Method Error	SOIL	LA-508-415	J	+	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	12587-47-2	Gross beta	SOIL	LA-508-415	J	0.042	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	Gross Beta Method Error	SOIL	LA-508-415	J	+	pCi/g	1.00	0.056	08/18/06	08/17/06
W060002500	B1KB52	13994-20-2	Neptunium-237	SOIL	LA-508-415	U	0.100	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	Np-237 by AEA Total Cing Error	SOIL	LA-508-471	U	+	pCi/g	1.00	0.023	08/18/06	08/17/06
W060002500	B1KB52	13981-16-3	Plutonium-238	SOIL	LA-508-471	J	0.017	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	Plutonium-238	SOIL	LA-508-471	J	1.90e-03	pCi/g	1.00	0.020	08/18/06	08/17/06

MDL = Minimum Detection Limit  
RQ = Result Qualifier

DF = Dilution Factor  
+ - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols  
Report WGP/ver. 1.3

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9/5/06

**REVISED**  
Addresses  
9/5/06

000011

# WSCF ANALYTICAL RESULTS REPORT

Attention: D.L. Klages H8-40      Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample Receive
W060002500	B1KB52	E.T.C	Pu-238 by AEA Total Cntg Error	SOIL	LA-508-471		+ 1.9e-03	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	PU-239/240	Pu-239/240 by AEA	SOIL	LA-508-471	J	0.0450	pCi/g	1.00	5.1e-03	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	Pu-239/240 AEA Total Cntg Err	SOIL	LA-508-471		+ 0.021	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	SR-RAD	Strontium-89/90	SOIL	LA-508-415		0.180	pCi/g	1.00	0.097	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	Sr-89/90 Ref. Count Error	SOIL	LA-508-415		+ 0.11	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	14133-76-7	Technetium-99	SOIL	LA-508-421	U J	-0.290	pCi/g	1.00	0.29	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	Tc-99 Counting Error	SOIL	LA-508-421		+ 0.29	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	U-233/234	Uranium-233/234	SOIL	LA-508-471		0.0320	pCi/g	1.00	0.015	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	U-233/234 AEA Total Cntg Error	SOIL	LA-508-471		+ 0.019	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	15117-96-1	Uranium-235	SOIL	LA-508-471	U J	2.20e-03	pCi/g	1.00	5.9e-03	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	U-235 by AEA Total Cntg Error	SOIL	LA-508-471		+ 4.4e-03	pCi/g	1.00	0.0	08/18/06	08/17/06
W060002500	B1KB52	U-238	Uranium-238	SOIL	LA-508-471		0.0240	pCi/g	1.00	5.4e-03	08/18/06	08/17/06
W060002500	B1KB52	E.T.C	U-238 by AEA Total Cntg Error	SOIL	LA-508-471		+ 0.015	pCi/g	1.00	0.10	08/18/06	08/17/06

R 9/5/06

E - Analyte is an estimate, has potentially larger errors  
 U - Analyzed for but not detected above limiting criteria

MDL = Minimum Detection Limit      C - The Analyte was found in the Associated Blank.  
 RQ = Result Qualifier                  J - Analyte is an estimate, has potentially larger errors  
 X - Other flags and notes described in the comments/narrative.

DF = Dilution Factor  
 + - Indicates results that have NOT been validated;      + - Indicates more than six qualifier symbols  
 Report WGPP/ver. 1.3

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9/5/06

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

**000013**

<b>Sample Delivery Group</b>	<b>WSCF20060935</b>
<b>Sample Matrix</b>	<b>SOLID</b>
<b>Sample Visual</b>	<b>N/A</b>
<b>SAF Number</b>	<b>R06-013</b>
<b>Data Deliverable</b>	<b>Summary Report</b>

**Introduction**

One (1) 200-UW-1 Operable Unit soil sample (B1KB52) from the trench between 216-U-8 and 216-U-12 were received at the WSCF Laboratory on August 17, 2006. The samples were received in a cool condition with ice present in the coolers. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *200-UW-1 Operable Unit Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, method references, and Laboratory QC information. Copies of the chain of custody and sample receipt are included as Attachment 3.

**Analytical Methodology for Requested Analyses**

Refer to *WSCF Method References Report*, pages 52 through 53 , for a complete listing of approved analytical methods used.

**Inorganic Comments**

**Anions** - The hold time requirements were met. A Blank, Duplicate, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group. See pages 12 through 13 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.
- Duplicate, Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Phosphate – Matrix Spike and Matrix Spike Duplicate recoveries were below established laboratory limits. Sample result was less than detection limit and U flagged.

All other QC controls are within the established limits.

**ICP-AES Metals** – The holding time for this analysis was met. A Blank, Laboratory Control Sample (LCS), Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group of less than 20 samples. See pages 14 through 16 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.

- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Aluminum, Calcium, Iron, Magnesium and Titanium – insufficient spike concentrations. Sample concentrations were greater than four times the spike concentration.
- Calcium – The Laboratory Control Sample recoveries exceeded established laboratory limits. Calcium result was E flagged. Lithium result was less than the method detection limit and U flagged.
- Silicon – Matrix Spike, Matrix Spike Duplicate and Laboratory Control Sample recoveries were outside established laboratory limits. Sample result was E flagged.
- Aluminum – Analyte detected in the associated preparation Blank sample was evaluated and sample result was C flagged.

All other QC controls are within the established limits.

**ICP-MS Metals** – The holding time for this analysis was met, with the exception of mercury. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this deliver group of less than 20 samples. See pages 17 through 20 for QC details Analytical Notes:

- Preparation Date: 21-aug-2006.
- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Thorium results listed in the report represent Th-232 exclusively.
- Zinc – Analyte detected in the associated preparation Blank sample was evaluated and sample B1KB51 was C flagged.
- Manganese (sample B1KB52), Thorium (sample B1KB52) and Uranium (sample B1KB52) – Negative preparation blank results may have potential affect on sample results. Sample results were X flagged.

All other QC controls are within the established limits.

**Percent Solids** – analyzed for organic moisture correction.

**Organic Comments**

- Sample results are moisture corrected and reported on dry weight basis.

**Semi-VOA** – The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 26 through 31 for QC details. Analytical Notes:

- Preparation Date: 17-aug-2006.
- Diethylphthalate - sample B1KB52 result was J flagged; result was less than the lowest calibration standard but greater than the detection limit.

All QC controls are within the established limits.

**TPHD-WA** - The hold time for this analysis were met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See page 32 for QC details. Analytical Note:

- Preparation Date: 17-aug-2006.

All QC controls are within the established limits.

**VOA** – The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 33 through 36 for QC details. Analytical Notes:

- Matrix Spike and Matrix Spike Duplicate QC samples were analyzed on sample# B1KB77 (SDG# 20060934, SAF# R06-013).
- 4-Bromofluorobenzene – Matrix Spike and Matrix Spike Duplicate QC exceeded established laboratory limits.

All other QC controls are within the established limits.

### **Radiochemistry Comments**

**RadChem** – There are no hold times associated with WSCF radiochemical methods. A Blank, Laboratory Control Sample, Matrix Spike (Technetium only), and Duplicate were analyzed with this delivery group. See pages 40 through 48 for QC details. Analytical Notes:

- Actinium-228 and Radium-228 Gamma Energy Analysis (GEA) – Duplicate QC Relative Percent Difference (RPD) exceeded established laboratory limits due to sample homogeneity issues.
- Americium-241, Neptunium-237, Plutonium Isotopic (238 and 239/240), Strontium-90, Technetium-99 and Uranium Isotopic (233/234, 235 and 238) – Applicable QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Pu-239/240 – Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Strontium-90 – Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

- Technetium-99 – Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Uranium Isotopic (233/234, 235 and 238) – Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

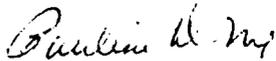
All other QC controls are within the established limits.

Americium-243, Plutonium-242, Strontium-85 and Uranium-232 – Radiochemical Tracer Recovery Data are summarized below:

<b>Radiochemical Tracer Percent Recovery</b>			
<b>Sample Number</b>	<b>Lab Sample ID</b>	<b>Isotope</b>	<b>Tracer Recovery (Percent)</b>
<b><u>Americium-243</u></b>			
BLANK		Am-243	79.9%
LCS		Am-243	93.0%
B1KB49	W060002493	Am-243	85.8%
DUPLICATE	W060002493	Am-243	89.2%
B1KB52	W060002500	Am-243	87.6%
<b><u>Plutonium-242</u></b>			
BLANK		Pu-242	84.0%
LCS		Pu-242	85.0%
B1KB49	W060002493	Pu-242	81.8%
DUPLICATE	W060002493	Pu-242	86.7%
B1KB52	W060002500	Pu-242	88.5%
<b><u>Strontium-85</u></b>			
BLANK		Sr-85	98.9%
LCS		Sr-85	83.4%
B1KB49	W060002493	Sr-85	86.0%
DUPLICATE	W060002493	Sr-85	88.2%
B1KB52	W060002500	Sr-85	89.1%
<b><u>Uranium-232</u></b>			
BLANK		U-232	79.8%
LCS		U-232	75.6%
B1KB49	W060002493	U-232	121.6%

Radiochemical Tracer Percent Recovery			
Sample Number	Lab Sample ID	Isotope	Tracer Recovery (Percent)
DUPLICATE	W060002493	U-232	93.0%
B1KB52	W060002500	U-232	88.7%

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.



Pauline D. Mix  
WSCF Client Services

Abbreviations

Hg – mercury  
IC – ion chromatography  
ICP – inductively coupled plasma  
ICP/AES – ICP/atomic emission spectroscopy  
ICP/MS – ICP/mass spectrometry  
Total U – total uranium  
AT/TB – total alpha/total beta  
AEA – Alpha Energy Analysis  
WTPH-G – Total Hydrocarbons-Gasoline

Am – americium  
Cm – curium  
Pu – plutonium  
Np – neptunium  
GEA – gamma energy analysis  
H3 – Tritium  
Sr – Strontium 89, 90  
WTPH-D – Total Hydrocarbons-Diesel  
TSS – Total Suspended Solids

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST  
 COMPANY CONTACT TELEPHONE NO. PROJECT COORDINATOR  
 TRECHTER, JE 373-7046 TRECHTER, JE  
 PROJECT DESIGNATION SAF NO. R06-013  
 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12  
 FIELD LOGBOOK NO. COA METHOD OF SHIPMENT  
 12.1600ES20 GOVERNMENT VEHICLE  
 DTS-SAWS-H112 BILL OF LADING/AIR BILL NO.  
 OFFSITE PROPERTY NO. N/A

SHIPPED TO  
 Waste Sampling & Characterization  
 MATRIX\*  
 OL = OTHER LIQUID  
 OS = OTHER SOLID  
 S = SOIL  
 W = WATER

SAMPLE NO.	LAB ID	MATRIX*	SAMPLE DATE	SAMPLE TIME	NO./TYPE CONTAINER(S)	ANALYSIS	PRESERVATION
BIK852	0060002500	S	8-16-06	1100	4X60mL aG	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Cool 4C
BIK852	62260007499	S			4X60mL G	TPH Diesel Range - WTPH-D (TPHKEROSEN)	Cool 4C
BIK852		S			1X40mL G	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Cool 4C
BIK852		S			1X500mL Square Bottle - Poly	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	None
BIK852		S			4X60mL G/P	Isotopic Plutonium (Pu-238, Pu-239/240), Isotopic Uranium (U-233/234, U-235, U-238), Americium-241 (Am-241)	None
BIK852		S			4X60mL G/P	Strontium-89,90 -- Sr-90 (Sr-90)	None
BIK852		S			4X60mL G/P	Technetium-99 (Tc-99)	None

CHAIN OF POSSESSION	SIGN / PRINT NAMES	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM CORATEK					SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM J. G. HOGAN	J. G. HOGAN	8/17/06 0955	JA FINEZIER	8/17/06 0955	
RELINQUISHED BY/REMOVED FROM					
RELINQUISHED BY/REMOVED FROM					
RELINQUISHED BY/REMOVED FROM					

ICED Initial Date  
 8-17-06

LABORATORY SECTION RECEIVED BY  
 FINAL SAMPLE DISPOSITION DISPOSED BY  
 TITLE  
 DATE/TIME



Fluor Hanford Inc. CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST R06-013-017 PAGE 3 OF 3

COLLECTOR HOGAN, JG COMPANY CONTACT TRECHTER, JE TELEPHONE NO. 373-7046 PROJECT COORDINATOR TRECHTER, JE PRICE CODE 8C DATA TURNAROUND

SAMPLING LOCATION 200-W-42 PROJECT DESIGNATION 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12 SAF NO. R06-013 AIR QUALITY 7 May 145 Days 7/16-05  
70 days 55-Days 8/16-05

ICE CHEST NO. FIELD LOGBOOK NO. COA 121600ES20 METHOD OF SHIPMENT GOVERNMENT VEHICLE

SHIPPED TO Waste Sampling & Characterization OFFSITE PROPERTY NO. N/A BILL OF LADING/AIR BILL NO. N/A

MATRIX\*  
 OL = OTHER LIQUID  
 OS = OTHER SOLID  
 S = SOIL  
 W = WATER

POSSIBLE SAMPLE HAZARDS/ REMARKS  
 DTS-SAWS-H112

SAMPLE NO.	LAB ID	MATRIX*	SAMPLE DATE	SAMPLE TIME	NO./TYPE CONTAINER(S)	ANALYSIS	PRESERVATION
B1KB52		S	8-16-06	1100	4x60ml G/P Neptunium-237 (Np-237)		None
B1KB52		S			4x60ml G/P IC Anions - 300.0 (BROMIDE, FLUORIDE, NO2-N, NO3-N, PO4-P, SULFATE)		None
B1KB52		S			4x60ml G/P ICP Metals - 6010A (Add-on) (B, Bi, La, Li, <u>Sm</u> , IT) ICP Metals - 6010A (TAL) (Al, Ca, Fe, K, Mg, Na)		Cool 4C
B1KB52		S			4x60ml G/P (SEE ITEM (4) IN SPECIAL INSTRUCTIONS)		None
B1KB52		S	8-16-06	1100	4x60ml G	GROSS ALPHA/BETA	None

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	DATE/TIME	DATE/TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM J. G. HOGAN	RECEIVED BY/STORED IN TA F1242/DR 122	8/17/06 0955	8/17/06 0955	Reporting format the same as GPP, including QC. All samples, except VOAs, have been taken using the multiple-increment sampling program. This requires the entire sample provided in each bottle to be used in analysis. VOAs will be analyzed as usual.
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN			(4)ICP/MS - 200.8 (Add-on) (As, Ba, Mo, Pb, Se, Sn, Sr, Ti, U) ICP/MS - 200.8 (TAL) (Ag, Ba, Cd, Co, Cr, Cu, Mn, Ni, Sb, V, Zn) ICP/MS - 200.8 (Hg) (Hg) Isotopic Thorium (Th-232)
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN			
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN			

ICED Initial Date  
 8-17-06

LABORATORY SECTION RECEIVED BY  
 FINAL SAMPLE DISPOSITION RECEIVED BY DATE/TIME

**Appendix 5**

**Data Validation Supporting Documentation**

**000022**



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: radium - 226 pu-239/40 U-234 - Jell

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

No FR

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 pu238, U-233 or U-235 LCS - Jell

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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-95 4796 - J cell  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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: actinium-228 42% - J radium-228 RPD

~~Sn-113 78%~~ ~~Fe-59 47% - J cell~~  
9/1/06

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: no field QC

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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Appendix 6**

**Additional Documentation Requested by Client**

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Gross Alpha/Gross Beta (AB32)

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/17/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002500</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
DUP	Gross alpha	12587-46-1	1.44E-01	0.692	RPD	08/18/06	0.000	20.000	
DUP	Gross beta	12587-47-2	1.2E-01	18.182	RPD	08/18/06	0.000	20.000	
<b>BATCH QC</b>									
BLANK	Gross alpha	12587-46-1	7.0E-03	0.007	pCi/g	08/18/06	-10.000	10.000	
BLANK	Gross beta	12587-47-2	1.1E-02	0.011	pCi/g	08/18/06	-10.000	10.000	
LCS	Gross alpha	12587-46-1	7.02	105.405	%rec	08/18/06	75.000	125.000	
LCS	Gross beta	12587-47-2	24.1	117.561	%rec	08/18/06	75.000	125.000	

000030

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Gamma Energy Analysis-grd H2O

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/17/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002500</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
DUP	Actinium-228	14331-83-0	3.06e-01	42.268	RPD	08/21/06	0.000	20.000	*
DUP	Americium-241	14596-10-2	U-2.6e-1	n/a	RPD	08/21/06	0.000	20.000	
DUP	Ba-133 by GEA	13981-41-4	U-9.7e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Cerium-144	14762-78-8	U-3.0e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Cerium/Praseodymium-144	CE/PR-144	U-6.0e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Cobalt-60	10198-40-0	U3.58e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Cesium-134	13967-70-9	U8.17e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Cesium-137	10045-97-3	U-8.5e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Europium-152	14883-23-9	U4.64e-2	n/a	RPD	08/21/06	0.000	20.000	
DUP	Europium-154	15585-10-1	U-5.2e-4	n/a	RPD	08/21/06	0.000	20.000	
DUP	Europium-155	14391-16-3	U-4.5e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Potassium-40	13966-00-2	1.47e+00	4.000	RPD	08/21/06	0.000	20.000	
DUP	Niobium-94	14681-63-1	U7.80e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Radium-226	13982-63-3	3.40e-01	5.714	RPD	08/21/06	0.000	20.000	
DUP	Radium-228	15262-20-1	3.06e-01	42.268	RPD	08/21/06	0.000	20.000	*
DUP	Ruthenium-103	13968-53-1	U-4.2e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Ruthenium-106	13967-48-1	U4.06e-2	n/a	RPD	08/21/06	0.000	20.000	
DUP	Antimony-125	14234-35-6	U5.08e-2	n/a	RPD	08/21/06	0.000	20.000	
DUP	Tin-113	13966-06-8	U-2.2e-3	n/a	RPD	08/21/06	0.000	20.000	
DUP	Tin-126	15832-50-5	U7.45e-02	n/a	RPD	08/21/06	0.000	20.000	
DUP	Uranium-235	15117-96-1	U-9.7e-2	n/a	RPD	08/21/06	0.000	20.000	
DUP	Zinc-65	13982-39-3	U-8.8e-3	n/a	RPD	08/21/06	0.000	20.000	
<b>BATCH QC</b>									
BLANK	Actinium-228	14331-83-0	5.95e-02	0.059	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Americium-241	14596-10-2	U-2.95e-3	n/a	pCi/g	08/21/06	-10.000	1000.000	

000031

# WSCF ANALYTICAL LABORATORY QC REPORT

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Gamma Energy Analysis-grd H2O

