

**WSCF Laboratory**

RECEIVED MAY 24, 2011

1214713

PO Box 650 S3-30  
Richland, WA 99352



May 23, 2011

Michael Neely  
CH2M-HILL PRC  
PO Box 1600  
Richland, WA 99352

Dear Michael Neely,

**FINAL RESULT FOR SAMPLE DELIVERY GROUP WSCF112279**

Reference: (1) SOW, Mod 2, #36587, Release 3  
(2) HNF-SD-CD-QAPP-017, current version, Waste Sampling & Characterization Facility Quality Assurance Plan

This letter contains the following information for sample delivery group WSCF112279

- \* Cover Sheet (Attachment 1)
- \* Narrative (Attachment 2)
- \* Analytical Results (Attachment 3)
- \* Sample Receipt Information (Attachment 4)

Very truly yours,

Electronically signed by Joseph Hale

For Lab Manager

WSCF Analytical Lab

(509) 373-7495



Attachments 4

CC: w/Attachments

File/LB

ATTACHMENT 1

**COVER SHEET**

Consisting of 2 pages  
Including cover page

**WSCF SAF Number Cross Reference**

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Group # WSCF112279

Data Deliverable Date 06/01/11

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<b>SAF #</b>	<b>Sample ID</b>	<b>Sample #</b>	<b>Matrix</b>	<b>Sampled</b>	<b>Received</b>
F11-120	B2DW21	112279001	SOIL	05/17/11	05/17/11
F11-120	B2DW22	112279002	SOIL	05/17/11	05/17/11

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**ATTACHMENT 2**

**NARRATIVE**

Consisting of 3 pages  
Including cover page

### Introduction

Samples were received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the chain of custody and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U and J) may be applicable to this report, as appropriate

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

### Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report* for a complete listing of approved analytical methods.

### Inorganic Comments

**Hexavalent Chromium** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

Attachment 2  
Narrative  
WSCF112279

We certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

ATTACHMENT 3

**ANALYTICAL RESULTS**

Consisting of 12 pages  
Including cover page

## WSCF ANALYTICAL RESULTS REPORT

For

CH2M Hill Plateau Remediation

PO Box 1600  
Richland, WA 99352

Attention: Michael Neely

**Contract #** MOA-FH-CHPRC-2008  
**Group #** WSCF112279  
**Report Date** May 23, 2011

**Analytical:** Electronically signed by Joseph Hale

**Client Services:** Electronically signed by Richard Barker

*Solid samples results that have a 'Percent Solid' test are reported on a "dry weight basis", except results of TCLP, Percent Solid, and Total Activity. If no 'Percent Solid' test is reported then the results are reported on an "as received" basis.*

This information is intended for the use of the addressee only. If the reader of this report is not the intended recipient or is not authorized by the recipient to receive the report, you are hereby notified that any dissemination, distribution or copying of this report is strictly prohibited. If you have received this report in error, please notify WSCF Laboratory immediately by telephone at (509) 373-7020 or (509) 531-8004. Information designation of this report is the responsibility of the customer.

Batch QC List

Attention Michael Neely  
Department Inorganic

Group # WSCF112279

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
182333	182334	1	BLANK	56180	BLANK		Hexavalent chromium
182333	182334	4	LCS	56181	LCS		Hexavalent chromium
182333	182334	5	DUP	56182	B2D2M0(112267001DUP)	112267001	Hexavalent chromium
182333	182334	6	MS	56183	B2D2M0(112267001MS)	112267001	Hexavalent chromium
182333	182334	7	PSTSPK	56184	PSTSPK		Hexavalent chromium
182333	182334	8	IMS	56185	B2D2M0(112267001IMS)	112267001	Hexavalent chromium
182333	182334	20	SAMPLE	112279001	B2DW21		Hexavalent chromium
182333	182334	21	SAMPLE	112279002	B2DW22		Hexavalent chromium

**Batch QC List**

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**Attention** Michael Neely  
**Department** Wet Chemistry

**Group #** WSCF112279

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<b>QC Batch</b>	<b>Analytical Batch</b>	<b>S#</b>	<b>Type</b>	<b>Sample #</b>	<b>Client Sample#</b>	<b>Original</b>	<b>Test</b>
182335	182335	14	SAMPLE	112279001	B2DW21		Dry Weight/Percent Moisture
182335	182335	15	SAMPLE	112279002	B2DW22		Dry Weight/Percent Moisture

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## Method Reference

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**Attention** Michael Neely  
**Department** Inorganic

**Group #** WSCF112279

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The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

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<b>LA-265-403</b>	Hexavalent Chromium Analysis		
	EPA SW-846	7196A	Hexavalent Chromium
	HEIS	7196_CR6	Hexavalent Chromium

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Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

## Method Reference

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**Attention** Michael Neely  
**Department** Wet Chemistry

**Group #** WSCF112279

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The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

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<b>LA-519-412</b>	Total Residual Percent Solids Dried at 103 - 105 Degrees C		
	EPA-600/4-79-020	160.3	Total Residue
	Standard Methods	2540B	Total Solids Dried at 103-105 C
	HEIS	%SOLIDS	Dry Weight, Percent Solids