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
BLANK	Ba-133 by GEA	13981-41-4	U1.00e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Cerium-144	14762-78-8	U-1.00e-4	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Cerium/Praseodymium-144	CE/PR-144	U-2.00e-4	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Cobalt-60	10198-40-0	U9.52e-04	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Cesium-134	13967-70-9	U1.26e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Cesium-137	10045-97-3	U-1.01e-3	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Europium-152	14683-23-9	U-7.56e-3	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Europium-154	15585-10-1	U2.31e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Europium-155	14391-16-3	U9.32e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Potassium-40	13966-00-2	U2.34e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Niobium-94	14681-63-1	U1.03e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Radium-226	13982-63-3	8.26e-02	0.083	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Radium-228	15262-20-1	5.95e-02	0.059	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Ruthenium-103	13968-53-1	U-8.70e-4	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Ruthenium-106	13967-48-1	U6.26e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Antimony-125	14234-35-6	U3.12e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Tin-113	13966-06-8	U-2.05e-3	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Tin-126	15832-50-5	U-1.05e-2	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Uranium-235	15117-96-1	U-1.99e-3	n/a	pCi/g	08/21/06	-10.000	1000.000	
BLANK	Zinc-65	13982-39-3	U4.22e-03	n/a	pCi/g	08/21/06	-10.000	1000.000	
LCS	Americium-241	14596-10-2	4.09e+03	104.337	% Recov	08/18/06	80.000	120.000	
LCS	Cobalt-60	10198-40-0	4.41e+03	105.251	% Recov	08/18/06	80.000	120.000	
LCS	Cesium-137	10045-97-3	4.03e+03	112.570	% Recov	08/18/06	80.000	120.000	

000032

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Americium by AEA

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002493</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
DUP	Americium-241	14596-10-2	U1.3e-02	n/a	RPD	08/18/06	0.000	20.000	
<b>BATCH QC</b>									
BLANK	Americium-241	14596-10-2	U4.1e-02	n/a	pCi/g	08/18/06	-10.000	1000.000	
LCS	Americium-241	14596-10-2	1.2e+01	99.792	% Recov	08/18/06	75.000	125.000	

000033

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Neptunium by AEA

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002493</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
DUP	Neptunium-237	13994-20-2	1.33	n/a	RPD	08/18/06	0.000	25.000	
<b>BATCH QC</b>									
BLANK	Neptunium-237	13994-20-2	U5.3e-03	n/a	pCi/g	08/18/06	-10.000	1000.000	
LCS	Neptunium-237	13994-20-2	8.8e+01	88.000	% Recov	08/18/06	75.000	125.000	

000034

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Plutonium Isotopics by AEA

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002493</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
DUP	Plutonium-238	13981-16-3	U3.6e-03	n/a	RPD	08/18/06	0.000	20.000	
DUP	Pu-239/240 by AEA	PU-239/240	1.4e-02	44.444	RPD	08/18/06	0.000	20.000	
<b>BATCH QC</b>									
BLANK	Plutonium-238	13981-16-3	U-2.0e-03	n/a	pCi/g	08/18/06	-10.000	1000.000	
BLANK	Pu-239/240 by AEA	PU-239/240	1.6e-02	0.016	pCi/g	08/18/06	-10.000	1000.000	
LCS	Pu-239/240 by AEA	PU-239/240	1.4e+01	99.432	% Recov	08/18/06	75.000	125.000	

000035

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Strontium 89/90

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002493</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
DUP	Strontium-89/90	SR-RAD	3.3	29.677	RPD	08/18/06	0.000	20.000	.
<b>BATCH QC</b>									
BLANK	Strontium-89/90	10098-97-2	-9.1E-02	-0.091	pCi/g	08/18/06	-10.000	300.000	
LCS	Strontium-89/90	10098-97-2	93.4	108.731	% Recov	08/18/06	80.000	120.000	

000036

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: TC99 by Liquid Scin.

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
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**Lab ID: W060002493**  
**BATCH QC ASSOCIATED WITH SAMPLE**

DUP	Technetium-99	14133-76-7	U-9.8e-02	n/a	RPD	08/18/06	0.000	20.000	
MS	Technetium-99	14133-76-7	534.8	47.490	% Recov	08/18/06	75.000	125.000	

**BATCH QC**

BLANK	Technetium-99	14133-76-7	U-7.5e-01	n/a	pCi/g	08/18/06	-10.000	1000.000	
LCS	Technetium-99	14133-76-7	11864.4	105.356	% Recov	08/18/06	75.000	125.000	

000037

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Uranium Isotopics by AEA

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002493</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
DUP	Uranium-233/234	U-233/234	1.7	25.641	RPD	08/18/06	0.000	20.000	*
DUP	Uranium-235	15117-96-1	1.6e-01	31.579	RPD	08/18/06	0.000	20.000	*
DUP	Uranium-238	U-238	1.5	28.571	RPD	08/18/06	0.000	20.000	*
<b>BATCH QC</b>									
BLANK	Uranium-233/234	13966-29-5	2.3e-02	0.023	pCi/g	08/18/06	-10.000	1000.000	
BLANK	Uranium-235	15117-96-1	U1.3e-02	n/a	pCi/g	08/18/06	-10.000	1000.000	
BLANK	Uranium-238	24678-82-8	U1.6e-02	n/a	pCi/g	08/18/06	-10.000	1000.000	
LCS	Uranium-238	24678-82-8	2.0e+01	105.513	% Recov	08/18/06	75.000	125.000	

000038

Date: 1 September 2006  
To: Fluor Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 & 216-U-12  
Cribs  
Subject: Semivolatile - Data Package No. WSCF20060935 (60935)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. 60935 prepared by WSCF Analytical Laboratories (WSCF). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
B1KB52	8/16/06	Soil	C	See note 1

1 - Semivolatiles by 8270 and TPH-D (diesel and kerosene).

Data validation was conducted in accordance with the FHI validation statement of work and the Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit, DOE/RL-2005-75, Rev. 0. 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. 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 for semivolatile organics are extraction within 14 days of the date of sample collection and analysis within 40 days from the date of extraction. TPH-D requires analysis within 14 days.

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

000001

"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".

All holding times were met.

· **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

All accuracy 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.

All duplicate results were acceptable.

##### Field Duplicate Samples

No field duplicates were submitted for analysis.

#### · **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 analytes met the RTQL.

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· **Completeness**

Data package No. 60935 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**

None found.

**REFERENCES**

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

DOE/RL-2005-75, Rev. 0, *Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit*, December 2005.

**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).

000006

**Appendix 2**

**Summary of Data Qualification**

000007

SEMIVOLATILE DATA QUALIFICATION SUMMARY\*

SDG: 60935	REVIEWER: TLI	Project: 200-UW-1	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

\* - 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**  
**Annotated Laboratory Reports**

000009

# WSCF ANALYTICAL RESULTS REPORT

Attention: D.L. Klages H8-40 Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	100-02-7	4-Nitrophenol	SOIL	LA-523-456	U	<	220	1.00	2.2e+02	08/18/06	08/17/06
W060002500	B1KB52	106-46-7	1,4-Dichlorobenzene	SOIL	LA-523-456	U	<	260	1.00	2.6e+02	08/18/06	08/17/06
W060002500	B1KB52	108-95-2	Phenol	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	120-82-1	1,2,4-Trichlorobenzene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	121-14-2	2,4-Dinitrotoluene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	129-00-0	Pyrene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	59-50-7	4-Chloro-3-methylphenol	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	621-64-7	N-Nitrosodi-n-dipropylamine	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	83-32-9	Acenaphthene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	87-86-5	Pentachlorophenol	SOIL	LA-523-456	U	<	220	1.00	2.2e+02	08/18/06	08/17/06
W060002500	B1KB52	95-57-8	2-Chlorophenol	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	100-01-6	4-Nitroaniline	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	101-55-3	4-Bromophenylphenyl ether	SOIL	LA-523-456	U	<	240	1.00	2.4e+02	08/18/06	08/17/06
W060002500	B1KB52	105-67-9	2,4-Dimethylphenol	SOIL	LA-523-456	U	<	330	1.00	3.3e+02	08/18/06	08/17/06
W060002500	B1KB52	106-47-8	4-Chloroaniline	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	108-60-1	Bis(2-chloro-1-methylethyl)eth	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	111-44-4	Bis(2-chloroethyl) ether	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	111-91-1	Bis(2-Chloromethoxy)methane	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	117-81-7	Bis(2-ethylhexyl) phthalate	SOIL	LA-523-456	U	<	220	1.00	2.2e+02	08/18/06	08/17/06
W060002500	B1KB52	117-84-0	Di-n-octylphthalate	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	118-74-1	Hexachlorobenzene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	120-12-7	Anthracene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	120-83-2	2,4-Dichlorophenol	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	131-11-3	Dimethyl phthalate	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	132-64-9	Dibenzofuran	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	191-24-2	Benzo(ghi)perylene	SOIL	LA-523-456	U	<	240	1.00	2.4e+02	08/18/06	08/17/06

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 DF = Dilution Factor  
 \* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols  
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E - Analyte is an estimate, has potentially larger errors  
 U - Analyzed for but not detected above limiting criteria.

C - The Analyte was found in the Associated Blank.  
 J - Analyte is an estimate, has potentially larger errors  
 X - Other flags and notes described in the comments/narrative.

✓

9/5/06

REVISED

9/5/06

# WSCF ANALYTICAL RESULTS REPORT

Group #: 20060935

Attention: D.L. Klages H8-40

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	193-39-5	Indeno[1,2,3-cd]pyrene	SOIL	LA-523-456	U	<	260	1.00	2.6e+02	08/18/06	08/17/06
W060002500	B1KB52	205-99-2	Benzo[b]fluoranthene	SOIL	LA-523-456	U	<	190	1.00	1.9e+02	08/18/06	08/17/06
W060002500	B1KB52	206-44-0	Fluoranthene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	207-08-9	Benzo[k]fluoranthene	SOIL	LA-523-456	U	<	190	1.00	1.9e+02	08/18/06	08/17/06
W060002500	B1KB52	208-96-8	Acenaphthylene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	218-01-9	Chrysene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	50-32-8	Benzo[a]pyrene	SOIL	LA-523-456	U	<	220	1.00	2.2e+02	08/18/06	08/17/06
W060002500	B1KB52	51-28-5	2,4-Dinitrophenol	SOIL	LA-523-456	U	<	660	1.00	6.6e+02	08/18/06	08/17/06
W060002500	B1KB52	53-70-3	Dibenz[a,h]anthracene	SOIL	LA-523-456	U	<	290	1.00	2.9e+02	08/18/06	08/17/06
W060002500	B1KB52	534-52-1	4,6-Dinitro-2-methylphenol	SOIL	LA-523-456	U	<	240	1.00	2.4e+02	08/18/06	08/17/06
W060002500	B1KB52	541-73-1	1,3-Dichlorobenzene	SOIL	LA-523-456	U	<	290	1.00	2.9e+02	08/18/06	08/17/06
W060002500	B1KB52	56-55-3	Benzo[ghi]perylene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	606-20-2	2,6-Dinitrotoluene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	7005-72-3	4-Chlorophenylphenyl ether	SOIL	LA-523-456	U	<	180	1.00	1.8e+02	08/18/06	08/17/06
W060002500	B1KB52	77-47-4	Hexachlorocyclopentadiene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	78-59-1	Isophorone	SOIL	LA-523-456	U	<	300	1.00	2.3e+02	08/18/06	08/17/06
W060002500	B1KB52	84-66-2	Diethylphthalate	SOIL	LA-523-456	J	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	84-74-2	Di-n-butylphthalate	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	85-01-8	Phenanthrene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	85-68-7	Butylbenzylphthalate	SOIL	LA-523-456	U	<	180	1.00	1.8e+02	08/18/06	08/17/06
W060002500	B1KB52	86-30-6	N-Nitrosodiphenylamine	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	86-73-7	Fluorene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	86-74-8	Carbazole	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	87-68-3	Hexachlorobutadiene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	88-74-4	2-Nitroaniline	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	88-75-5	2-Nitrophenol	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06
W060002500	B1KB52	91-20-3	Naphthalene	SOIL	LA-523-456	U	<	150	1.00	1.5e+02	08/18/06	08/17/06

E - Analyte is an estimate, has potentially larger errors  
U - Analyzed for but not detected above limiting criteria.

C - The Analyte was found in the Associated Blank.  
J - Analyte is an estimate, has potentially larger errors  
X - Other flags and notes described in the comments/narrative

MDL = Minimum Detection Limit  
RQ = Result Qualifier

DF = Dilution Factor

• Indicates results that have NOT been validated; + Indicates more than six qualifier symbols

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PROJECT HANFORD MANAGEMENT COMPANY

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9/5/06

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9/5/06

Page 3

000011

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

**000014**

<b>Sample Delivery Group</b>	<b>WSCF20060935</b>
<b>Sample Matrix</b>	<b>SOLID</b>
<b>Sample Visual</b>	<b>N/A</b>
<b>SAF Number</b>	<b>R06-013</b>
<b>Data Deliverable</b>	<b>Summary Report</b>

### Introduction

One (1) 200-UW-1 Operable Unit soil sample (B1KB52) from the trench between 216-U-8 and 216-U-12 were received at the WSCF Laboratory on August 17, 2006. The samples were received in a cool condition with ice present in the coolers. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *200-UW-1 Operable Unit Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, method references, and Laboratory QC information. Copies of the chain of custody and sample receipt are included as Attachment 3.

### Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report*, pages 52 through 53 , for a complete listing of approved analytical methods used.

### Inorganic Comments

**Anions** - The hold time requirements were met. A Blank, Duplicate, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group. See pages 12 through 13 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.
- Duplicate, Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Phosphate – Matrix Spike and Matrix Spike Duplicate recoveries were below established laboratory limits. Sample result was less than detection limit and U flagged.

All other QC controls are within the established limits.

**ICP-AES Metals** – The holding time for this analysis was met. A Blank, Laboratory Control Sample (LCS), Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group of less than 20 samples. See pages 14 through 16 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.

- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Aluminum, Calcium, Iron, Magnesium and Titanium – insufficient spike concentrations. Sample concentrations were greater than four times the spike concentration.
- Calcium – The Laboratory Control Sample recoveries exceeded established laboratory limits. Calcium result was E flagged. Lithium result was less than the method detection limit and U flagged.
- Silicon – Matrix Spike, Matrix Spike Duplicate and Laboratory Control Sample recoveries were outside established laboratory limits. Sample result was E flagged.
- Aluminum – Analyte detected in the associated preparation Blank sample was evaluated and sample result was C flagged.

All other QC controls are within the established limits.

**ICP-MS Metals** – The holding time for this analysis was met, with the exception of mercury. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this deliver group of less than 20 samples. See pages 17 through 20 for QC details Analytical Notes:

- Preparation Date: 21-aug-2006.
- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Thorium results listed in the report represent Th-232 exclusively.
- Zinc – Analyte detected in the associated preparation Blank sample was evaluated and sample B1KB51 was C flagged.
- Manganese (sample B1KB52), Thorium (sample B1KB52) and Uranium (sample B1KB52) – Negative preparation blank results may have potential affect on sample results. Sample results were X flagged.

All other QC controls are within the established limits.

**Percent Solids** – analyzed for organic moisture correction.

**Organic Comments**

- Sample results are moisture corrected and reported on dry weight basis.

**Semi-VOA** – The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 26 through 31 for QC details. Analytical Notes:

- Preparation Date: 17-aug-2006.
- Diethylphthalate - sample B1KB52 result was J flagged; result was less than the lowest calibration standard but greater than the detection limit.

All QC controls are within the established limits.

**TPHD-WA** - The hold time for this analysis were met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See page 32 for QC details. Analytical Note:

- Preparation Date: 17-aug-2006.

All QC controls are within the established limits.

**VOA** - The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 33 through 36 for QC details. Analytical Notes:

- Matrix Spike and Matrix Spike Duplicate QC samples were analyzed on sample# B1KB77 (SDG# 20060934, SAF# R06-013).
- 4-Bromofluorobenzene - Matrix Spike and Matrix Spike Duplicate QC exceeded established laboratory limits.

All other QC controls are within the established limits.

### Radiochemistry Comments

**RadChem** - There are no hold times associated with WSCF radiochemical methods. A Blank, Laboratory Control Sample, Matrix Spike (Technetium only), and Duplicate were analyzed with this delivery group. See pages 40 through 48 for QC details. Analytical Notes:

- Actinium-228 and Radium-228 Gamma Energy Analysis (GEA) - Duplicate QC Relative Percent Difference (RPD) exceeded established laboratory limits due to sample homogeneity issues.
- Americium-241, Neptunium-237, Plutonium Isotopic (238 and 239/240), Strontium-90, Technetium-99 and Uranium Isotopic (233/234, 235 and 238) - Applicable QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Pu-239/240 - Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Strontium-90 - Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

- Technetium-99 – Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Uranium Isotopic (233/234, 235 and 238) – Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

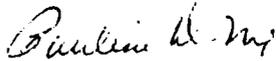
All other QC controls are within the established limits.

Americium-243, Plutonium-242, Strontium-85 and Uranium-232 – Radiochemical Tracer Recovery Data are summarized below:

<b>Radiochemical Tracer Percent Recovery</b>			
<b>Sample Number</b>	<b>Lab Sample ID</b>	<b>Isotope</b>	<b>Tracer Recovery (Percent)</b>
<b><u>Americium-243</u></b>			
BLANK		Am-243	79.9%
LCS		Am-243	93.0%
B1KB49	W060002493	Am-243	85.8%
DUPLICATE	W060002493	Am-243	89.2%
B1KB52	W060002500	Am-243	87.6%
<b><u>Plutonium-242</u></b>			
BLANK		Pu-242	84.0%
LCS		Pu-242	85.0%
B1KB49	W060002493	Pu-242	81.8%
DUPLICATE	W060002493	Pu-242	86.7%
B1KB52	W060002500	Pu-242	88.5%
<b><u>Strontium-85</u></b>			
BLANK		Sr-85	98.9%
LCS		Sr-85	83.4%
B1KB49	W060002493	Sr-85	86.0%
DUPLICATE	W060002493	Sr-85	88.2%
B1KB52	W060002500	Sr-85	89.1%
<b><u>Uranium-232</u></b>			
BLANK		U-232	79.8%
LCS		U-232	75.6%
B1KB49	W060002493	U-232	121.6%

Radiochemical Tracer Percent Recovery			
Sample Number	Lab Sample ID	Isotope	Tracer Recovery (Percent)
DUPLICATE	W060002493	U-232	93.0%
B1KB52	W060002500	U-232	88.7%

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.



Pauline D. Mix  
WSCF Client Services

Abbreviations

Hg – mercury  
IC – ion chromatography  
ICP – inductively coupled plasma  
ICP/AES – ICP/atomic emission spectroscopy  
ICP/MS – ICP/mass spectrometry  
Total U – total uranium  
AT/TB – total alpha/total beta  
AEA – Alpha Energy Analysis  
WTPH-G – Total Hydrocarbons-Gasoline

Am – americium  
Cm – curium  
Pu – plutonium  
Np – neptunium  
GEA – gamma energy analysis  
H3 – Tritium  
Sr – Strontium 89, 90  
WTPH-D – Total Hydrocarbons-Diesel  
TSS – Total Suspended Solids



<b>COLLECTOR</b> HOGAN, XG	<b>COMPANY CONTACT</b> TRECHTER, JE	<b>TELEPHONE NO.</b> 373-7046	<b>PROJECT COORDINATOR</b> TRECHTER, JE	<b>PRICE CODE</b> BC	<b>DATA</b> TURNAROUND 7/8 8-14-06 15 Days 7 Days
<b>SAMPLING LOCATION</b> 200-W-42	<b>PROJECT DESIGNATION</b> 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12	<b>SAF NO.</b> R06-013	<b>METHOD OF SHIPMENT</b> GOVERNMENT VEHICLE	<b>AIR QUALITY</b>	
<b>ICE CHEST NO.</b>	<b>FIELD LOGBOOK NO.</b> COA	<b>121600ES20</b>	<b>BILL OF LADING/AIR BILL NO.</b> N/A		

*DTS-SAWS-HIZ*

**SHIPPED TO**

Waste Sampling & Characterization

**SPECIAL INSTRUCTIONS**

Reporting format the same as GPP, including QC. All samples, except VOAs, have been taken using the multiple-increment sampling program. This requires the entire sample provided in each bottle to be used in analysis. VOAs will be analyzed as usual.

- (1)Semi-VOA -- 8270A (Add-On) (1,2,4-TRIMBEN, 2-NAPHTHAM, ZBUTOXETOL, BENZALC, CYCHEXN, DECANE, MCRESOL, METHYLPHEN, PYRIDINE, TRIBUPH) Semi-VOA - 8270A (TCL) (1,2-DICLBENZ, 1,3-DICLBENZ, 1,4-DICLBENZ, 2,4,5-TRICLPHN, 2,4-DICLPHEN, 2,4-DIMET, 2,4-DINITOLU, 2,6-DINITOLU, 2-METHPH, 2-NITRAN, 2-NITRPH, 3-NITRAN, 4,6-DINIT, 4-CHLOET, 9H-CARB, ACENAPH, ACENATI, ANTHRACENE, BENZAN, BENZBF, BENZOPE, BENZOPI, BISZCHE, BISZCHM, BISZEPH, BNZKFLU, BROPHEN, BUTBENP, CHLANIL, CHLCRES, CHILMAPH, CHILPHEN, CHRYSENE, DIBAHAN, DIBENFR, DIBPHTH, DICHBEN, DIEPHTH, DIMPHTH, DIMPHTH, DIOPHTH, DIPRNIT, FLUORAN, FLUORENE, HEXCBUT, HEXCCYC, HEXCETH, INDENOP, ISOPHORONE, NAPHTHA, NITBENZ, NITPHENOL, NITRANILIN, NNDIPHA, PENTC-P, PHENANT, PHENOL, PYRENE, TRICHLB)
- (2)VOA - 8260A (Add-On) (1-BUTANOL, 1-PROPANOL, 2-PENTANON, ACETILE, CISDCE, ETHANOL, HEXANE, N-BUTYL, PROPYHEXA, TETHYDF, TRANDCE, TRICMFLM) VOA - 5035/8260 (TCL) (1,1,1-T, 1,1,2-T, 1,1-DCL, 1,2-DCL, 1,1,2-T, 1,2-DICHL, 2-HEXANONE, ACETONE, BDCM, BENZENE, BROMOFORM, CARBIDE, CARBITET, COBM, CHLOROBEZ, CHLOROFORM, CIST3DI, CLETHAN, DICETHY, DICPANE, ETHBENZENE, HEXONE, METHBRO, METHCHL, METHONE, METHYCH, PERCENE, STYRENE, TOLUENE, TRANSI3, TRICELN, VINYLIDE, XYLENES)
- (3)Gamma Spec - Add-on (Ac-228, Ba-133, Cs-134, Cs-137, Ce-144, Ce/Pa-144, Cm-244, Cs-134, K-40, Nb-94, Ra-228, Ru-103, Sb-125, Sn-113, Sn-125, Sn-126, Th-232, Th-232, U-235, U-238, Zn-65) Gamma Spectroscopy (Am-241, Co-58) Co-60, Cs-137, Eu-152, Eu-154, Eu-155 (Fe-59) Ra-226, Ru-106)

COLLECTOR: HOGAN, JG  
 COMPANY CONTACT: TRECHTER, JE  
 PROJECT COORDINATOR: TRECHTER, JE  
 PRICE CODE: 8C  
 DATA TURNAROUND: 7 days 15-Days 8-16-16  
 AIR QUALITY: 7 days 15-Days 8-16-16

PROJECT DESIGNATION: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12  
 SAF NO.: R06-013  
 METHOD OF SHIPMENT: GOVERNMENT VEHICLE  
 BILL OF LADING/AIR BILL NO.: N/A

FIELD LOGBOOK NO.: COA  
 OFFSITE PROPERTY NO.: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS: DTS-SAWS-H12

LAB ID	MATRIX*	SAMPLE DATE	SAMPLE TIME	NO./TYPE CONTAINER(S)	ANALYSIS	PRESERVATION
B1KB52	S	8-16-06	1100	4X60mL G/P Neptunium-237 (Np-237)	IC Anions - 300.0 (BROMIDE, CHLORIDE, FLUORIDE, NO2-N, NO3-N, PO4-P, SULFATE)	None
B1KB52	S			4X60mL G/P	IC Metals - 6010A (Add-on) (B, Bi, La, Li, Sr, (Sm), Tl) ICP Metals - 6010A (TAL) (Al, Ca, Fe, K, Mg, Na)	Cool 4C
B1KB52	S			4X60mL G/P	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	None
B1KB52	S	8-16-06	1100	4X60mL G/P	GROSS ALPHA/BETA	None

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME	SPECIAL INSTRUCTIONS
J. G. HOGAN	8/17/06 0955	[Signature]	AF 1942100 [Signature]	8/17/06 0955	Reporting format the same as GPP, including QC. All samples, except VOAs, have been taken using the multiple-increment sampling program. This requires the entire sample provided in each bottle to be used in analysis. VOAs will be analyzed as usual.
					(4) ICP/MS - 200.8 (Add-on) (As, Be, Mo, Pb, Se, Sn, Sr, Ti, U), ICP/MS - 200.8 (TAL) (Ag, Ba, Co, Cr, Cu, Mn, Ni, Sb, V, Zn) ICP/MS - 200.8 (Hg) (Hg) Isotopic Thorium (Th-232)

ICED Initial Date  
 8-17-06

LABORATORY SECTION: RECEIVED BY  
 FINAL SAMPLE DISPOSITION: DISPOSED BY

DATE/TIME

TITLE

000022

60 of 60

**Appendix 5**  
**Data Validation Supporting Documentation**

**000023**



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 PB  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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 PA  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**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**

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: SW-846 8270C Semi-Vols

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/17/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
MS	1,2,4-Trichlorobenzene	120-82-1	4404.7	103.000	% Recov	08/21/06	46.000	107.000	
MS	1,4-Dichlorobenzene	106-46-7	4014.8	93.858	% Recov	08/21/06	30.000	96.000	
MS	2,4-Dinitrotoluene	121-14-2	3733.3	87.300	% Recov	08/21/06	59.000	106.000	
MS	2-Fluorophenol	367-12-4	4453.4	104.000	% Recov	08/21/06	42.000	105.000	
MS	Acenaphthene	83-32-9	4359.8	102.000	% Recov	08/21/06	61.000	116.000	
MS	4-Chloro-3-methylphenol	59-50-7	6941.9	98.800	% Recov	08/21/06	61.000	106.000	
MS	2-Chlorophenol	95-57-8	6448.0	100.000	% Recov	08/21/06	66.000	106.000	
MS	N-Nitrosodi-n-propylamine	621-64-7	4481.8	105.000	% Recov	08/21/06	71.000	114.000	
MS	2-Fluorobiphenyl	321-60-8	4550.1	106.000	% Recov	08/21/06	56.000	122.000	
MS	Phenol	108-95-2	6463.4	101.000	% Recov	08/21/06	42.000	111.000	
MS	Nitrobenzene-d5	4165-60-0	4364.3	102.000	% Recov	08/21/06	64.000	111.000	
MS	4-Nitrophenol	100-02-7	5579.1	87.000	% Recov	08/21/06	32.000	118.000	
MS	Pentachlorophenol	87-86-5	6387.4	99.500	% Recov	08/21/06	62.000	114.000	
MS	Phenol-d5	4165-62-2	4429.3	104.000	% Recov	08/21/06	54.000	120.000	
MS	Pyrene	129-00-0	4261.2	99.600	% Recov	08/21/06	66.000	118.000	
MS	2,4,6-Tribromophenol	118-79-6	3898.6	91.100	% Recov	08/21/06	24.000	122.000	
MS	Terphenyl-d14 (7Cl)	98904-43-9	4521.8	106.000	% Recov	08/21/06	35.000	150.000	
MSD	1,2,4-Trichlorobenzene	120-82-1	4850.6	105.000	% Recov	08/21/06	46.000	107.000	
MSD	1,4-Dichlorobenzene	106-46-7	4326.5	93.846	% Recov	08/21/06	30.000	96.000	
MSD	2,4-Dinitrotoluene	121-14-2	4605.5	99.900	% Recov	08/21/06	59.000	106.000	
MSD	2-Fluorophenol	367-12-4	4690.8	102.000	% Recov	08/21/06	42.000	105.000	
MSD	Acenaphthene	83-32-9	4697.2	102.000	% Recov	08/21/06	61.000	116.000	
MSD	4-Chloro-3-methylphenol	59-50-7	6635.5	96.000	% Recov	08/21/06	61.000	106.000	
MSD	2-Chlorophenol	95-57-8	6930.1	100.000	% Recov	08/21/06	66.000	106.000	
MSD	N-Nitrosodi-n-propylamine	621-64-7	4638.9	101.000	% Recov	08/21/06	71.000	114.000	
MSD	2-Fluorobiphenyl	321-60-8	5014.2	109.000	% Recov	08/21/06	56.000	122.000	

Lab ID: W060002500  
 BATCH QC ASSOCIATED WITH SAMPLE

000029

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: SW-846 8270C Semi-Vols

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/17/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
MSD	Phenol	108-95-2	7065.7	102.000	% Recov	08/21/06	42.000	111.000	
MSD	Nitrobenzene-d5	4165-60-0	4825.2	105.000	% Recov	08/21/06	64.000	111.000	
MSD	4-Nitrophenol	100-02-7	6511.2	94.200	% Recov	08/21/06	32.000	118.000	
MSD	Pentachlorophenol	87-86-5	6792.8	98.200	% Recov	08/21/06	62.000	114.000	
MSD	Phenol-d5	4165-62-2	5000.9	108.000	% Recov	08/21/06	54.000	120.000	
MSD	Pyrene	129-00-0	4771.2	103.000	% Recov	08/21/06	66.000	118.000	
MSD	2,4,6-Tribromophenol	118-79-6	4447.6	96.500	% Recov	08/21/06	24.000	122.000	
MSD	Terphenyl-d14 (7Cl)	98904-43-9	4998.6	108.000	% Recov	08/21/06	35.000	150.000	
SPK-RPD	1,2,4-Trichlorobenzene	120-82-1	105.000	1.923	RPD	08/18/06	0.000	20.000	
SPK-RPD	1,4-Dichlorobenzene	106-46-7	93.846	0.013	RPD	08/21/06	0.000	20.000	
SPK-RPD	2,4-Dinitrotoluene	121-14-2	99.900	13.462	RPD	08/18/06	0.000	20.000	
SPK-RPD	2-Fluorophenol	367-12-4	102.000	1.942	RPD	08/18/06	0.000	20.000	
SPK-RPD	Acenaphthene	83-32-9	102.000	0.000	RPD	08/18/06	0.000	20.000	
SPK-RPD	4-Chloro-3-methylphenol	59-50-7	96.000	2.875	RPD	08/18/06	0.000	20.000	
SPK-RPD	2-Chlorophenol	95-57-8	100.000	0.000	RPD	08/18/06	0.000	20.000	
SPK-RPD	N-Nitrosodi-n-dipropylamine	621-64-7	101.000	3.883	RPD	08/18/06	0.000	20.000	
SPK-RPD	2-Fluorobiphenyl	321-60-8	109.000	2.791	RPD	08/18/06	0.000	20.000	
SPK-RPD	Phenol	108-95-2	102.000	0.985	RPD	08/18/06	0.000	20.000	
SPK-RPD	Nitrobenzene-d5	4165-60-0	105.000	2.899	RPD	08/18/06	0.000	20.000	
SPK-RPD	4-Nitrophenol	100-02-7	94.200	7.947	RPD	08/18/06	0.000	20.000	
SPK-RPD	Pentachlorophenol	87-86-5	98.200	1.315	RPD	08/18/06	0.000	20.000	
SPK-RPD	Phenol-d5	4165-62-2	108.000	3.774	RPD	08/18/06	0.000	20.000	
SPK-RPD	Pyrene	129-00-0	103.000	3.356	RPD	08/18/06	0.000	20.000	
SPK-RPD	2,4,6-Tribromophenol	118-79-6	96.500	5.757	RPD	08/18/06	0.000	20.000	
SPK-RPD	Terphenyl-d14 (7Cl)	98904-43-9	108.000	1.869	RPD	08/18/06	0.000	20.000	
SURR	2-Fluorophenol	367-12-4	4431.2	101.000	% Recov	08/18/06	42.000	105.000	
SURR	2-Fluorobiphenyl	321-60-8	4680.8	106.000	% Recov	08/18/06	56.000	122.000	
SURR	Nitrobenzene-d5	4165-60-0	4427.0	101.000	% Recov	08/18/06	64.000	111.000	
SURR	Phenol-d5	4165-62-2	4500.6	102.000	% Recov	08/18/06	54.000	120.000	
SURR	2,4,6-Tribromophenol	118-79-6	3907.0	88.800	% Recov	08/18/06	24.000	122.000	

000030

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: SW-846 8270C Semi-Vols

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/17/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
SURR	Terphenyl-d14 (TCI)	98904-43-9	4643.6	106.000	% Recov	08/18/06	35.000	150.000	
<b>BATCH QC</b>									
BLANK	1,2-Dichlorobenzene	95-50-1	< 240	n/a	ug/Kg	08/18/06			U
BLANK	1,2,4-Trimethylbenzene	95-63-6	< 180	n/a	ug/Kg	08/18/06			U
BLANK	1,2,4-Trichlorobenzene	120-82-1	< 140	n/a	ug/Kg	08/18/06			U
BLANK	1,3-Dichlorobenzene	541-73-1	< 260	n/a	ug/Kg	08/18/06			U
BLANK	1,4-Dichlorobenzene	106-48-7	< 240	n/a	ug/Kg	08/18/06			U
BLANK	2-Naphthylamine	91-59-8	< 380	n/a	ug/Kg	08/18/06			U
BLANK	2,4-Dichlorophenol	120-83-2	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2,4-Dinitrotoluene	121-14-2	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2,4,5-Trichlorophenol	95-95-4	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2,4,6-Trichlorophenol	88-06-2	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2,4-Dimethylphenol	105-67-9	< 220	n/a	ug/Kg	08/18/06			U
BLANK	2,6-Dinitrotoluene	606-20-2	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2-Butoxyethanol	111-76-2	< 200	n/a	ug/Kg	08/18/06			U
BLANK	2-Chloronaphthalene	91-58-7	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2-Fluorophenol	367-12-4	4129.6	103.240	% Recov	08/18/06	42.000	105.000	U
BLANK	2-Methylnaphthalene	91-57-6	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2-Methylphenol (cresol, o-)	95-48-7	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2-Nitroaniline	88-74-4	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2-Nitrophenol	88-75-5	< 140	n/a	ug/Kg	08/18/06			U
BLANK	3 & 4 Methylphenol Total	65794-98-9	< 140	n/a	ug/Kg	08/18/06			U
BLANK	3-Nitroaniline	99-09-2	< 140	n/a	ug/Kg	08/18/06			U
BLANK	4,6-Dinitro-2-methylphenol	534-52-1	< 220	n/a	ug/Kg	08/18/06			U
BLANK	4-Bromophenylphenyl ether	101-55-3	< 140	n/a	ug/Kg	08/18/06			U
BLANK	4-Chlorophenylphenyl ether	7005-72-3	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Acenaphthene	83-32-9	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Acenaphthylene	208-96-8	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Anthracene	120-12-7	< 140	n/a	ug/Kg	08/18/06			U

000031

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: SW-846 8270C Semi-Vols

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
BLANK	Bis(2-chloroethyl) ether	111-44-4	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Benzo(a)anthracene	56-55-3	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Benzo(b)fluoranthene	205-99-2	< 170	n/a	ug/Kg	08/18/06			U
BLANK	Benzoic acid	65-85-0	< 400	n/a	ug/Kg	08/18/06	0.000		U
BLANK	Benzo(ghi)perylene	191-24-2	< 220	n/a	ug/Kg	08/18/06			U
BLANK	Benzo(a)pyrene	50-32-8	< 200	n/a	ug/Kg	08/18/06			U
BLANK	Bis(2-Chloroethoxy)methane	111-91-1	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Bis(2-ethylhexyl) phthalate	117-81-7	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Bis(2-chloro-1-methylethyl)eth	108-60-1	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Benzyl alcohol	100-51-6	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Benzo(k)fluoranthene	207-08-9	< 170	n/a	ug/Kg	08/18/06			U
BLANK	Butylbenzylphthalate	85-68-7	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Carbazole	86-74-8	< 140	n/a	ug/Kg	08/18/06			U
BLANK	4-Chloroaniline	106-47-8	< 300	n/a	ug/Kg	08/18/06			U
BLANK	4-Chloro-3-methylphenol	59-50-7	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2-Chlorophenol	95-57-8	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Chrysenes	218-01-9	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Cyclohexanone	108-94-1	< 140	n/a	ug/Kg	08/18/06			U
BLANK	3,3'-Dichlorobenzidine	91-94-1	< 260	n/a	ug/Kg	08/18/06			U
BLANK	Decane	124-18-5	< 200	n/a	ug/Kg	08/18/06			U
BLANK	Dibenz(a,h)anthracene	53-70-3	< 260	n/a	ug/Kg	08/18/06			U
BLANK	Dibutyl butylphosphonate	78-46-6	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Dibenzofuran	132-64-9	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Di-n-butylphthalate	84-74-2	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Diethylphthalate	84-66-2	< 210	n/a	ug/Kg	08/18/06			U
BLANK	Dimethyl phthalate	131-11-3	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2,4-Dinitrophenol	51-28-5	< 600	n/a	ug/Kg	08/18/06			U
BLANK	Di-n-octylphthalate	117-84-0	< 200	n/a	ug/Kg	08/18/06			U
BLANK	N-Nitrosodi-n-dipropylamine	621-64-7	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Dodecane	112-40-3	< 140	n/a	ug/Kg	08/18/06	-999.000	999.000	U

000032

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: SW-846 8270C Semi-Vols

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
BLANK	2-Fluorobiphenyl	321-60-8	4053.9	101.000	% Recov	08/18/06	56.000	122.000	U
BLANK	Fluorene	86-73-7	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Fluoranthene	206-44-0	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Hexachlorobenzene	118-74-1	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Hexachlorobutadiene	87-68-3	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Hexachlorocyclopentadiene	77-47-4	< 160	n/a	ug/Kg	08/18/06			U
BLANK	Hexachloroethane	67-72-1	< 230	n/a	ug/Kg	08/18/06			U
BLANK	Indeno(1,2,3-cd)pyrene	193-39-5	< 240	n/a	ug/Kg	08/18/06			U
BLANK	Isophorone	78-59-1	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Phenol	108-95-2	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Naphthalene	91-20-3	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Nitrobenzene-d5	4165-60-0	4151.5	104.000	% Recov	08/18/06	64.000	111.000	U
BLANK	Nitrobenzene	98-95-3	< 140	n/a	ug/Kg	08/18/06			U
BLANK	4-Nitrophenol	100-02-7	< 200	n/a	ug/Kg	08/18/06			U
BLANK	4-Nitroaniline	100-01-6	< 200	n/a	ug/Kg	08/18/06			U
BLANK	N-Nitrosodiphenylamine	86-30-6	< 160	n/a	ug/Kg	08/18/06			U
BLANK	Pentachlorophenol	87-86-5	< 200	n/a	ug/Kg	08/18/06			U
BLANK	Phenanthrene	85-01-8	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Phenol-d5	4165-62-2	4267.2	107.000	% Recov	08/18/06	54.000	120.000	U
BLANK	Pyrene	129-00-0	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Pyridine	110-86-1	< 140	n/a	ug/Kg	08/18/06			U
BLANK	Tributyl phosphate	126-73-8	< 140	n/a	ug/Kg	08/18/06			U
BLANK	2,4,6-Tribromophenol	118-79-6	3877.3	96.900	% Recov	08/18/06	24.000	122.000	U
BLANK	Terphenyl-d14 (7Cl)	98904-43-9	4111.2	103.000	% Recov	08/18/06	35.000	150.000	U
LCS	1,2,4-Trichlorobenzene	120-82-1	4238.8	106.000	% Recov	08/21/06	46.000	107.000	U
LCS	1,4-Dichlorobenzene	108-46-7	4369.5	109.000	% Recov	08/21/06	42.000	111.000	U
LCS	2,4-Dinitrotoluene	121-14-2	3906.3	97.700	% Recov	08/21/06	59.000	106.000	U
LCS	2-Fluorophenol	367-12-4	4113.2	103.000	% Recov	08/21/06	50.000	110.000	U
LCS	Acenaphthene	83-32-9	4378.9	109.000	% Recov	08/21/06	61.000	116.000	U
LCS	4-Chloro-3-methylphenol	59-50-7	4107.6	68.500	% Recov	08/21/06	61.000	106.000	U