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Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

# WSCF Analytical Results Report

Attention Michael Neely  
 Department Inorganic

Group # WSCF112279

Sample # 112279001  
 SAF# F11-120  
 Sample ID B2DW21

Matrix SOIL  
 Sampled 05/17/11  
 Received 05/17/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Cr(VI) Prep										05/19/11
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403		1.08		ug/g	1	0.035	0.52	05/20/11

MDL = Minimum Detection  
 RQ = Result Qualifier  
 TP Err = Total Propagated  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

# WSCF Analytical Results Report

Attention Michael Neely  
 Department Inorganic

Group # WSCF112279

Sample # 112279002  
 SAF# F11-120  
 Sample ID B2DW22

Matrix SOIL  
 Sampled 05/17/11  
 Received 05/17/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Cr(VI) Prep</b>										<b>05/19/11</b>
<b>Cr(VI)</b>										
Hexavalent chromium	18540-29-9	LA-265-403		7.95		ug/g	1	0.034	0.51	05/20/11

MDL = Minimum Detection  
 RQ = Result Qualifier  
 TP Err = Total Propagated  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary diltution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

# WSCF Analytical Results Report

Attention Michael Neely  
 Department Wet Chemistry

Group # WSCF112279

Sample # 112279001  
 SAF# F11-120  
 Sample ID B2DW21

Matrix SOIL  
 Sampled 05/17/11  
 Received 05/17/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Total Residue</b>										<b>05/19/11</b>
<b>Total Residue</b>										
Percent Solids	%SOLIDS	LA-519-412		95		percent	1			05/19/11

MDL = Minimum Detection  
 RQ = Result Qualifier  
 TP Err = Total Propagated  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the RDL but >= the IDL/MDL.  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 N - MS and/or MSD sample recovery outside control limits.  
 U - Analyzed for but not detected above limiting criteria.

N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

**WSCF Analytical Results Report**

Attention Michael Neely  
 Department Wet Chemistry

Group # WSCF112279

Sample # 112279002  
 SAF# F11-120  
 Sample ID B2DW22

Matrix SOIL  
 Sampled 05/17/11  
 Received 05/17/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Total Residue</b>										05/19/11
<b>Total Residue</b>										
Percent Solids	%SOLIDS	LA-519-412		95		percent	1			05/19/11

MDL = Minimum Detection  
 RQ = Result Qualifier  
 TP Err = Total Propagated  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the RDL but >= the IDL/MDL.  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary diltution factor.  
 N - MS and/or MSD sample recovery outside control limits.  
 U - Analyzed for but not detected above limiting criteria.

N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

# Quality Control Report

Attention Michael Neely  
 Department Inorganic

Group # WSCF112279

QC Batch 182333 Test Hexavalent chromium  
 Associated Samples 112279001, 112279002

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
			<b>QC Sample #56180</b>							
Hexavalent chromium <b>LCS</b>	18540-29-9	<0.098		ug/g					U	05/20/11
			<b>QC Sample #56181</b>							
Hexavalent chromium <b>DUP</b>	18540-29-9	3.83		ug/g	96.5	80 - 120				05/20/11
			<b>QC Sample #56182</b>							
			<b>Original 112267001</b>							
Hexavalent chromium <b>MS</b>	18540-29-9	<0.035		ug/g			652.70	30	* UX	05/20/11
			<b>QC Sample #56183</b>							
			<b>Original 112267001</b>							
Hexavalent chromium <b>PSTSPK</b>	18540-29-9	3.08		ug/g	78	75 - 125				05/20/11
			<b>QC Sample #56184</b>							
Hexavalent chromium <b>IMS</b>	18540-29-9	0.0435		ug/g	87.9	85 - 115				05/20/11
			<b>QC Sample #56185</b>							
			<b>Original 112267001</b>							
Hexavalent chromium	18540-29-9	329		ug/g	96.1	75 - 125			D	05/20/11

## Analytical Comment Report

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Attention: Michael Neely

Group #

WSCF112279

### Quality Control Comments

Department Inorganic

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56182

B2D2M0(112267001DUP)

**Analyte** Hexavalent chromium - Hexavalent chromium

- [1] Duplicate is flagged for RPD out-of-limits. RPD does not apply to samples concentrations below the calibration range. RPD is calculated on measured values and not applicable for a result below the RDL.

ATTACHMENT4

**SAMPLE RECEIPT**

Consisting of 4 pages  
Including cover page

# Sample Receipt

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**Waste Sampling and Characterization Facility**  
P.O. Box 1970 S3-30, Richland WA 99352  
Phone: (509) 373-7004/FAX: (509) 373-7134

## ACKNOWLEDGEMENT OF SAMPLES RECEIVED

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**WSCF Laboratory**  
PO Box 650 S3-30  
Richland, WA 99352

ATTN: Michael Neely

Customer Code: CHPRC  
PO #: 401352ES20  
Work Order #: 112279  
Profile #: F11-120-003  
Proj. Mgr.:  
Phone:

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The following samples were received from you on 5/17/2011 12:45:00 PM. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using Waste Sampling and Characterization Facility.