000033

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: SW-846 8270C Semi-Vols

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
LCS	2-Chlorophenol	95-57-8	6161.8	103.000	% Recov	08/21/06	66.000	106.000	
LCS	N-Nitrosodi-n-dipropylamine	621-64-7	4123.0	103.000	% Recov	08/21/06	71.000	114.000	
LCS	2-Fluorobiphenyl	321-60-8	4201.5	105.000	% Recov	08/21/06	58.000	109.000	
LCS	Phenol	108-95-2	6060.9	101.000	% Recov	08/21/06	67.000	105.000	
LCS	Nitrobenzene-d5	4165-60-0	4528.6	113.000	% Recov	08/21/06	60.000	118.000	
LCS	4-Nitrophenol	100-02-7	5813.3	96.900	% Recov	08/21/06	32.000	118.000	
LCS	Pentachlorophenol	87-86-5	5785.1	96.400	% Recov	08/21/06	62.000	114.000	
LCS	Phenol-d5	4165-62-2	4162.6	104.000	% Recov	08/21/06	59.000	116.000	
LCS	Pyrene	129-00-0	4349.8	109.000	% Recov	08/21/06	66.000	118.000	
LCS	2,4,6-Tribromophenol	118-79-6	3900.2	97.500	% Recov	08/21/06	60.000	120.000	
LCS	Terphenyl-d14 (7Cl)	98904-43-9	4349.9	109.000	% Recov	08/21/06	60.000	120.000	

000034

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: WTPH-D TPH Diesel Range (Wa)

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/17/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
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## Lab ID: W060002500 BATCH QC ASSOCIATED WITH SAMPLE

MS	ortho-Terphenyl	Surr	84-15-1	21567	101.000	% Recov	70.000	130.000	
MS	Total Pet. Hydrocarbons Diesel		TPHDIESEL	107450	101.000	% Recov	75.000	125.000	
MSD	ortho-Terphenyl	Surr	84-15-1	22027	91.800	% Recov	70.000	130.000	
MSD	Total Pet. Hydrocarbons Diesel		TPHDIESEL	109000	90.900	% Recov	75.000	125.000	
SPK-RPD	ortho-Terphenyl	Surr	84-15-1	91.800	9.544	RPD	0.000	20.000	
SPK-RPD	Total Pet. Hydrocarbons Diesel		TPHDIESEL	90.900	10.526	RPD	0.000	20.000	
SURR	ortho-Terphenyl	Surr	84-15-1	19022	89.200	% Recov	70.000	130.000	

## BATCH QC

BLANK	Kerosene		TPHKEROSENE	< 3000	n/a	ug/Kg	70.000	130.000	U
BLANK	ortho-Terphenyl	Surr	84-15-1	18525	92.600	% Recov	70.000	130.000	
BLANK	Total Pet. Hydrocarbons Diesel		TPHDIESEL	< 3000	n/a	ug/Kg	70.000	130.000	U
LCS	ortho-Terphenyl	Surr	84-15-1	20009	100.000	% Recov	70.000	130.000	
LCS	Total Pet. Hydrocarbons Diesel		TPHDIESEL	100020	100.000	% Recov	80.000	120.000	

000035

Date: 1 September 2006  
To: Fluor Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 & 216-U-12  
Cribs  
Subject: Volatile Organics- Data Package No.WSCF20060935 (60935)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. 60935 prepared by WSCF Analytical Laboratories (WSCF). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
B1KB52	8/16/06	Soil	C	VOAs by 8260B

Data validation was conducted in accordance with the FHI validation statement of work and the Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit, DOE/RL-2005-75, Rev. 0. 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. 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 limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

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All holding times were acceptable.

- **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 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.

All accuracy and blank spike results were acceptable.

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## 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 duplicate matrix spike analyses performed on a sample. Sample results must be within RPD limits of  $\pm 35\%$ . 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.

All 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 analytes met the RTQL.

000003

• **Completeness**

Data package No. 60935 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**

None found.

**REFERENCES**

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

DOE/RL-2005-75, Rev. 0, *Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit*, December 2005.

**Appendix 1**

**Glossary of Data Reporting Qualifiers**

000005

Qualifiers which may be applied by data validator 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 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).

000006

**Appendix 2**

**Summary of Data Qualification**

000007

VOLATILE DATA QUALIFICATION SUMMARY\*

SDG: 60935	REVIEWER: TLI	Project: 200-UW-1	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

\* - 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**  
**Annotated Laboratory Reports**

000009

# WSCF ANALYTICAL RESULTS REPORT

Attention: D.L. Klages H8-40 Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	91-57-6	2-Methylnaphthalene	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	91-58-7	2-Chloronaphthalene	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	91-94-1	3,3-Dichlorobenzidine	SOIL	LA-523-456	U	< 290	ug/kg	1.00	2.9e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	95-48-7	2-Methylphenol (resol. o-)	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	95-50-1	1,2-Dichlorobenzene	SOIL	LA-523-456	U	< 260	ug/kg	1.00	2.6e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	95-95-4	2,4,5-Trichlorophenol	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	98-95-3	Nitrobenzene	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	99-09-2	3-Nitroaniline	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	65794-96-9	3 & 4 Methylphenol Total	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	67-72-1	Hexachloroethane	SOIL	LA-523-456	U	< 250	ug/kg	1.00	2.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	88-06-2	2,4,6-Trichlorophenol	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	124-18-5	Decane	SOIL	LA-523-456	U	< 220	ug/kg	1.00	2.2e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	112-40-3	Dodecane	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	100-51-6	Benzyl alcohol	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	111-76-2	2-Butoxyethanol	SOIL	LA-523-456	U	< 220	ug/kg	1.00	2.2e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	126-73-8	Tributyl phosphate	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	91-59-8	2-Naphthylamine	SOIL	LA-523-456	U	< 420	ug/kg	1.00	4.2e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	108-94-1	Cyclohexanone	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	110-86-1	Pyridine	SOIL	LA-523-456	U	< 150	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	95-63-6	1,2,4-Trimethylbenzene	SOIL	LA-523-456	U	< 200	ug/kg	1.00	2.0e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	65-85-0	Benzoic acid	SOIL	LA-523-456	U	< 440	ug/kg	1.00	440	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	78-49-6	Dibutylbutylphosphonate	SOIL	LA-523-456	U	< 1.5e+02	ug/kg	1.00	1.5e+02	08/18/06	08/16/06 08/17/06
W060002500	B1KB52	75-35-4	1,1-Dichloroethene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	79-01-6	Trichloroethene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	71-43-2	Benzene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	108-88-3	Toluene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	108-90-7	Chlorobenzene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06

E - Analyte is an estimate, has potentially larger errors  
 U - Analyzed for but not detected above limiting criteria.

C - The Analyte was found in the Associated Blank.  
 J - Analyte is an estimate, has potentially larger errors  
 X - Other flags and notes described in the comments/narrative.

MDL=Minimum Detection Limit  
 RQ=Result Qualifier

DF=Dilution Factor  
 - - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols  
 Report WGPP/ver. 1.3

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*KLages*  
 7/5/06

7/9/15/04  
 Page 4

000010

# WSCF ANALYTICAL RESULTS REPORT

Group #: 20060935

Attention: D.L. Klages H8-40

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	75-34-3	1,1-Dichloroethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	100-41-4	Ethylbenzene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	100-42-5	Styrene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	10061-01-5	cis-1,3-Dichloropropene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	10061-02-6	trans-1,3-Dichloropropene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	107-06-2	1,2-Dichloroethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	108-10-1	4-Methyl-2-Pentanone	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	124-48-1	Dibromochloromethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	127-18-4	Tetrachloroethene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	1330-20-7	Xylenes (total)	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	540-59-0	1,2-Dichloroethene(Total)	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	56-23-5	Carbon tetrachloride	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	591-78-6	2-Hexanone	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	67-64-1	Acetone	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	67-66-3	Chloroform	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	71-55-6	1,1,1-Trichloroethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	74-83-9	Bromomethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	74-87-3	Chloromethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-00-3	Chloroethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-01-4	Vinyl chloride	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-09-2	Methylenechloride	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-15-0	Carbon disulfide	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-25-2	Bromoform	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-27-4	Bromodichloromethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	78-87-5	1,2-Dichloropropane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	78-93-3	2-Butanone	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	79-00-5	1,1,2-Trichloroethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06

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C - The Analyte was found in the Associated Blank.  
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X - Other flags and notes described in the comments/narrative.

MDL = Minimum Detection Limit  
RQ = Result Qualifier

DF = Dilution Factor

• - Indicates results that have NOT been validated. + - Indicates more than six qualifier symbols  
Report: WGP/Ver. 1.3  
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*R. Klages*

9/5/06

p/g/s/ol

000011

# WSCF ANALYTICAL RESULTS REPORT

Group #: 20060935

Attention: D.L. Klages H8-40

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	79-34-5	1,1,2,2-Tetrachloroethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	71-36-3	1-Butanol	SOIL	LA-523-455	U	< 19.0	ug/kg	1.00	19	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	107-87-9	2-Pentanone	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	110-82-7	Cyclohexane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	110-54-3	Hexane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	109-99-9	Tetrahydrofuran	SOIL	LA-523-455	U	< 1.90	ug/kg	1.00	1.9	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-69-4	Trichloromono-fluoromethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	104-51-8	n-Butylbenzene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	156-60-5	trans-1,2-Dichloroethylene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-05-8	Acetonitrile	SOIL	LA-523-455	U	< 1.90	ug/kg	1.00	1.9	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	156-59-2	cis-1,2-Dichloroethylene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	TPH/DIESEL	Total Pet. Hydrocarbons Diesel	SOIL	NWTPH	U	< 3.20e+03	ug/kg	1.00	3.2e+03	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	TPHKEROSENE	Kerosene	SOIL	NWTPH	U	< 3.2e+03	ug/kg	1.00	3.2e+03	08/21/06	08/16/06 08/17/06

Klages/06

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MDL = Minimum Detection Limit  
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 DF = Dilution Factor  
 - indicates results that have NOT been validated; + indicates more than six qualifier symbols  
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*R. Klages*

7/5/06

000012

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

**000013**

<b>Sample Delivery Group</b>	<b>WSCF20060935</b>
<b>Sample Matrix</b>	<b>SOLID</b>
<b>Sample Visual</b>	<b>N/A</b>
<b>SAF Number</b>	<b>R06-013</b>
<b>Data Deliverable</b>	<b>Summary Report</b>

**Introduction**

One (1) 200-UW-1 Operable Unit soil sample (B1KB52) from the trench between 216-U-8 and 216-U-12 were received at the WSCF Laboratory on August 17, 2006. The samples were received in a cool condition with ice present in the coolers. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *200-UW-1 Operable Unit Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, method references, and Laboratory QC information. Copies of the chain of custody and sample receipt are included as Attachment 3.

**Analytical Methodology for Requested Analyses**

Refer to *WSCF Method References Report*, pages 52 through 53 , for a complete listing of approved analytical methods used.

**Inorganic Comments**

**Anions** - The hold time requirements were met. A Blank, Duplicate, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group. See pages 12 through 13 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.
- Duplicate, Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Phosphate – Matrix Spike and Matrix Spike Duplicate recoveries were below established laboratory limits. Sample result was less than detection limit and U flagged.

All other QC controls are within the established limits.

**ICP-AES Metals** – The holding time for this analysis was met. A Blank, Laboratory Control Sample (LCS), Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group of less than 20 samples. See pages 14 through 16 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.

- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Aluminum, Calcium, Iron, Magnesium and Titanium – insufficient spike concentrations. Sample concentrations were greater than four times the spike concentration.
- Calcium – The Laboratory Control Sample recoveries exceeded established laboratory limits. Calcium result was E flagged. Lithium result was less than the method detection limit and U flagged.
- Silicon – Matrix Spike, Matrix Spike Duplicate and Laboratory Control Sample recoveries were outside established laboratory limits. Sample result was E flagged.
- Aluminum – Analyte detected in the associated preparation Blank sample was evaluated and sample result was C flagged.

All other QC controls are within the established limits.

**ICP-MS Metals** – The holding time for this analysis was met, with the exception of mercury. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this deliver group of less than 20 samples. See pages 17 through 20 for QC details Analytical Notes:

- Preparation Date: 21-aug-2006.
- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Thorium results listed in the report represent Th-232 exclusively.
- Zinc – Analyte detected in the associated preparation Blank sample was evaluated and sample B1KB51 was C flagged.
- Manganese (sample B1KB52), Thorium (sample B1KB52) and Uranium (sample B1KB52) – Negative preparation blank results may have potential affect on sample results. Sample results were X flagged.

All other QC controls are within the established limits.

**Percent Solids** – analyzed for organic moisture correction.

**Organic Comments**

- Sample results are moisture corrected and reported on dry weight basis.

**Semi-VOA** – The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 26 through 31 for QC details. Analytical Notes:

- Preparation Date: 17-aug-2006.
- Diethylphthalate - sample B1KB52 result was J flagged; result was less than the lowest calibration standard but greater than the detection limit.

All QC controls are within the established limits.

**TPHD-WA** - The hold time for this analysis were met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See page 32 for QC details. Analytical Note:

- Preparation Date: 17-aug-2006.

All QC controls are within the established limits.

**VOA** - The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 33 through 36 for QC details. Analytical Notes:

- Matrix Spike and Matrix Spike Duplicate QC samples were analyzed on sample# B1KB77 (SDG# 20060934, SAF# R06-013).
- 4-Bromofluorobenzene - Matrix Spike and Matrix Spike Duplicate QC exceeded established laboratory limits.

All other QC controls are within the established limits.

### Radiochemistry Comments

**RadChem** - There are no hold times associated with WSCF radiochemical methods. A Blank, Laboratory Control Sample, Matrix Spike (Technetium only), and Duplicate were analyzed with this delivery group. See pages 40 through 48 for QC details. Analytical Notes:

- Actinium-228 and Radium-228 Gamma Energy Analysis (GEA) - Duplicate QC Relative Percent Difference (RPD) exceeded established laboratory limits due to sample homogeneity issues.
- Americium-241, Neptunium-237, Plutonium Isotopic (238 and 239/240), Strontium-90, Technetium-99 and Uranium Isotopic (233/234, 235 and 238) - Applicable QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Pu-239/240 - Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Strontium-90 - Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

- Technetium-99 – Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Uranium Isotopic (233/234, 235 and 238) – Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

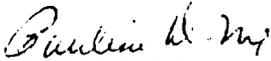
All other QC controls are within the established limits.

Americium-243, Plutonium-242, Strontium-85 and Uranium-232 – Radiochemical Tracer Recovery Data are summarized below:

<b>Radiochemical Tracer Percent Recovery</b>			
<b>Sample Number</b>	<b>Lab Sample ID</b>	<b>Isotope</b>	<b>Tracer Recovery (Percent)</b>
<b><u>Americium-243</u></b>			
BLANK		Am-243	79.9%
LCS		Am-243	93.0%
B1KB49	W060002493	Am-243	85.8%
DUPLICATE	W060002493	Am-243	89.2%
B1KB52	W060002500	Am-243	87.6%
<b><u>Plutonium-242</u></b>			
BLANK		Pu-242	84.0%
LCS		Pu-242	85.0%
B1KB49	W060002493	Pu-242	81.8%
DUPLICATE	W060002493	Pu-242	86.7%
B1KB52	W060002500	Pu-242	88.5%
<b><u>Strontium-85</u></b>			
BLANK		Sr-85	98.9%
LCS		Sr-85	83.4%
B1KB49	W060002493	Sr-85	86.0%
DUPLICATE	W060002493	Sr-85	88.2%
B1KB52	W060002500	Sr-85	89.1%
<b><u>Uranium-232</u></b>			
BLANK		U-232	79.8%
LCS		U-232	75.6%
B1KB49	W060002493	U-232	121.6%

<b>Radiochemical Tracer Percent Recovery</b>			
<b>Sample Number</b>	<b>Lab Sample ID</b>	<b>Isotope</b>	<b>Tracer Recovery (Percent)</b>
DUPLICATE	W060002493	U-232	93.0%
B1KB52	W060002500	U-232	88.7%

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.



Pauline D. Mix  
WSCF Client Services

Abbreviations

Hg - mercury  
IC - ion chromatography  
ICP - inductively coupled plasma  
ICP/AES - ICP/atomic emission spectroscopy  
ICP/MS - ICP/mass spectrometry  
Total U - total uranium  
AT/TB - total alpha/total beta  
AEA - Alpha Energy Analysis  
WTPH-G - Total Hydrocarbons-Gasoline

Am - americium  
Cm - curium  
Pu - plutonium  
Np - neptunium  
GEA - gamma energy analysis  
H3 - Tritium  
Sr - Strontium 89, 90  
WTPH-D - Total Hydrocarbons-Diesel  
TSS - Total Suspended Solids

Fluor Hanford Inc. 08/27/06 R06-013-017 PAGE 1 OF 3

COLLECTOR HOGAN, JG COMPANY CONTACT TRECHTER, JE TELEPHONE NO. 373-7046 PROJECT COORDINATOR TRECHTER, JE PRICE CODE 8C DATA TURNAROUND

SAMPLING LOCATION 200-W-42 PROJECT DESIGNATION 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12 SAF NO. R06-013 AIR QUALITY 7 DAYS 43-DAYS / 14 24-HRS 7 DAYS 15-DAYS

ICE CHEST NO. FIELD LOGBOOK NO. COA 12.1600ESZ0 METHOD OF SHIPMENT GOVERNMENT VEHICLE

SHIPPED TO Waste Sampling & Characterization OFFSITE PROPERTY NO. N/A BILL OF LADING/AIR BILL NO. N/A

POSSIBLE SAMPLE HAZARDS/ REMARKS

DTS-SAWS-H11Z

SAMPLE NO.	LAB ID	MATRIX*	SAMPLE DATE	SAMPLE TIME	NO./TYPE CONTAINER(S)	ANALYSIS	PRESERVATION
BIK852	0060002500	S	8-16-06	1100	4X60ml aG	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Cool 4C
BIK852	0060002499	S			4X60ml G	TPH (Diesel Range - WTPH-D (TPHKEROSEN)	Cool 4C
BIK852		S			1X40ml G	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Cool 4C
BIK852		S			1X500ml Square Bottle - Poly	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	None
BIK852		S			4X60ml G/P	Isotopic Plutonium (Pu-238, Pu-239/240) Isotopic Uranium (U-233/234, U-235, U-238) Americium-241 (Am-241)	None
BIK852		S			4X60ml G/P	Strontium-89,90 - Sr-90 (Sr-90)	None
BIK852		S			4X60ml G/P	Technetium-99 (Tc-99)	None

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	DATE/TIME	DATE/TIME	SPECIAL INSTRUCTIONS
RELINQUISHED FROM COURATEK				SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM J. G. HOGAN	J. G. HOGAN	8/17/06 0955	8/17/06 0955	
RELINQUISHED BY/REMOVED FROM				
RELINQUISHED BY/REMOVED FROM				
RELINQUISHED BY/REMOVED FROM				

ICED Initial Date 8-17-06

000019

68 69 60



COLLECTOR: HOGAN, JG COMPANY CONTACT: TRECHTER, JE TELEPHONE NO.: 373-7046 PROJECT COORDINATOR: TRECHTER, JE DATA: TURMAROUND  
 SAMPLING LOCATION: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12 PROJECT DESIGNATION: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12 SAF NO.: R06-013 AIR QUALITY: 7 May 1995 - Days 1st 7 Days 15 Days 8/15/96  
 ICE CHEST NO.: FIELD LOGBOOK NO.: COA 121600ES20 METHOD OF SHIPMENT: GOVERNMENT VEHICLE BILL OF LADING/AIR BILL NO.: N/A

SHIPPED TO: Waste Sampling & Characterization OFFSITE PROPERTY NO.: N/A POSSIBLE SAMPLE HAZARDS/REMARKS: N/A

MATRIX\*: OL = OTHER LIQUID OS = OTHER SOLID S = SOIL W = WATER

SAMPLE NO.	LAB ID	MATRIX*	SAMPLE DATE	SAMPLE TIME	NO./TYPE CONTAINER(S)	ANALYSIS	PRESERVATION
BIKBS2		S	8-16-06	1100	4X60mL G/P (Neptunium-237 (np-237))	IC Anions - 300.0 (BROMIDE, CHLORIDE, FLUORIDE, NO2-N, NO3-N, PO4-P, SULFATE)	None
BIKBS2		S			4X60mL G/P	IC Metals - 6010A (Add-on) (B, Bi, La, Li, Si, Sm, Ti) ICP Metals - 6010A (TAL) (Al, Ca, Fe, K, Mg, Na)	Cool 4C
BIKBS2		S			4X60mL G/P	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	None
BIKBS2		S	8-16-06	1100	4X60mL G/P	GROSS ALPHA/BETA	None

CHAIN OF POSSESSION: SIGN/PRINT NAMES: RECEIVED BY/STORED IN: DATE/TIME: RELINQUISHED BY/REMOVED FROM: J. G. HOGAN 8/17/06 0955 TA F142/03/04 RECEIVED BY/STORED IN: DATE/TIME: 8/17/06 0955

SPECIAL INSTRUCTIONS: Reporting format the same as GPP, including QC. All samples, except VOAs, have been taken using the multiple-increment sampling program. This requires the entire sample provided in each bottle to be used in analysis. VOAs will be analyzed as usual. (4)ICP/MS - 200.8 (Add-on) (As, Be, Mo, Pb, Se, Sn, Sr, Ti, U) ICP/MS - 200.8 (TAL) (Ag, Ba, Cd, Co, Cr, Cu, Mn, Ni, Sb, V, Zn) ICP/MS - 200.8 (Hg) (Hg) Isotopic Thorium (Th-232)

ICED Initial Date  
 8-17-06

**Appendix 5**

**Data Validation Supporting Documentation**

**000022**

**GC/MS ORGANIC DATA VALIDATION CHECKLIST**

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	200-UW-1		DATA PACKAGE: 60935		
VALIDATOR:	TLT	LAB:	WSCF	DATE: 9/1/06	
			SDG: 60935		
ANALYSES PERFORMED					
<b>SW-846 8260</b>		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
B1K352					
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: 4-bromoSturo hereu - no assoc constituents no PB  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**GC/MS ORGANIC DATA VALIDATION CHECKLIST**

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

MS/MSD samples analyzed? .....	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
MS/MSD RPD values acceptable? .....	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
MS/MSD standards NIST traceable? (Levels D, E) .....	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
MS/MSD standards expired? (Levels D, E) .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Field duplicate RPD values acceptable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Field split RPD values acceptable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Transcription/calculation errors? (Levels D, E) .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**6. SYSTEM PERFORMANCE (Levels D and E)**

Internal standards analyzed? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Internal standard areas acceptable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Internal standard retention times acceptable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Standards traceable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Standards expired? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Transcription/calculation errors? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**7. HOLDING TIMES (all levels )**

Samples properly preserved? .....	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Sample holding times acceptable? .....	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**GC/MS ORGANIC DATA VALIDATION CHECKLIST**

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

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

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**9. SAMPLE CLEANUP (Levels D and E)**

GPC cleanup performed? .....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
GPC check performed? .....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
GPC check recoveries acceptable?.....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
GPC calibration performed?.....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
GPC calibration check performed? .....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
GPC calibration check retention times acceptable? .....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Check/calibration materials traceable?.....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Check/calibration materials Expired?.....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Analytical batch QC given similar cleanup? .....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Transcription/Calculation Errors? .....	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Appendix 6**

**Additional Documentation Requested by Client**

000027

# WSCF ANALYTICAL LABORATORY QC REPORT

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

SDG Number: 20060935  
 Matrix: SOLID  
 Test: VOA Ground Water Protection

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
MS	1,1-Dichloroethane	75-35-4	27.420	110.000	% Recov	08/21/06	63.000	117.000	
MS	Benzene	71-43-2	26.680	107.000	% Recov	08/21/06	75.000	129.000	
MS	4-Bromofluorobenzene	460-00-4	58.700	117.000	% Recov	08/21/06	84.000	116.000	
MS	Chlorobenzene	108-90-7	27.180	109.000	% Recov	08/21/06	79.000	119.000	
MS	1,2-Dichloroethane-d4	17060-07-0	53.080	106.000	% Recov	08/21/06	82.000	136.000	
MS	Toluene-d8	2037-26-5	54.510	109.000	% Recov	08/21/06	89.000	119.000	
MS	Toluene	108-88-3	27.430	110.000	% Recov	08/21/06	76.000	120.000	
MS	Trichloroethane	79-01-6	25.840	103.000	% Recov	08/21/06	73.000	123.000	
MSD	1,1-Dichloroethane	75-35-4	25.390	101.000	% Recov	08/21/06	63.000	117.000	
MSD	Benzene	71-43-2	26.690	107.000	% Recov	08/21/06	75.000	129.000	
MSD	4-Bromofluorobenzene	460-00-4	58.640	117.000	% Recov	08/21/06	84.000	116.000	
MSD	Chlorobenzene	108-90-7	28.730	107.000	% Recov	08/21/06	79.000	119.000	
MSD	1,2-Dichloroethane-d4	17060-07-0	52.590	105.000	% Recov	08/21/06	82.000	136.000	
MSD	Toluene-d8	2037-26-5	54.540	109.000	% Recov	08/21/06	89.000	119.000	
MSD	Toluene	108-88-3	27.670	110.000	% Recov	08/21/06	76.000	120.000	
MSD	Trichloroethane	79-01-6	25.610	102.000	% Recov	08/21/06	73.000	123.000	
SPK-RPD	1,1-Dichloroethane	75-35-4	101.000	8.531	RPD	08/21/06	0.000	20.000	
SPK-RPD	Benzene	71-43-2	107.000	0.000	RPD	08/21/06	0.000	20.000	
SPK-RPD	4-Bromofluorobenzene	460-00-4	117.000	0.000	RPD	08/21/06	0.000	20.000	
SPK-RPD	Chlorobenzene	108-90-7	107.000	1.852	RPD	08/21/06	0.000	20.000	
SPK-RPD	1,2-Dichloroethane-d4	17060-07-0	105.000	0.948	RPD	08/21/06	0.000	20.000	
SPK-RPD	Toluene-d8	2037-26-5	109.000	0.000	RPD	08/21/06	0.000	20.000	
SPK-RPD	Toluene	108-88-3	110.000	0.000	RPD	08/21/06	0.000	20.000	
SPK-RPD	Trichloroethane	79-01-6	102.000	0.976	RPD	08/21/06	0.000	20.000	

Lab ID: W060002498  
 BATCH QC ASSOCIATED WITH SAMPLE

000028

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: VOA Ground Water Protection

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/17/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002500</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
SURR	4-Bromofluorobenzene	460-00-4	54.690	116.000	% Recov	08/21/06	71.000	125.000	
SURR	1,2-Dichloroethane-d4	17060-07-0	50.010	106.000	% Recov	08/21/06	80.000	134.000	
SURR	Toluene-d8	2037-26-5	51.670	110.000	% Recov	08/21/06	80.000	126.000	
<b>BATCH QC</b>									
BLANK	1,1-Dichloroethane	75-34-3	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1,1,1-Trichloroethane	71-55-6	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1,1,2-Trichloroethane	79-00-5	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1,1,2,2-Tetrachloroethane	79-34-5	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1,1-Dichloroethene	75-35-4	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1,2-Dichloroethane	107-06-2	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1,2-Dichloroethene(Total)	540-59-0	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1-Butanol	71-36-3	< 40	n/a	ug/Kg	08/21/06			U
BLANK	2-Hexanone	591-78-6	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	2-Pentanone	107-87-9	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	4-Methyl-2-Pentanone	108-10-1	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Acetone	67-64-1	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Bromodichloromethane	75-27-4	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Benzene	71-43-2	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	4-Bromofluorobenzene	460-00-4	117.00	117.000	% Recov	08/21/06	71.000	125.000	
BLANK	Bromoform	75-25-2	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	n-Butylbenzene	104-51-8	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Carbon disulfide	75-15-0	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Carbon tetrachloride	56-23-5	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Dibromochloromethane	124-48-1	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Cyclohexane	110-82-7	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Chloroform	67-66-3	< 2.0	n/a	ug/Kg	08/21/06			U

000029

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: VOA Ground Water Protection

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
BLANK	Chlorobenzene	108-90-7	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	cis-1,2-Dichloroethylene	156-59-2	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	cis-1,3-Dichloropropene	10061-01-5	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Chloroethane	75-00-3	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1,2-Dichloroethane-d4	17060-07-0	108.60	109.000	% Recov	08/21/06	80.000	134.000	U
BLANK	trans-1,2-Dichloroethylene	156-60-5	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	1,2-Dichloropropane	78-87-5	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Ethylbenzene	100-41-4	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Hexane	110-54-3	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Bromomethane	74-83-9	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Chloromethane	74-87-3	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	2-Butanone	78-93-3	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Methylenechloride	75-09-2	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Tetrachloroethene	127-18-4	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Styrene	100-42-5	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Xylenes (total)	1330-20-7	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Tetrahydrofuran	109-99-9	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Toluene-d8	2037-26-5	108.70	109.000	% Recov	08/21/06	80.000	126.000	U
BLANK	Toluene	108-88-3	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	trans-1,3-Dichloropropene	10061-02-6	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Trichloromono fluoromethane	75-69-4	< 2.0	n/a	ug/Kg	08/21/06	0.000	5.000	U
BLANK	Trichloroethene	79-01-6	< 2.0	n/a	ug/Kg	08/21/06			U
BLANK	Vinyl chloride	75-01-4	< 2.0	n/a	ug/Kg	08/21/06			U
LCS	1,1-Dichloroethene	75-35-4	50.210	100.000	% Recov	08/21/06	70.000	130.000	U
LCS	Benzene	71-43-2	51.860	104.000	% Recov	08/21/06	70.000	130.000	U
LCS	4-Bromofluorobenzene	460-00-4	115.20	115.000	% Recov	08/21/06	71.000	125.000	U
LCS	Chlorobenzene	108-90-7	52.470	105.000	% Recov	08/21/06	70.000	130.000	U
LCS	1,2-Dichloroethane-d4	17060-07-0	108.20	108.000	% Recov	08/21/06	80.000	134.000	U
LCS	Toluene-d8	2037-26-5	108.50	108.000	% Recov	08/21/06	80.000	126.000	U
LCS	Toluene	108-88-3	52.930	106.000	% Recov	08/21/06	70.000	130.000	U

000030

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: VOA Ground Water Protection

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
LCS	Trichloroethene	79-01-6	49.350	98.700	% Recov	08/21/06	70.000	130.000	

000031

Date: 1 September 2006  
To: Fluor Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 & 216-U-12 Cribs  
Subject: Inorganics - Data Package No. WSCF20060935 (60935)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. 60935 prepared by WSCF Analytical Laboratories (WSCF). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
B1KB52	8/16/06	Soil	C	See note 1

1 - ICP metals by 6010B and 200.8.

Data validation was conducted in accordance with the FHI validation statement of work and the Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit, DOE/RL-2005-75, Rev. 0. 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. 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.

All holding times were met.

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 "UJ". 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 70% to 130%. 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 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 69% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

000002

Due to a matrix spike (378%) and matrix spike duplicate (398%) recoveries outside QC limits, all silicon results were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate 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 70% to 130% for LCS analysis. Samples with a recovery below 69% and a sample recovery below the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to an LCS recovery outside QC limits (23%), all silicon results 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 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 +/- 30%, 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 and matrix spike duplicate analysis, all aluminum, calcium, iron, magnesium and titanium results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

#### Field Duplicate

No field duplicates were submitted for analysis.

000003

· **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. All results met RTQL.

· **Completeness**

Data package No. 60935 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 matrix spike (378%) and matrix spike duplicate (398%) recoveries outside QC limits, all silicon results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits (23%), all silicon results were qualified as estimates and flagged "J".
- Due to the lack of a matrix spike and matrix spike duplicate analysis, all aluminum, calcium, iron, magnesium and titanium 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.

**REFERENCES**

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

DOE/RL-2005-75, Rev. 0, *Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit*, December 2005.

000004

**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

000005

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).

000006

**Appendix 2**  
**Summary of Data Qualification**

000007

METALS DATA QUALIFICATION SUMMARY\*

SDG: 60935	REVIEWER: TLI	Project: 200-UW-1	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Aluminum Calcium Iron Magnesium Titanium	J	All	No MS/MSD
Silicon	J	All	MS, MSD and LCS recoveries

\* - 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**  
**Annotated Laboratory Reports**

000009

# WSCF ANALYTICAL RESULTS REPORT

Attention: D.L. Klages H8-40 Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
<b>Inorganic</b>												
W060002500	B1KB52	TS	Total solids	SOIL	LA-519-412		> 99.5	%	1.00	0.0	08/21/06	08/17/06
W060002500	B1KB52	10984-48-8	Fluoride	SOIL	LA-533-410	U	< 2.00	mg/kg	50.00	2.0	08/21/06	08/17/06
W060002500	B1KB52	16887-00-6	Chloride	SOIL	LA-533-410	U	< 1.70	mg/kg	50.00	1.7	08/21/06	08/17/06
W060002500	B1KB52	NO2-N	Nitrogen in Nitrite	SOIL	LA-533-410	U	< 0.490	mg/kg	50.00	0.49	08/21/06	08/17/06
W060002500	B1KB52	24959-67-9	Bromide	SOIL	LA-533-410	U	< 4.65	mg/kg	50.00	4.6	08/21/06	08/17/06
W060002500	B1KB52	NO3-N	Nitrogen in Nitrate	SOIL	LA-533-410	U	< 0.900	mg/kg	50.00	0.90	08/21/06	08/17/06
W060002500	B1KB52	PO4-P	Phosphate (P) by IC	SOIL	LA-533-410	U	< 3.90	mg/kg	50.00	3.9	08/21/06	08/17/06
W060002500	B1KB52	14806-79-8	Sulfate	SOIL	LA-533-410	U	< 6.50	mg/kg	30.00	6.5	08/21/06	08/17/06
W060002500	B1KB52	7429-90-5	Aluminum	SOIL	LA-505-411	J	51.1	mg/kg	94.08	3.5	08/22/06	08/17/06
W060002500	B1KB52	7439-99-6	Iron	SOIL	LA-505-411	J	525	mg/kg	94.08	3.1	08/22/06	08/17/06
W060002500	B1KB52	7439-95-4	Magnesium	SOIL	LA-505-411	J	21.5	mg/kg	94.08	1.4	08/22/06	08/17/06
W060002500	B1KB52	7440-09-7	Potassium	SOIL	LA-505-411	U	< 20.7	mg/kg	94.08	21	08/22/06	08/17/06
W060002500	B1KB52	7440-23-5	Sodium	SOIL	LA-505-411	U	< 10.8	mg/kg	94.08	11	08/22/06	08/17/06
W060002500	B1KB52	7440-70-2	Calcium	SOIL	LA-505-411	J	73.1	mg/kg	94.08	2.9	08/22/06	08/17/06
W060002500	B1KB52	7439-93-2	Lithium	SOIL	LA-505-411	U	< 0.565	mg/kg	94.08	0.56	08/22/06	08/17/06
W060002500	B1KB52	7440-32-6	Titanium	SOIL	LA-505-411	J	0.778	mg/kg	94.08	0.38	08/22/06	08/17/06
W060002500	B1KB52	7440-42-8	Boron	SOIL	LA-505-411	U	< 1.98	mg/kg	94.08	2.0	08/22/06	08/17/06
W060002500	B1KB52	7440-69-9	Bismuth	SOIL	LA-505-411	U	< 4.99	mg/kg	94.08	5.0	08/22/06	08/17/06
W060002500	B1KB52	7440-21-3	Silicon	SOIL	LA-505-411	J	26.2	mg/kg	94.08	7.1	08/22/06	08/17/06
W060002500	B1KB52	7439-96-5	Manganese	SOIL	LA-505-412	X	0.548	mg/kg	0.95	0.0191	08/22/06	08/17/06
W060002500	B1KB52	7440-02-0	Nickel	SOIL	LA-505-412	U	0.0863	mg/kg	0.95	0.0572	08/22/06	08/17/06
W060002500	B1KB52	7440-22-4	Silver	SOIL	LA-505-412	U	< 0.0381	mg/kg	0.95	0.0381	08/22/06	08/17/06
W060002500	B1KB52	7440-36-0	Antimony	SOIL	LA-505-412	U	< 0.286	mg/kg	0.95	0.286	08/22/06	08/17/06
W060002500	B1KB52	7440-39-3	Barium	SOIL	LA-505-412	U	0.206	mg/kg	0.95	0.191	08/22/06	08/17/06
W060002500	B1KB52	7440-41-7	Beryllium	SOIL	LA-505-412	U	< 0.0191	mg/kg	0.95	0.0191	08/22/06	08/17/06
W060002500	B1KB52	7440-43-9	Cadmium	SOIL	LA-505-412	U	< 0.0381	mg/kg	0.95	0.0381	08/22/06	08/17/06

E - Analyte is an estimate, has potentially larger errors  
 U - Analyzed for but not detected above limiting criteria.

C - The Analyte was found in the Associated Blank.  
 J - Analyte is an estimate, has potentially larger errors  
 X - Other flags and notes described in the comments/narrative.