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Sample #	Sample ID	Matrix	Collected	Received
		<b>Tests scheduled</b>		
112279001	B2DW21	SOIL	5/17/2011 11:30	5/17/2011 12:45
		CR6-S; DRY-WEIGHT		
112279002	B2DW22	SOIL	5/17/2011 11:35	5/17/2011 12:45
		CR6-S; DRY-WEIGHT		

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### Test Acronym Description

Test Acronym	Description
CR6-S	Cr6 (S)
DRY-WEIGHT	Dry Weight as Pct Moisture

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CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

CH2MHill Plateau Remediation Company

COLLECTOR KC Patterson  
CHPRC

COMPANY CONTACT BAUER, RG  
TELEPHONE NO. 373-3931

PROJECT COORDINATOR BAUER, RG

PRICE CODE 8C

DATA TURNAROUND 15 Days / 15 Days

SAMPLING LOCATION 600281 ZPC 6 VR-6-1  
ICE CHEST NO.

PROJECT DESIGNATION AFRA Verification Sampling of the 600-281 Scattered Debris Area Surface

SAF NO. F11-120

AIR QUALITY

FIELD LOGBOOK NO. HNF-N-507-21

ACTUAL SAMPLE DEPTH 6-12"

COA 5022276510

METHOD OF SHIPMENT GOVERNMENT VEHICLE

ORIGINAL

SHIPPED TO Waste Sampling & Characterization

OFFSITE PROPERTY NO. N/A

BILL OF LADING/AIR BILL NO. N/A

MATRIX\* A - Air  
D1 - Debris  
D2 - Debris  
L - Liquid  
D5 - Debris  
S - Soil  
S1 - Soil  
S2 - Sediment  
T - Tissue  
V - Vegetation  
W - Waste  
X - Other  
POSSIBLE SAMPLE HAZARDS/ REMARKS Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1993/1993)  
SPECIAL HANDLING AND/OR STORAGE

PRESERVATION Cool-AC  
HOLDING TIME 30 Days  
TYPE OF CONTAINER G/P  
NO. OF CONTAINER(S) 1  
VOLUME 60mL  
SAMPLE ANALYSIS Chromium (m) (116)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B2DW21 001	SOIL	5/12/11	1130

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson	5/12/11 12:45	V. C. [Signature]	5/17/11 12:45
CHPRC			
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

\*\* The CACN for all analytical work at WSCF laboratory is 401352ES20. The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.  
\*\* Only those constituents of concern requested shall be reported in any preliminary or final hardcopy data reports, or EDDs. If a sample is chosen for matrix spike, it shall be identified in the narrative, and the spike compounds shall be identified in the narrative or removed from all Data Reports. No TICs shall be reported.

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME
PRINTED ON 5/18/2011			

CH2MHILL Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-120-004	PAGE 1 OF 1
<b>COLLECTOR</b> BAUER, RG	<b>COMPANY CONTACT</b> BAUER, RG	<b>TELEPHONE NO.</b> 373-3931	<b>PROJECT COORDINATOR</b> BAUER, RG	<b>PRICE CODE</b> BC	<b>DATA TURNAROUND</b> 15 Days / 15 Days	
<b>SAMPLING LOCATION</b> G00-ZR1 7PC 6 VR-5 Z	<b>PROJECT DESIGNATION</b> A2RA Verification Sampling of the G00-ZR1 Scattered Debris Area - Surface	<b>FIELD LOGBOOK NO.</b> HNF-N-857-21	<b>ACTUAL SAMPLE DEPTH</b> 6-12"	<b>SAP NO.</b> F11-120	<b>AIR QUALITY</b> □	<b>ORIGINAL</b>
<b>ICE CHEST NO.</b>	<b>OFFSITE PROPERTY NO.</b> N/A	<b>PRESERVATION</b> Cool-AC	<b>HOLDING TIME</b> 30 Days	<b>COA</b> 352222ES10	<b>METHOD OF SHIPMENT</b> GOVERNMENT VEHICLE	
<b>SHIPPED TO</b> Waste Sampling & Characterization	<b>PRESERVATION</b> Cool-AC	<b>TYPE OF CONTAINER</b> GIP	<b>NO. OF CONTAINER(S)</b> 1	<b>BILL OF LADING/AIR BILL NO.</b> N/A		
<b>MATRIX*</b> A-Air DL-Drain L-Liquids OS-Other S-Solids L-Liquid G-Gas S-Sediment T-Tissue V-Vegetation W-Water WI-Wipe X-Other	<b>POSSIBLE SAMPLE HAZARDS/ REMARKS</b> Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 540.5 (1990/1993)	<b>VOLUME</b> 50 mL	<b>SAMPLE ANALYSIS</b> Chemistry (50%)			
<b>SPECIAL HANDLING AND/OR STORAGE</b>						

  

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B20W22	OC2 SOL	5/7/11	1135	✓

  

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		DATE/TIME		SPECIAL INSTRUCTIONS
RECEIVED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

  

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

PRINTED ON 5/9/2011 46203-618 (REV.2)

Tuesday, May 17, 2011 4:47:16 PM  
Page 3 of 3