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 DF = Dilution Factor  
 \* - Indicates results that have NOT been validated.  
 + - Indicates more than six qualifier symbols

Report WGPP/ver. 1.3  
 PROJECT HANFORD MANAGEMENT COMPANY

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*9/5/06*

*9/5/06*

000010

# WSCF ANALYTICAL RESULTS REPORT

Attention: D.L. Klages H8-40      Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	7440-47-3	Chromium	SOIL	LA-505-412	U	< 0.668	mg/kg	0.95	0.668	08/22/06	08/17/06
W060002500	B1KB52	7440-48-4	Cobalt	SOIL	LA-505-412	U	< 0.0191	mg/kg	0.95	0.0191	08/22/06	08/17/06
W060002500	B1KB52	7440-50-8	Copper	SOIL	LA-505-412	U	0.579	mg/kg	0.95	0.191	08/22/06	08/17/06
W060002500	B1KB52	7440-52-2	Vanadium	SOIL	LA-505-412	U	< 0.477	mg/kg	0.95	0.477	08/22/06	08/17/06
W060002500	B1KB52	7440-56-6	Zinc	SOIL	LA-505-412	C	1.77	mg/kg	0.95	0.286	08/22/06	08/17/06
W060002500	B1KB52	7439-92-1	Lead	SOIL	LA-505-412	U	0.130	mg/kg	0.95	0.0477	08/22/06	08/17/06
W060002500	B1KB52	7439-97-6	Mercury	SOIL	LA-505-412	U	< 0.0381	mg/kg	0.95	0.0381	08/22/06	08/17/06
W060002500	B1KB52	7439-98-7	Methylmercury	SOIL	LA-505-412	U	< 0.0954	mg/kg	0.95	0.0954	08/22/06	08/17/06
W060002500	B1KB52	7440-29-1	Thorium	SOIL	LA-505-412	X	0.284	mg/kg	0.95	0.0477	08/22/06	08/17/06
W060002500	B1KB52	7440-61-1	Uranium	SOIL	LA-505-412	X	0.0282	mg/kg	0.95	0.0191	08/22/06	08/17/06
W060002500	B1KB52	7440-38-2	Arsenic	SOIL	LA-505-412	U	< 0.954	mg/kg	0.95	0.954	08/22/06	08/17/06
W060002500	B1KB52	7782-49-2	Selenium	SOIL	LA-505-412	U	< 0.381	mg/kg	0.95	0.381	08/22/06	08/17/06
W060002500	B1KB52	7440-28-0	Thallium	SOIL	LA-505-412	U	< 0.0300	mg/kg	0.95	0.0286	08/22/06	08/17/06
W060002500	B1KB52	7440-24-6	Strontium	SOIL	LA-505-412	U	0.154	mg/kg	0.95	0.0286	08/22/06	08/17/06
W060002500	B1KB52	7440-31-5	Tin	SOIL	LA-505-412	U	< 0.0477	mg/kg	0.95	0.0477	08/22/06	08/17/06

MDL = Minimum Detection Limit      C - The Analyte was found in the Associated Blank.  
 RQ = Result Qualifier                      J - Analyte is an estimate, has potentially larger errors  
 DF = Dilution Factor                      X - Other flags and notes described in the comments/narrative.

\* - Indicates results that have NOT been validated:      + - Indicates more than six qualifier symbols  
 Report WGPP/ver. 1.3  
 PROJECT HANFORD MANAGEMENT COMPANY

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*Revised*

K 9/5/06

000011

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

**000012**

<b>Sample Delivery Group</b>	<b>WSCF20060935</b>
<b>Sample Matrix</b>	<b>SOLID</b>
<b>Sample Visual</b>	<b>N/A</b>
<b>SAF Number</b>	<b>R06-013</b>
<b>Data Deliverable</b>	<b>Summary Report</b>

**Introduction**

One (1) 200-UW-1 Operable Unit soil sample (B1KB52) from the trench between 216-U-8 and 216-U-12 were received at the WSCF Laboratory on August 17, 2006. The samples were received in a cool condition with ice present in the coolers. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *200-UW-1 Operable Unit Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, method references, and Laboratory QC information. Copies of the chain of custody and sample receipt are included as Attachment 3.

**Analytical Methodology for Requested Analyses**

Refer to *WSCF Method References Report*, pages 52 through 53 , for a complete listing of approved analytical methods used.

**Inorganic Comments**

**Anions** - The hold time requirements were met. A Blank, Duplicate, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group. See pages 12 through 13 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.
- Duplicate, Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Phosphate – Matrix Spike and Matrix Spike Duplicate recoveries were below established laboratory limits. Sample result was less than detection limit and U flagged.

All other QC controls are within the established limits.

**ICP-AES Metals** – The holding time for this analysis was met. A Blank, Laboratory Control Sample (LCS), Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group of less than 20 samples. See pages 14 through 16 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.

- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Aluminum, Calcium, Iron, Magnesium and Titanium – insufficient spike concentrations. Sample concentrations were greater than four times the spike concentration.
- Calcium – The Laboratory Control Sample recoveries exceeded established laboratory limits. Calcium result was E flagged. Lithium result was less than the method detection limit and U flagged.
- Silicon – Matrix Spike, Matrix Spike Duplicate and Laboratory Control Sample recoveries were outside established laboratory limits. Sample result was E flagged.
- Aluminum – Analyte detected in the associated preparation Blank sample was evaluated and sample result was C flagged.

All other QC controls are within the established limits.

**ICP-MS Metals** – The holding time for this analysis was met, with the exception of mercury. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this deliver group of less than 20 samples. See pages 17 through 20 for QC details Analytical Notes:

- Preparation Date: 21-aug-2006.
- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Thorium results listed in the report represent Th-232 exclusively.
- Zinc – Analyte detected in the associated preparation Blank sample was evaluated and sample B1KB51 was C flagged.
- Manganese (sample B1KB52), Thorium (sample B1KB52) and Uranium (sample B1KB52) – Negative preparation blank results may have potential affect on sample results. Sample results were X flagged.

All other QC controls are within the established limits.

**Percent Solids** – analyzed for organic moisture correction.

#### **Organic Comments**

- Sample results are moisture corrected and reported on dry weight basis.

**Semi-VOA** – The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 26 through 31 for QC details. Analytical Notes:

- Preparation Date: 17-aug-2006.
- Diethylphthalate - sample B1KB52 result was J flagged; result was less than the lowest calibration standard but greater than the detection limit.

All QC controls are within the established limits.

**TPHD-WA** - The hold time for this analysis were met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See page 32 for QC details. Analytical Note:

- Preparation Date: 17-aug-2006.

All QC controls are within the established limits.

**VOA** - The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 33 through 36 for QC details. Analytical Notes:

- Matrix Spike and Matrix Spike Duplicate QC samples were analyzed on sample# B1KB77 (SDG# 20060934, SAF# R06-013).
- 4-Bromofluorobenzene - Matrix Spike and Matrix Spike Duplicate QC exceeded established laboratory limits.

All other QC controls are within the established limits.

### Radiochemistry Comments

**RadChem** - There are no hold times associated with WSCF radiochemical methods. A Blank, Laboratory Control Sample, Matrix Spike (Technetium only), and Duplicate were analyzed with this delivery group. See pages 40 through 48 for QC details. Analytical Notes:

- Actinium-228 and Radium-228 Gamma Energy Analysis (GEA) - Duplicate QC Relative Percent Difference (RPD) exceeded established laboratory limits due to sample homogeneity issues.
- Americium-241, Neptunium-237, Plutonium Isotopic (238 and 239/240), Strontium-90, Technetium-99 and Uranium Isotopic (233/234, 235 and 238) - Applicable QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Pu-239/240 - Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Strontium-90 - Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

- Technetium-99 – Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Uranium Isotopic (233/234, 235 and 238) – Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

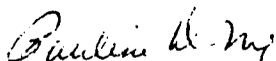
All other QC controls are within the established limits.

Americium-243, Plutonium-242, Strontium-85 and Uranium-232 – Radiochemical Tracer Recovery Data are summarized below:

<b>Radiochemical Tracer Percent Recovery</b>			
<b>Sample Number</b>	<b>Lab Sample ID</b>	<b>Isotope</b>	<b>Tracer Recovery (Percent)</b>
<b><u>Americium-243</u></b>			
BLANK		Am-243	79.9%
LCS		Am-243	93.0%
B1KB49	W060002493	Am-243	85.8%
DUPLICATE	W060002493	Am-243	89.2%
B1KB52	W060002500	Am-243	87.6%
<b><u>Plutonium-242</u></b>			
BLANK		Pu-242	84.0%
LCS		Pu-242	85.0%
B1KB49	W060002493	Pu-242	81.8%
DUPLICATE	W060002493	Pu-242	86.7%
B1KB52	W060002500	Pu-242	88.5%
<b><u>Strontium-85</u></b>			
BLANK		Sr-85	98.9%
LCS		Sr-85	83.4%
B1KB49	W060002493	Sr-85	86.0%
DUPLICATE	W060002493	Sr-85	88.2%
B1KB52	W060002500	Sr-85	89.1%
<b><u>Uranium-232</u></b>			
BLANK		U-232	79.8%
LCS		U-232	75.6%
B1KB49	W060002493	U-232	121.6%

Radiochemical Tracer Percent Recovery			
Sample Number	Lab Sample ID	Isotope	Tracer Recovery (Percent)
DUPLICATE	W060002493	U-232	93.0%
B1KB52	W060002500	U-232	88.7%

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.



Pauline D. Mix  
WSCF Client Services

Abbreviations

Hg – mercury  
IC – ion chromatography  
ICP – inductively coupled plasma  
ICP/AES – ICP/atomic emission spectroscopy  
ICP/MS – ICP/mass spectrometry  
Total U – total uranium  
AT/TB – total alpha/total beta  
AEA – Alpha Energy Analysis  
WTPH-G – Total Hydrocarbons-Gasoline

Am – americium  
Cm - curium  
Pu – plutonium  
Np – neptunium  
GEA – gamma energy analysis  
H3 – Tritium  
Sr – Strontium 89, 90  
WTPH-D – Total Hydrocarbons-Diesel  
TSS – Total Suspended Solids

Waste Sampling & Characterization  
 MATRIX\*  
 OL = OTHER LIQUID  
 OS = OTHER SOLID  
 S = SOIL  
 W = WATER

SAMPLE NO.	LAB ID	MATRIX*	SAMPLE DATE	SAMPLE TIME	NO./TYPE CONTAINER(S)	ANALYSIS	PRESERVATION
B1KB52	10060002500	S	8-16-06	1100	4X60mL aG	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Cool 4C
B1KB52	10060002499	S			4X60mL G	TPH, Diesel Range - WTPH-D (TPHKEROSEN)	Cool 4C
B1KB52		S			1X40mL G	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Cool 4C
B1KB52		S			1X500mL Square Bottle - Poly	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	None
B1KB52		S			4X60mL G/P	Isotopic Plutonium (Pu-238, Pu-239/240) Isotopic Uranium (U-233/234, U-235, U-238) Americium-241 (Am-241)	None
B1KB52		S			4X60mL G/P	Strontium-89,90 -- Sr-90 (Sr-90)	None
B1KB52		S			4X60mL G/P	Technetium-99 (Tc-99)	None

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	DATE/TIME	DATE/TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM OURATEK	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
J. G. HOGAN	J. G. HOGAN	8/17/06 0955	8/17/06 0955	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME	
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD		DATE/TIME	

ICED Initial Date  
 8-17-06



COLLECTOR: HOGAN, JG  
 COMPANY CONTACT: TRECHTER, JE  
 PROJECT DESIGNATION: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12  
 FIELD LOGBOOK NO.: COA  
 OFFSITE PROPERTY NO.: DTS-SAWS-H112  
 SHIPPED TO: Waste Sampling & Characterization

TELEPHONE NO.: 373-7046  
 PROJECT COORDINATOR: TRECHTER, JE  
 SAF NO.: R06-013  
 METHOD OF SHIPMENT: GOVERNMENT VEHICLE  
 BILL OF LADING/AIR BILL NO.: N/A

PRICE CODE: 8C  
 AIR QUALITY: 7 May 85-Days + Jk  
 7 Days 85-Days 8/16/86  
 DATA: TURNAROUND

SAMPLE NO.	LAB ID	MATRIX*	SAMPLE DATE	SAMPLE TIME	NO./TYPE CONTAINER(S)	ANALYSIS	PRESERVATION
B1KB52		S	8-16-06	1100	4X60mL G/P Neptunium-237 (Np-237)		None
B1KB52		S			4X60mL G/P	IC Anions - 300.0 (BROMIDE, CHLORIDE, FLUORIDE, NO2-N, NO3-N, PO4-P, SULFATE)	None
B1KB52		S			4X60mL G/P	ICP Metals - 6010A (Add-on) (B, Bi, La, Li, Si, <sup>51</sup> Sm, Tl) ICP Metals - 6010A (TAL) (Al, Ca, Fe, K, Mg, Na)	Cool AC
B1KB52		S			4X60mL G/P	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	None

B1KB52  
 8-16-06 1100  
 4X60mL GROSS ALPHA/BETA  
 NONE

CHAIN OF POSSESSION	SIGN/PRINT NAMES	DATE/TIME	DATE/TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM <b>BURATEK</b>				Reporting format the same as GPP, including QC. All samples, except VOAs, have been taken using the multiple-increment sampling program. This requires the entire sample provided in each bottle to be used in analysis. VOAs will be analyzed as usual. (4)ICP/MS - 200.8 (Add-on) (As, Be, Mo, Pb, Se, Sn, Sr, Ti, U) ICP/MS - 200.8 (TAL) (Ag, Ba, Cd, Co, Cr, Cu, Mn, Ni, Sb, V, Zn) ICP/MS - 200.8 (Hg) (Hg) Isotopic Thorium (Th-232)
RELINQUISHED BY/REMOVED FROM <b>J. G. HOGAN</b>		8/17/06 0955	8/17/06 0955	
RELINQUISHED BY/REMOVED FROM				
RELINQUISHED BY/REMOVED FROM				
LABORATORY SECTION	RECEIVED BY	DATE/TIME	DATE/TIME	ICED Initial Date 8-17-06
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD			

**Appendix 5**  
**Data Validation Supporting Documentation**

**000021**

**INORGANIC ANALYSIS DATA VALIDATION CHECKLIST**

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	200-UW-1		DATA PACKAGE: 60935		
VALIDATOR:	TLT	LAB:	WSCF	DATE:	9/1/02
			SDG:	60935	
ANALYSES PERFORMED					
<b>SW-846/ICP</b>	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
B1FB52					
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: no FB

**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: Silicon MS 37870 MSD 378 - J all no PAs  
Silicon LCS 2370 - J all

~~no Al, K, Fe, magnesium or titanium MS/MSD - J~~  
9/1/02

**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: no al, calcium, fe, magnesium or titanium  $\mu\text{s}/\text{msb}$  - Jaly

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**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: \_\_\_\_\_

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**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?.....	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Results supported in the raw data? (Levels D, E).....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Samples properly prepared? (Levels D, E).....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Detection limits meet RDL?.....	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Transcription/calculation errors? (Levels D, E) .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Appendix 6**

**Additional Documentation Requested by Client**

000027

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: ICP Metals Analysis, Grd H20 P

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002493</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
MS	Aluminum	7429-90-5	NA	n/a	% Recov	08/22/06	75.000	125.000	
MS	Boron	7440-42-8	212	109.845	% Recov	08/22/06	75.000	125.000	
MS	Bismuth	7440-69-9	213	110.363	% Recov	08/22/06	75.000	125.000	
MS	Calcium	7440-70-2	NA	n/a	% Recov	08/22/06	75.000	125.000	
MS	Iron	7439-89-6	NA	n/a	% Recov	08/22/06	75.000	125.000	
MS	Potassium	7440-09-7	2088	108.187	% Recov	08/22/06	75.000	125.000	
MS	Lithium	7439-93-2	106.675	110.544	% Recov	08/22/06	70.000	130.000	
MS	Magnesium	7439-95-4	NA	n/a	% Recov	08/22/06	75.000	125.000	
MS	Sodium	7440-23-5	193.9	100.466	% Recov	08/22/06	75.000	125.000	
MS	Silicon	7440-21-3	729.7	378.083	% Recov	08/22/06	70.000	130.000	
MS	Titanium	7440-32-6	NA	n/a	% Recov	08/22/06	75.000	125.000	
MSD	Aluminum	7429-90-5	NA	n/a	% Recov	08/22/06	75.000	125.000	
MSD	Boron	7440-42-8	214.3	108.782	% Recov	08/22/06	75.000	125.000	
MSD	Bismuth	7440-69-9	225	114.213	% Recov	08/22/06	75.000	125.000	
MSD	Calcium	7440-70-2	NA	n/a	% Recov	08/22/06	75.000	125.000	
MSD	Iron	7439-89-6	NA	n/a	% Recov	08/22/06	75.000	125.000	
MSD	Potassium	7440-09-7	2087	105.939	% Recov	08/22/06	75.000	125.000	
MSD	Lithium	7439-93-2	108.475	110.127	% Recov	08/22/06	75.000	125.000	
MSD	Magnesium	7439-95-4	NA	n/a	% Recov	08/22/06	75.000	125.000	
MSD	Sodium	7440-23-5	194.1	98.528	% Recov	08/22/06	75.000	125.000	
MSD	Silicon	7440-21-3	785.2	398.579	% Recov	08/22/06	75.000	125.000	
MSD	Titanium	7440-32-6	NA	n/a	% Recov	08/22/06	75.000	125.000	
SPK-RPD	Aluminum	7429-90-5		n/a	RPD	08/22/06	0.000	20.000	
SPK-RPD	Boron	7440-42-8	108.782	0.972	RPD	08/22/06	0.000	20.000	
SPK-RPD	Bismuth	7440-69-9	114.213	3.429	RPD	08/22/06	0.000	20.000	
SPK-RPD	Calcium	7440-70-2		n/a	RPD	08/22/06	0.000	20.000	

000028

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: ICP Metals Analysis, Grd H20 P

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
SPK-RPD	Iron	7439-89-6		n/a	RPD	08/22/06	0.000	20.000	
SPK-RPD	Potassium	7440-09-7	105.939	2.100	RPD	08/22/06	0.000	20.000	
SPK-RPD	Lithium	7439-93-2	110.127	0.378	RPD	08/22/06	0.000	20.000	
SPK-RPD	Magnesium	7439-95-4		n/a	RPD	08/22/06	0.000	20.000	
SPK-RPD	Sodium	7440-23-5	98.528	1.948	RPD	08/22/06	0.000	20.000	
SPK-RPD	Silicon	7440-21-3	398.579	5.278	RPD	08/22/06	0.000	20.000	
SPK-RPD	Titanium	7440-32-6		n/a	RPD	08/22/06	0.000	20.000	
<b>BATCH QC</b>									
BLANK	Aluminum	7429-90-5	6.02e-2	0.060	ug/mL	08/22/06			U
BLANK	Boron	7440-42-8	<2.1e-2	n/a	ug/mL	08/22/06			U
BLANK	Bismuth	7440-69-9	<5.3e-2	n/a	ug/mL	08/22/06			U
BLANK	Calcium	7440-70-2	<3.1e-2	n/a	ug/mL	08/22/06			U
BLANK	Iron	7439-89-6	<3.3e-2	n/a	ug/mL	08/22/06			U
BLANK	Potassium	7440-09-7	<0.22	n/a	ug/mL	08/22/06			U
BLANK	Lithium	7439-93-2	<6e-3	n/a	ug/mL	08/22/06			U
BLANK	Magnesium	7439-95-4	<1.5e-2	n/a	ug/mL	08/22/06			U
BLANK	Sodium	7440-23-5	<0.115	n/a	ug/mL	08/22/06			U
BLANK	Silicon	7440-21-3	<7.5e-2	n/a	ug/mL	08/22/06			U
BLANK	Titanium	7440-32-6	<4e-3	n/a	ug/mL	08/22/06			U
LCS	Aluminum	7429-90-5	7143	113.022	% Recov	08/22/06	44.000	157.000	
LCS	Boron	7440-42-8	107.4	110.267	% Recov	08/22/06	45.000	156.000	
LCS	Bismuth	7440-69-9	236.2	119.052	% Recov	08/22/06	80.000	120.000	
LCS	Calcium	7440-70-2	4197	126.416	% Recov	08/22/06	76.000	124.000	
LCS	Iron	7439-89-6	12920	115.357	% Recov	08/22/06	47.000	152.000	
LCS	Potassium	7440-09-7	2176	113.333	% Recov	08/22/06	64.000	136.000	
LCS	Lithium	7439-93-2	7.524	126.242	% Recov	08/22/06	80.000	120.000	
LCS	Magnesium	7439-95-4	2348	115.098	% Recov	08/22/06	71.000	129.000	
LCS	Sodium	7440-23-5	509.5	114.494	% Recov	08/22/06	51.000	149.000	
LCS	Silicon	7440-21-3	169.2	23.210	% Recov	08/22/06	80.000	120.000	

000029

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: ICP Metals Analysis, Grd H20 P

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
LCS	Titanium	7440-32-6	291.4	94.000	% Recov	08/22/06	9.000	191.000	

000030

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: ICP-2008 MS All possible metal

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
MS	Silver	7440-22-4	195.1	97.550	% Recov	08/22/06	70.000	130.000	
MS	Arsenic	7440-38-2	168.39	84.195	% Recov	08/22/06	70.000	130.000	
MS	Barium	7440-39-3	195.42	97.710	% Recov	08/22/06	70.000	130.000	
MS	Beryllium	7440-41-7	200.5175	100.259	% Recov	08/22/06	70.000	130.000	
MS	Cadmium	7440-43-9	207.60505	103.803	% Recov	08/22/06	70.000	130.000	
MS	Cobalt	7440-48-4	187.382	93.691	% Recov	08/22/06	70.000	130.000	
MS	Chromium	7440-47-3	192.848	96.424	% Recov	08/22/06	70.000	130.000	
MS	Copper	7440-50-8	184	92.000	% Recov	08/22/06	70.000	130.000	
MS	Mercury	7439-97-6	2.1878	109.390	% Recov	08/22/06	70.000	130.000	
MS	Manganese	7439-96-5	163.4	81.700	% Recov	08/22/06	70.000	130.000	
MS	Molybdenum	7439-98-7	173.7549	86.877	% Recov	08/22/06	70.000	130.000	
MS	Nickel	7440-02-0	189.91	94.955	% Recov	08/22/06	70.000	130.000	
MS	Lead	7439-92-1	203.126	101.563	% Recov	08/22/06	70.000	130.000	
MS	Antimony	7440-36-0	190.8	95.400	% Recov	08/22/06	70.000	130.000	
MS	Selenium	7782-49-2	168	84.000	% Recov	08/22/06	70.000	130.000	
MS	Tin	7440-31-5	204.54	102.270	% Recov	08/22/06	70.000	130.000	
MS	Strontium	7440-24-6	165.13	82.565	% Recov	08/22/06	70.000	130.000	
MS	Thorium	7440-29-1	197.993	98.996	% Recov	08/22/06	70.000	130.000	
MS	Thallium	7440-28-0	198.93748	99.469	% Recov	08/22/06	70.000	130.000	
MS	Uranium	7440-61-1	201.272	100.638	% Recov	08/22/06	70.000	130.000	
MS	Vanadium	7440-62-2	173.2	86.600	% Recov	08/22/06	70.000	130.000	
MS	Zinc	7440-66-6	186.34	93.170	% Recov	08/22/06	70.000	130.000	
MSD	Silver	7440-22-4	186.4	93.200	% Recov	08/22/06	70.000	130.000	
MSD	Arsenic	7440-38-2	158.89	79.445	% Recov	08/22/06	70.000	130.000	
MSD	Barium	7440-39-3	186.22	93.110	% Recov	08/22/06	70.000	130.000	
MSD	Beryllium	7440-41-7	192.2175	96.109	% Recov	08/22/06	70.000	130.000	

Lab ID: W060002493  
 BATCH QC ASSOCIATED WITH SAMPLE

000031

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: ICP-2008 MS All possible metal

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
MSD	Cadmium	7440-43-9	195.10505	97.553	% Recov	08/22/06	70.000	130.000	
MSD	Cobalt	7440-48-4	175.782	87.891	% Recov	08/22/06	70.000	130.000	
MSD	Chromium	7440-47-3	184.048	92.024	% Recov	08/22/06	70.000	130.000	
MSD	Copper	7440-50-8	179.1	89.550	% Recov	08/22/06	70.000	130.000	
MSD	Mercury	7439-97-6	2.0908	104.540	% Recov	08/22/06	70.000	130.000	
MSD	Manganese	7439-96-5	152.4	76.200	% Recov	08/22/06	70.000	130.000	
MSD	Molybdenum	7439-98-7	159.7549	79.877	% Recov	08/22/06	70.000	130.000	
MSD	Nickel	7440-02-0	179.71	89.855	% Recov	08/22/06	70.000	130.000	
MSD	Lead	7439-92-1	198.526	99.263	% Recov	08/22/06	70.000	130.000	
MSD	Antimony	7440-36-0	185.1	92.550	% Recov	08/22/06	70.000	130.000	
MSD	Selenium	7782-49-2	155.4	77.700	% Recov	08/22/06	70.000	130.000	
MSD	Tin	7440-31-5	195.54	97.770	% Recov	08/22/06	70.000	130.000	
MSD	Strontium	7440-24-6	156.53	78.265	% Recov	08/22/06	70.000	130.000	
MSD	Thorium	7440-29-1	188.393	94.197	% Recov	08/22/06	70.000	130.000	
MSD	Thallium	7440-28-0	193.53748	96.769	% Recov	08/22/06	70.000	130.000	
MSD	Uranium	7440-61-1	189.472	94.736	% Recov	08/22/06	70.000	130.000	
MSD	Vanadium	7440-62-2	165.7	82.850	% Recov	08/22/06	70.000	130.000	
MSD	Zinc	7440-66-6	179.64	89.820	% Recov	08/22/06	70.000	130.000	
SPK-RPD	Silver	7440-22-4	93.200	4.561	RPD	08/22/06	0.000	20.000	
SPK-RPD	Arsenic	7440-38-2	79.445	5.805	RPD	08/22/06	0.000	20.000	
SPK-RPD	Barium	7440-39-3	93.110	4.821	RPD	08/22/06	0.000	20.000	
SPK-RPD	Beryllium	7440-41-7	96.109	4.227	RPD	08/22/06	0.000	20.000	
SPK-RPD	Cadmium	7440-43-9	97.553	6.208	RPD	08/22/06	0.000	20.000	
SPK-RPD	Cobalt	7440-48-4	87.891	6.388	RPD	08/22/06	0.000	20.000	
SPK-RPD	Chromium	7440-47-3	92.024	4.670	RPD	08/22/06	0.000	20.000	
SPK-RPD	Copper	7440-50-8	89.550	2.699	RPD	08/22/06	0.000	20.000	
SPK-RPD	Mercury	7439-97-6	104.540	4.534	RPD	08/22/06	0.000	20.000	
SPK-RPD	Manganese	7439-96-5	76.200	6.966	RPD	08/22/06	0.000	20.000	
SPK-RPD	Molybdenum	7439-98-7	79.877	8.396	RPD	08/22/06	0.000	20.000	
SPK-RPD	Nickel	7440-02-0	89.855	5.519	RPD	08/22/06	0.000	20.000	

000032

# WSCF ANALYTICAL LABORATORY QC REPORT

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

SDG Number: 20060935  
 Matrix: SOLID  
 Test: ICP-2008 MS All possible metal

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
SPK-RPD	Lead	7439-92-1	99.263	2.291	RPD	08/22/06	0.000	20.000	
SPK-RPD	Antimony	7440-36-0	92.550	3.033	RPD	08/22/06	0.000	20.000	
SPK-RPD	Selenium	7782-49-2	77.700	7.792	RPD	08/22/06	0.000	20.000	
SPK-RPD	Tin	7440-31-5	97.770	4.499	RPD	08/22/06	0.000	20.000	
SPK-RPD	Strontium	7440-24-6	78.265	5.347	RPD	08/22/06	0.000	20.000	
SPK-RPD	Thorium	7440-29-1	94.197	4.968	RPD	08/22/06	0.000	20.000	
SPK-RPD	Thallium	7440-28-0	96.769	2.752	RPD	08/22/06	0.000	20.000	
SPK-RPD	Uranium	7440-61-1	94.736	6.040	RPD	08/22/06	0.000	20.000	
SPK-RPD	Vanadium	7440-62-2	82.850	4.428	RPD	08/22/06	0.000	20.000	
SPK-RPD	Zinc	7440-66-6	89.820	3.661	RPD	08/22/06	0.000	20.000	
<b>BATCH QC</b>									
BLANK	Silver	7440-22-4	<4e-2	n/a	ug/L	08/22/06			U
BLANK	Arsenic	7440-38-2	<1	n/a	ug/L	08/22/06			U
BLANK	Barium	7440-39-3	<0.2	n/a	ug/L	08/22/06			U
BLANK	Beryllium	7440-41-7	<2e-2	n/a	ug/L	08/22/06			U
BLANK	Cadmium	7440-43-9	<4e-2	n/a	ug/L	08/22/06			U
BLANK	Cobalt	7440-48-4	<2e-2	n/a	ug/L	08/22/06			U
BLANK	Chromium	7440-47-3	<0.7	n/a	ug/L	08/22/06			U
BLANK	Copper	7440-50-8	<0.2	n/a	ug/L	08/22/06			U
BLANK	Mercury	7439-97-6	<4e-2	n/a	ug/L	08/22/06			U
BLANK	Manganese	7439-96-5	<2e-2	n/a	ug/L	08/22/06			U
BLANK	Molybdenum	7439-98-7	<0.1	n/a	ug/L	08/22/06			U
BLANK	Nickel	7440-02-0	<6e-2	n/a	ug/L	08/22/06			U
BLANK	Lead	7439-92-1	<5e-2	n/a	ug/L	08/22/06			U
BLANK	Antimony	7440-36-0	<0.3	n/a	ug/L	08/22/06			U
BLANK	Selenium	7782-49-2	<0.4	n/a	ug/L	08/22/06			U
BLANK	Tin	7440-31-5	<5e-2	n/a	ug/L	08/22/06			U
BLANK	Strontium	7440-24-6	<3e-2	n/a	ug/L	08/22/06			U
BLANK	Thorium	7440-29-1	<5e-2	n/a	ug/L	08/22/06			U

000033

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: ICP-2008 MS All possible metal

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
BLANK	Thallium	7440-28-0	<3e-2	n/a	ug/L	08/22/06			U
BLANK	Uranium	7440-61-1	<2e-2	n/a	ug/L	08/22/06			U
BLANK	Vanadium	7440-62-2	<0.5	n/a	ug/L	08/22/06			U
BLANK	Zinc	7440-66-6	0.3413	0.341	ug/L	08/22/06			
LCS	Silver	7440-22-4	145.6	112.000	% Recov	08/22/06	98.000	134.000	
LCS	Arsenic	7440-38-2	160.3	99.565	% Recov	08/22/06	75.000	134.000	
LCS	Barium	7440-39-3	253.6	100.635	% Recov	08/22/06	87.000	121.000	
LCS	Beryllium	7440-41-7	98.22	104.047	% Recov	08/22/06	70.000	153.000	
LCS	Cadmium	7440-43-9	128.3	100.234	% Recov	08/22/06	95.000	124.000	
LCS	Cobalt	7440-48-4	36.52	103.750	% Recov	08/22/06	88.000	119.000	
LCS	Chromium	7440-47-3	70.03	100.763	% Recov	08/22/06	77.000	125.000	
LCS	Copper	7440-50-8	151.1	102.095	% Recov	08/22/06	84.000	122.000	
LCS	Mercury	7439-97-6	16.93	100.178	% Recov	08/22/06	71.000	132.000	
LCS	Manganese	7439-96-5	424.9	104.142	% Recov	08/22/06	83.000	118.000	
LCS	Molybdenum	7439-98-7	88.47	105.196	% Recov	08/22/06	71.000	130.000	
LCS	Nickel	7440-02-0	155.8	105.986	% Recov	08/22/06	90.000	121.000	
LCS	Lead	7439-92-1	149.6	105.352	% Recov	08/22/06	92.000	123.000	
LCS	Antimony	7440-36-0	100.7	165.353	% Recov	08/22/06	114.000	260.000	
LCS	Selenium	7782-49-2	68.67	106.963	% Recov	08/22/06	52.000	157.000	
LCS	Tin	7440-31-5	61.44	100.721	% Recov	08/22/06	86.000	123.000	
LCS	Strontium	7440-24-6	84.12	100.143	% Recov	08/22/06	68.000	123.000	
LCS	Thorium	7440-29-1	378.1	94.525	% Recov	08/22/06	77.000	121.000	
LCS	Thallium	7440-28-0	86.99	103.560	% Recov	08/22/06	92.000	123.000	
LCS	Uranium	7440-61-1	390.4	97.600	% Recov	08/22/06	81.000	125.000	
LCS	Vanadium	7440-62-2	102.6	105.447	% Recov	08/22/06	81.000	122.000	
LCS	Zinc	7440-66-6	175.7	106.485	% Recov	08/22/06	85.000	130.000	

000034

Date: 1 September 2006  
To: Fluor Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 & 216-U-12 Cribs  
Subject: Wet Chemistry - Data Package No.WSCF20060935 (60935)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. 60935 prepared by WSCF Analytical Laboratories (WSCF). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
B1KB52	8/16/06	Soil	C	See note 1

1 - Anions by 300.0.

Data validation was conducted in accordance with the FHI validation statement of work and the Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit, DOE/RL-2005-75, Rev. 0. 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. 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 28 days for fluoride, chloride, sulfate and bromide; and 48 hours for nitrate, nitrite and phosphate.

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

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All 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.

All method blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Matrix Spike

Matrix spike (MS) and matrix spike duplicate (MSD) 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 70% to 130%. 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 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 69% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to matrix spike (58%) and matrix spike duplicate (60%) recoveries outside QC limits, all phosphate results were qualified as an estimate and flagged "J".

All other matrix spike/matrix spike duplicate 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 70% to 130% for LCS analysis. Samples with a recovery of less than 50% are rejected and flagged "UR". Samples with recoveries of 50% to 69% and a sample recovery below the IDL are qualified "UJ".

000002

Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% 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 30%, 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.

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

- **Completeness**

Data package 60935 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%.

000003

## **MAJOR DEFICIENCIES**

None found.

## **MINOR DEFICIENCIES**

Due to matrix spike (58%) and matrix spike duplicate (60%) recoveries outside QC limits, all phosphate results were qualified as an estimate 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 fluoride 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-2005-75, Rev. 0, *Sampling and Analysis Plan for Support Activities to the 200-UW-1 Operable Unit*, December 2005.

000004

**Appendix 1**

**Glossary of Data Reporting Qualifiers**

**000005**

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).

000006

**Appendix 2**

**Summary of Data Qualification**

000007

WET CHEMISTRY DATA QUALIFICATION SUMMARY\*

SDG: 60935	REVIEWER: TLI	Project: 200-UW-1	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Phosphate	J	All	MS/MSD recovery

\* - 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**  
**Annotated Laboratory Reports**

**000009**

# WSCF ANALYTICAL RESULTS REPORT

Attention: D.L. Klages H8-40 Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
<b>Inorganic</b>												
W060002500	B1KB52	TS	Total solids	SOIL	LA-519-412		> 99.5	%	1.00	0.0	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	16984-48-8	Fluoride	SOIL	LA-533-410	U	< 2.00	mg/kg	50.00	2.0	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	16887-00-6	Chloride	SOIL	LA-533-410	U	< 1.70	mg/kg	50.00	1.7	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	NO2-N	Nitrogen in Nitrite	SOIL	LA-533-410	U	< 0.490	mg/kg	50.00	0.49	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	24959-67-9	Bromide	SOIL	LA-533-410	U	< 4.65	mg/kg	50.00	4.6	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	NO3-N	Nitrogen in Nitrate	SOIL	LA-533-410	U	< 0.900	mg/kg	50.00	0.90	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	PO4-P	Phosphate (P) by IC	SOIL	LA-533-410	J	< 3.90	mg/kg	50.00	3.9	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	14808-79-8	Sulfate	SOIL	LA-533-410	U	< 6.50	mg/kg	50.00	6.5	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	7429-90-5	Aluminum	SOIL	LA-505-411	G	51.1	mg/kg	94.08	3.5	<del>08/22/06</del>	<del>08/16/06 08/17/06</del>
W060002500	B1KB52	7439-89-6	Iron	SOIL	LA-505-411		525	mg/kg	94.08	3.1	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7439-95-4	Magnesium	SOIL	LA-505-411		21.5	mg/kg	94.08	1.4	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-09-7	Potassium	SOIL	LA-505-411	U	< 20.7	mg/kg	94.08	21	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-23-5	Sodium	SOIL	LA-505-411	U	< 10.8	mg/kg	94.08	11	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-70-2	Calcium	SOIL	LA-505-411	E	73.1	mg/kg	94.08	2.9	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7439-93-2	Lithium	SOIL	LA-505-411	U	< 0.565	mg/kg	94.08	0.56	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-32-6	Titanium	SOIL	LA-505-411		0.776	mg/kg	94.08	0.38	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-42-8	Boron	SOIL	LA-505-411	U	< 1.98	mg/kg	94.08	2.0	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-69-9	Bismuth	SOIL	LA-505-411	U	< 4.99	mg/kg	94.08	5.0	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-21-3	Silicon	SOIL	LA-505-411	E	26.2	mg/kg	94.08	7.1	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7439-96-5	Manganese	SOIL	LA-505-412	X	0.576	mg/kg	0.95	0.0191	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-02-0	Nickel	SOIL	LA 505-412		0.0853	mg/kg	0.95	0.0572	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-22-4	Silver	SOIL	LA-505-412	U	< 0.0381	mg/kg	0.95	0.0381	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-36-0	Antimony	SOIL	LA-505-412	U	< 0.286	mg/kg	0.95	0.286	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-39-3	Barium	SOIL	LA-505-412		0.206	mg/kg	0.95	0.191	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-41-7	Beryllium	SOIL	LA-505-412	U	< 0.0191	mg/kg	0.95	0.0191	08/22/06	08/16/06 08/17/06
W060002500	B1KB52	7440-43-9	Cadmium	SOIL	LA-505-412	U	< 0.0381	mg/kg	0.95	0.0381	08/22/06	08/16/06 08/17/06

000010

E - Analyte is an estimate, has potentially larger errors  
 U - Analyzed for but not detected above limiting criteria

C - The Analyte was found in the Associated Blank.  
 J - Analyte is an estimate, has potentially larger errors  
 X - Other flags and notes described in the comments/narrative.

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 DF = Dilution Factor  
 \* - Indicates results that have NOT been validated.  
 + - Indicates more than six qualifier symbols

Report WGP/ver. 1.3

PROJECT HANFORD MANAGEMENT COMPANY

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**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

**000011**

<b>Sample Delivery Group</b>	<b>WSCF20060935</b>
<b>Sample Matrix</b>	<b>SOLID</b>
<b>Sample Visual</b>	<b>N/A</b>
<b>SAF Number</b>	<b>R06-013</b>
<b>Data Deliverable</b>	<b>Summary Report</b>

**Introduction**

One (1) 200-UW-1 Operable Unit soil sample (B1KB52) from the trench between 216-U-8 and 216-U-12 were received at the WSCF Laboratory on August 17, 2006. The samples were received in a cool condition with ice present in the coolers. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *200-UW-1 Operable Unit Letter of Instruction*, referenced in the cover letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment report detailing method abnormalities, method references, and Laboratory QC information. Copies of the chain of custody and sample receipt are included as Attachment 3.

**Analytical Methodology for Requested Analyses**

Refer to *WSCF Method References Report*, pages 52 through 53 , for a complete listing of approved analytical methods used.

**Inorganic Comments**

**Anions** - The hold time requirements were met. A Blank, Duplicate, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group. See pages 12 through 13 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.
- Duplicate, Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Phosphate – Matrix Spike and Matrix Spike Duplicate recoveries were below established laboratory limits. Sample result was less than detection limit and U flagged.

All other QC controls are within the established limits.

**ICP-AES Metals** – The holding time for this analysis was met. A Blank, Laboratory Control Sample (LCS), Matrix Spike and Matrix Spike Duplicate were analyzed with this delivery group of less than 20 samples. See pages 14 through 16 for QC details. Analytical Notes:

- Preparation Date: 21-aug-2006.

- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Aluminum, Calcium, Iron, Magnesium and Titanium – insufficient spike concentrations. Sample concentrations were greater than four times the spike concentration.
- Calcium – The Laboratory Control Sample recoveries exceeded established laboratory limits. Calcium result was E flagged. Lithium result was less than the method detection limit and U flagged.
- Silicon – Matrix Spike, Matrix Spike Duplicate and Laboratory Control Sample recoveries were outside established laboratory limits. Sample result was E flagged.
- Aluminum – Analyte detected in the associated preparation Blank sample was evaluated and sample result was C flagged.

All other QC controls are within the established limits.

**ICP-MS Metals** – The holding time for this analysis was met, with the exception of mercury. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spike Duplicate were analyzed with this deliver group of less than 20 samples. See pages 17 through 20 for QC details Analytical Notes:

- Preparation Date: 21-aug-2006.
- Matrix Spike and Matrix Spike Duplicate QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Thorium results listed in the report represent Th-232 exclusively.
- Zinc – Analyte detected in the associated preparation Blank sample was evaluated and sample B1KB51 was C flagged.
- Manganese (sample B1KB52), Thorium (sample B1KB52) and Uranium (sample B1KB52) – Negative preparation blank results may have potential affect on sample results. Sample results were X flagged.

All other QC controls are within the established limits.

**Percent Solids** – analyzed for organic moisture correction.

**Organic Comments**

- Sample results are moisture corrected and reported on dry weight basis.

**Semi-VOA** – The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 26 through 31 for QC details. Analytical Notes:

- Preparation Date: 17-aug-2006.
- Diethylphthalate - sample B1KB52 result was J flagged; result was less than the lowest calibration standard but greater than the detection limit.

All QC controls are within the established limits.

**TPHD-WA** - The hold time for this analysis were met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See page 32 for QC details. Analytical Note:

- Preparation Date: 17-aug-2006.

All QC controls are within the established limits.

**VOA** - The hold time for this analysis was met. A Blank, Laboratory Control Sample, Matrix Spike and Matrix Spiked Duplicate were analyzed with this delivery group. See pages 33 through 36 for QC details. Analytical Notes:

- Matrix Spike and Matrix Spike Duplicate QC samples were analyzed on sample# B1KB77 (SDG# 20060934, SAF# R06-013).
- 4-Bromofluorobenzene - Matrix Spike and Matrix Spike Duplicate QC exceeded established laboratory limits.

All other QC controls are within the established limits.

### **Radiochemistry Comments**

**RadChem** - There are no hold times associated with WSCF radiochemical methods. A Blank, Laboratory Control Sample, Matrix Spike (Technetium only), and Duplicate were analyzed with this delivery group. See pages 40 through 48 for QC details. Analytical Notes:

- Actinium-228 and Radium-228 Gamma Energy Analysis (GEA) - Duplicate QC Relative Percent Difference (RPD) exceeded established laboratory limits due to sample homogeneity issues.
- Americium-241, Neptunium-237, Plutonium Isotopic (238 and 239/240), Strontium-90, Technetium-99 and Uranium Isotopic (233/234, 235 and 238) - Applicable QC was analyzed on sample# B1KB49 (SDG# 20060934, SAF# R06-013).
- Pu-239/240 - Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Strontium-90 - Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

- Technetium-99 – Duplicate QC RPD exceeded established laboratory limits due to low sample activity.
- Uranium Isotopic (233/234, 235 and 238) – Duplicate QC RPD exceeded established laboratory limits due to sample homogeneity issues.

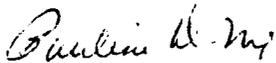
All other QC controls are within the established limits.

Americium-243, Plutonium-242, Strontium-85 and Uranium-232 – Radiochemical Tracer Recovery Data are summarized below:

<b>Radiochemical Tracer Percent Recovery</b>			
<b>Sample Number</b>	<b>Lab Sample ID</b>	<b>Isotope</b>	<b>Tracer Recovery (Percent)</b>
<b><u>Americium-243</u></b>			
BLANK		Am-243	79.9%
LCS		Am-243	93.0%
B1KB49	W060002493	Am-243	85.8%
DUPLICATE	W060002493	Am-243	89.2%
B1KB52	W060002500	Am-243	87.6%
<b><u>Plutonium-242</u></b>			
BLANK		Pu-242	84.0%
LCS		Pu-242	85.0%
B1KB49	W060002493	Pu-242	81.8%
DUPLICATE	W060002493	Pu-242	86.7%
B1KB52	W060002500	Pu-242	88.5%
<b><u>Strontium-85</u></b>			
BLANK		Sr-85	98.9%
LCS		Sr-85	83.4%
B1KB49	W060002493	Sr-85	86.0%
DUPLICATE	W060002493	Sr-85	88.2%
B1KB52	W060002500	Sr-85	89.1%
<b><u>Uranium-232</u></b>			
BLANK		U-232	79.8%
LCS		U-232	75.6%
B1KB49	W060002493	U-232	121.6%

Radiochemical Tracer Percent Recovery			
Sample Number	Lab Sample ID	Isotope	Tracer Recovery (Percent)
DUPLICATE	W060002493	U-232	93.0%
B1KB52	W060002500	U-232	88.7%

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCF Laboratory Analytical Manager and Client Services, as verified by the following signature.



Pauline D. Mix  
WSCF Client Services

Abbreviations

Hg – mercury  
IC – ion chromatography  
ICP – inductively coupled plasma  
ICP/AES – ICP/atomic emission spectroscopy  
ICP/MS – ICP/mass spectrometry  
Total U – total uranium  
AT/TB – total alpha/total beta  
AEA – Alpha Energy Analysis  
WTPH-G – Total Hydrocarbons-Gasoline

Am – americium  
Cm - curium  
Pu – plutonium  
Np – neptunium  
GEA – gamma energy analysis  
H3 – Tritium  
Sr – Strontium 89, 90  
WTPH-D – Total Hydrocarbons-Diesel  
TSS – Total Suspended Solids

Fluor Hanford Inc. 08/27/06 PAGE 1 OF 3  
 R06-013-017 PRICE CODE 8C DATA TURNAROUND  
 HOGAN, JG COMPANY CONTACT TRECHTER, JE PROJECT COORDINATOR TRECHTER, JE  
 AIR QUALITY 70 DAYS 45-DAYS 7-A 811-03  
 70 DAYS 35-DAYS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST  
 TELEPHONE NO. 373-7046  
 SAF NO. R06-013  
 PROJECT DESIGNATION 200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12  
 METHOD OF SHIPMENT GOVERNMENT VEHICLE  
 FIELD LOGBOOK NO. COA 121600ES20  
 BILL OF LADING/AIR BILL NO. N/A  
 OFFSITE PROPERTY NO. N/A

SHIPPED TO Waste Sampling & Characterization  
 POSSIBLE SAMPLE HAZARDS/ REMARKS  
 DTS-SAWS-H112  
 N/A

SAMPLE NO.	LAB ID	MATRIX*	SAMPLE DATE	SAMPLE TIME	NO./TYPE CONTAINER(S)	ANALYSIS	PRESERVATION
BIK852	W060002500	S	8-16-06	1100	4X60mL ag	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Cool 4C
BIK852	W060002499	S			4X60mL G	TPH-Diesel Range - WTPH-D (TPHKEROSEIN)	Cool 4C
BIK852		S			1X40mL G	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Cool 4C
BIK852		S			1X500mL Square Bottle - Poly	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	None
BIK852		S			4X60mL G/P	Isotopic Plutonium (Pu-238, Pu-239/240) Isotopic Uranium (U-233/234, U-235, U-238) Americium-241 (Am-241)	None
BIK852		S			4X60mL G/P	Strontium-89,90 -- Sr-90 (Sr-90)	None
BIK852		S			4X60mL G/P	Technetium-99 (Tc-99)	None

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	DATE/TIME	DATE/TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM DUPRATK				SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM J. G. HOGAN	J. G. HOGAN	8/17/06 0955	8/17/06 0955	
RELINQUISHED BY/REMOVED FROM	J. F. FERRIER		8/17/06 0955	
RELINQUISHED BY/REMOVED FROM				
RELINQUISHED BY/REMOVED FROM				
RELINQUISHED BY/REMOVED FROM				

ICED Initial Date  
 8-17-06

LABORATORY SECTION RECEIVED BY  
 FINAL SAMPLE DISPOSITION DISPOSED BY  
 DATE/TIME DATE/TIME



COLLECTOR  
HOGAN, JG

COMPANY CONTACT  
TRECHTER, JE

PROJECT COORDINATOR  
TRECHTER, JE

PRICE CODE  
8C

DATA  
TURNAROUND

7 May 95 - Beyer - JH  
7 May 95 - Beyer - JH

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

PROJECT DESIGNATION  
200-UW-1 Operable Unit, Soil from Trench between 216-U-8 and 216-U-12

SAMPLING LOCATION  
200-W-42

PROJECT NO.  
R06-013

SAF NO.  
R06-013

AIR QUALITY

METHOD OF SHIPMENT  
GOVERNMENT VEHICLE

ICE CHEST NO.

COA  
121600ES20

BILL OF LADING/AIR BILL NO.  
N/A

SHIPPED TO  
Waste Sampling & Characterization

OFFSITE PROPERTY NO.  
N/A

POSSIBLE SAMPLE HAZARDS/REMARKS

SPECIAL HANDLING AND/OR STORAGE

MATRIX\*  
S

SAMPLE DATE  
8-16-06

SAMPLE TIME  
1100

NO./TYPE CONTAINER(S)  
4X60ml G/P (Neptunium-237 (Np-237))

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

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LAB ID

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MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

LAB ID

MATRIX\*  
S

SAMPLE DATE

SAMPLE TIME

NO./TYPE CONTAINER(S)  
4X60ml G/P

LAB ID

ANALYSIS

LAB ID

ANALYSIS

SPECIAL INSTRUCTIONS

Reporting format the same as GPP, including QC. All samples, except VOAs, have been taken using the multiple-increment sampling program. This requires the entire sample provided in each bottle to be used in analysis. VOAs will be analyzed as usual.

SIGN/PRINT NAMES

RECEIVED BY/STORED IN  
J. G. HOGAN  
8/17/06 0955

DATE/TIME

8/17/06 0955

RECEIVED BY/STORED IN

8/17/06 0955

DATE/TIME

8/17/06 0955

RECEIVED BY/STORED IN

8/17/06 0955

DATE/TIME

8/17/06 0955

ICED Initial  
8-17-06 Date

**Appendix 5**

**Data Validation Supporting Documentation**

000020

**GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST**

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	200-UW-1		DATA PACKAGE: 60935		
VALIDATOR:	TLI	LAB:	WSCF	DATE:	9/1/06
		SDG:	60935		
ANALYSES PERFORMED					
<b>Anions/IC</b>	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO <sub>3</sub> /NO <sub>2</sub>
Sulfate	TDS	TKN	Phosphate		
SAMPLES/MATRIX					
BIKRS2					
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  
Field 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)**

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: phosphate - MS (57%) MSD (60%) - Fall no PA

**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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**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: all fluoride on  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Appendix 6**

**Additional Documentation Requested by Client**

**000025**

# WSCF ANALYTICAL LABORATORY QC REPORT

SAF Number: R06-013  
 Sample Date: 08/16/06  
 Receive Date: 08/16/06

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Anions by Ion Chromatography

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
<b>Lab ID: W060002493</b>									
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>									
DUP	Bromide	24959-67-9	<4.65	n/a	RPD	08/21/06	0.000	20.000	U
DUP	Chloride	16887-00-6	7.5314	9.110	RPD	08/21/06	0.000	20.000	U
DUP	Fluoride	16984-48-8	<2	n/a	RPD	08/21/06	0.000	20.000	U
DUP	Nitrogen in Nitrite	NO2-N	<0.49	n/a	RPD	08/21/06	0.000	20.000	U
DUP	Nitrogen in Nitrate	NO3-N	13.4643	2.025	RPD	08/21/06	0.000	20.000	U
DUP	Phosphate (P) by IC	PO4-P	<3.9	n/a	RPD	08/21/06	0.000	20.000	U
DUP	Sulfate	14808-79-8	29.0249	2.346	RPD	08/21/06	0.000	20.000	U
MS	Bromide	24959-67-9	1.69307	84.654	% Recov	08/21/06	75.000	125.000	
MS	Chloride	16887-00-6	0.894452	91.271	% Recov	08/21/06	75.000	125.000	
MS	Fluoride	16984-48-8	0.42702	85.404	% Recov	08/21/06	75.000	125.000	
MS	Nitrogen in Nitrite	NO2-N	0.44588	89.534	% Recov	08/21/06	75.000	125.000	
MS	Nitrogen in Nitrate	NO3-N	0.407006	92.501	% Recov	08/21/06	75.000	125.000	
MS	Phosphate (P) by IC	PO4-P	0.55435	57.625	% Recov	08/21/06	75.000	125.000	
MS	Sulfate	14808-79-8	1.775156	88.758	% Recov	08/21/06	75.000	125.000	
MSD	Bromide	24959-67-9	1.694338	84.717	% Recov	08/21/06	75.000	125.000	
MSD	Chloride	16887-00-6	0.90542	92.390	% Recov	08/21/06	75.000	125.000	
MSD	Fluoride	16984-48-8	0.434964	86.993	% Recov	08/21/06	75.000	125.000	
MSD	Nitrogen in Nitrite	NO2-N	0.438152	87.982	% Recov	08/21/06	75.000	125.000	
MSD	Nitrogen in Nitrate	NO3-N	0.425402	96.682	% Recov	08/21/06	75.000	125.000	
MSD	Phosphate (P) by IC	PO4-P	0.578926	60.179	% Recov	08/21/06	75.000	125.000	
MSD	Sulfate	14808-79-8	1.764856	88.243	% Recov	08/21/06	75.000	125.000	
<b>BATCH QC</b>									
BLANK	Bromide	24959-67-9	<9.3e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Bromide	24959-67-9	<9.3e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Chloride	16887-00-6	<3.4e-2	n/a	mg/L	08/21/06	0.000	300.000	U

000026

# WSCF ANALYTICAL LABORATORY QC REPORT

SDG Number: 20060935  
 Matrix: SOLID  
 Test: Anions by Ion Chromatography

SAF Number: R06-013  
 Sample Date:  
 Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Analysis Date	Lower Limit	Upper Limit	RQ
BLANK	Chloride	16987-00-6	< 3.4e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Fluoride	16984-48-8	< 4e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Fluoride	16984-48-8	< 4e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Nitrogen in Nitrite	NO2-N	< 9.8e-3	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Nitrogen in Nitrite	NO2-N	< 9.8e-3	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Nitrogen in Nitrate	NO3-N	< 1.8e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Nitrogen in Nitrate	NO3-N	< 1.8e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Phosphate (P) by IC	PO4-P	< 7.9e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Phosphate (P) by IC	PO4-P	< 7.9e-2	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Sulfate	14808-79-8	< 0.13	n/a	mg/L	08/21/06	0.000	300.000	U
BLANK	Sulfate	14808-79-8	< 0.13	n/a	mg/L	08/21/06	0.000	300.000	U
LCS	Bromide	24959-67-9	390.9538	97.738	% Recov	08/21/06	80.000	120.000	U
LCS	Chloride	16887-00-6	203.9548	104.059	% Recov	08/21/06	80.000	120.000	U
LCS	Fluoride	16984-48-8	92.1569	92.157	% Recov	08/21/06	80.000	120.000	U
LCS	Nitrogen in Nitrite	NO2-N	99.6832	100.084	% Recov	08/21/06	80.000	120.000	U
LCS	Nitrogen in Nitrate	NO3-N	87.9705	100.080	% Recov	08/21/06	80.000	120.000	U
LCS	Phosphate (P) by IC	PO4-P	189.4201	98.400	% Recov	08/21/06	80.000	120.000	U
LCS	Sulfate	14808-79-8	388.5084	97.127	% Recov	08/21/06	80.000	120.000	U

000027



# WSCF ANALYTICAL RESULTS REPORT

Attention: D. L. Klages H8-40      Group #: 20060935

Sample #	Client ID	CAS #	Test Performed	Matrix	Method	RQ	Result	Unit	DF	MDL	Analyze Sample	Receive
W060002500	B1KB52	79-34-5	1,1,2,2-Tetrachloroethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	71-36-3	1-Butanol	SOIL	LA-523-455	U	< 19.0	ug/kg	1.00	19	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	107-87-9	2-Pentanone	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	110-82-7	Cyclohexane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	110-54-3	Hexane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	109-99-9	Tetrahydrofuran	SOIL	LA-523-455	U	< 1.90	ug/kg	1.00	1.9	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-69-4	Trichloromonofluoromethane	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	104-51-8	n-Butylbenzene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	156-60-5	trans-1,2-Dichloroethylene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	75-05-8	Acetonitrile	SOIL	LA-523-455	U	< 1.90	ug/kg	1.00	1.9	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	156-60-2	cis-1,2-Dichloroethylene	SOIL	LA-523-455	U	< 0.940	ug/kg	1.00	0.94	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	TPHDIESEL	Total Pet. Hydrocarbons Diesel	SOIL	NWTPH	U	< 3.20e+03	ug/kg	1.00	3.2e+03	08/21/06	08/16/06 08/17/06
W060002500	B1KB52	TPHKEROSENE	Kerosene	SOIL	NWTPH	U	< 3.20e+03	ug/kg	1.00	3.2e+03	08/21/06	08/16/06 08/17/06

K 9/5/04

E - Analyte is an estimate, has potentially larger errors  
 U - Analyzed for but not detected above limiting criteria.

MDL = Minimum Detection Limit      C - The Analyte was found in the Associated Blank.  
 RQ = Result Qualifier                  J - Analyte is an estimate, has potentially larger errors  
 DF = Dilution Factor                  X - Other flags and notes described in the comments/narrative.  
 + - Indicates results that have NOT been validated;      + - Indicates more than six qualifier symbols

**REVISED**  
*R. Daynes*  
 9/5/06

Report WGP/ver. 1.3  
 PROJECT HANFORD MANAGEMENT COMPANY

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