

## SOUTHWEST RESEARCH INSTITUTE®

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION  
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

March 21, 2018

CH2M Hill Plateau Remediation Company  
2420 Stevens Center Place  
Mail Stop H8-41  
Richland, WA 99352

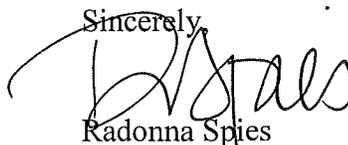
Attn: Ms. Karen Waters-Husted

Subject:	SAF No:	S18-002, W18-002
	SDG Number:	628100
	SwRI Project Number:	20859.01.00X
	SwRI Task Order Number:	180222-2, 180302-4, 180308-5
	SwRI Sample Receipt Number:	61231, 61268, 61303
	Samples Received	02.22.18, 03.02.18, 03.08.18
	Fraction:	Various Cyanide

Dear Ms. Waters-Husted:

Please find the enclosed results for the seven (07) overall water samples received on the above referenced date. If you should have any questions, please do not hesitate to contact me at (210) 522-3242, or at [radonna.spies@swri.org](mailto:radonna.spies@swri.org).

Sincerely,



Radonna Spies  
Principal Scientist

APPROVED:



Michael J. Dammann  
Director

RPS: aa  
Encl

Benefiting government, industry and the public through innovative science and technology

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: CH2M Hill Plateau Remediation**  
**Company**  
**TASK ORDER(s): 180222-2, 180302-4,**  
**180308-5**  
**SRR: 61231, 61268, 61303**  
**SDG: 628100**  
**VTSR: 02.22.18, 03.02.18, 03.08.18**  
**PROJECT#: 20859.01.00X**

## **NARRATIVE**

**Client: CH2M Hill Plateau Remediation Company**

**SDG: 628100**

**SwRI Project Number: 20859.01.00X**

**SwRI Task Order Number(s): 180222-2**

### WETCHEM ANALYSIS

The following analyses were performed for this sample delivery group (SDG):

Total Cyanide – SW-846 Method 9012

Free Cyanide – SW-846 Method 9014

### Holding Times:

All holding times were met.

### Cyanide:

All PBs, ICB's and CCB's were less than the reporting limit. All LCSWs were within 80-120% recovery and all ICV's and CCV's were within 90-110% recovery. The method states 90-110% recovery criteria for LCSH and LCSL; all were within their specified criteria. All LLCs were within 50-150% recovery and all duplicates were less than 20% recovery. If the method did not specify MS recovery criteria, then 75-125% was used. All matrix spike recoveries were within their specified criteria with the exception of free cyanide #628100 with a 128% recovery.

**"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package and in the electronic data deliverable submitted has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."**



Principal Scientist



Date

**Client: CH2M Hill Plateau Remediation Company**  
**SDG: 628100**  
**SwRI Project Number: 20859.01.00X**  
**SwRI Task Order Number(s): 180302-4, 180308-5**

### WETCHEM ANALYSIS

The following analyses were performed for this sample delivery group (SDG):

Total Cyanide – SW-846 Method 9012  
Free Cyanide – SW-846 Method 9014  
Amenable Cyanide – SW-846 Method 9012

### Holding Times:

All holding times were met.

### Cyanide:

All PBs, ICB's and CCB's were less than the reporting limit. All LCSWs were within 80-120% recovery and all ICV's and CCV's were within 90-110% recovery. The method states 90-110% recovery criteria for LCSH and LCSL; all were within their specified criteria. All LLCs were within 50-150% recovery and all duplicates were less than 20% recovery with the exception of free cyanide #628745 with an RPD of 200%. Although the RPD was not within the required criteria, a control limit of +/- the reporting limit should be used for samples less than five times the reporting limit. If the method did not specify MS recovery criteria, then 75-125% was used. All matrix spike recoveries were within their specified criteria.

**“I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package and in the electronic data deliverable submitted has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI.”**



Principal Scientist



Date

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: CH2M Hill Plateau Remediation**  
**Company**  
**TASK ORDER(s): 180222-2, 180302-4,**  
**180308-5**  
**SRR: 61231, 61268, 61303**  
**SDG: 628100**  
**VTSR: 02.22.18, 03.02.18, 03.08.18**  
**PROJECT#: 20859.01.00X**

**SAMPLE RECEIPT, TASK ORDER**  
**&**  
**CHAIN OF CUSTODY**

### Sample Receipt

Southwest Research Institute

Sample Receipt Number: 61231

VTSR: 02/22/18

Time: 09:00:00

Project: 20859.01.00X

Manager: SPIES, RADONNA

Case #: CHPRC

Logged in by: DXGARCIA

Client: CH2M Hill Plateau Remediation Company

Creation Date: 02/22/18

#### Notes

amples were received intact,

Fed Ex Tracking #(s):

7715 3774 7066\_1.0°C (wet ice)

pH Test Paper 0.0- 13.0

Lot - 230016

Exp: 10/30/2019

Ice Chest No.:

GWS-713

Test requirements located on the applicable Task Order.

See chain-of-custody as part of the SRR system for more information.

ALL SAMPLE CONTAINERS / APPLICABLE ITEMS WERE RECEIVED OK.

Backaroud CPM: <150 cpm Container Wipe CPM: <150 cpm Total CPM: <150
--

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
628098	B3D9K2	02/21/18	Water	1	
628099	B3D9K3	02/21/18	Water	1	
628100	B3H5Y3	02/20/18	Water	1	
628101	B3H6J9	02/20/18	Water	1	

Containers: 4

Samples: 4

These documents are associated with this receipt: 238499[COC for SRR 61231], 238500[Paperwork for SRR 61231]

Thermometer: 021056 Temperature: 1.0
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61231 CH2M Hill Plateau Remediation

Southwest Research Institute

# Laboratory Task Order

TO #: 180222-2 Revision: 2

Project(s): 20859.01.00X  
 Manager(s): SPIES, RADONNA  
 To Client: 03/21/18

SDG: 628100  
 VTSR: 02/22/18  
 SAF: S18-002

SRR #'s: 61231  
 Client(s): CH2M Hill Plateau Remediation Company

## Instructions

CH2MHill Plateau Remediation Company. 300071  
 SAF No. S18-002

SDG 628100 is open until 03/08/18

30-day TAT.  
 FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 03/22/2018.

4 overall samples (4 containers) were received on 02/22/2018.  
 OUT of the 4 samples, ONLY the 2 samples for CN, under S18-002, are listed here.

Sample Analysis REQUIRED

9014 \_ FREE-CN Cyanide (Free)  
 9012 \_ 57-12-5 Cyanide (Total)

DATA DELIVERABLE \_ Summary (Narrative / Results only)  
 REQUESTER \_ Karen Waters-Husted

ATTACHMENT C - QC Requirements for Chemical and Radiochemical Analysis  
 Section 7.2.2 Sample Data Packages  
 Section 7.2.3 Hard Copy Deliverable format  
 Section 7.2.4 Final Data Package Requirements  
 Section 8.8 CHPRC Electronic Address

Electronic copies of all sample receipt information, COCs, priority data packages, final data packages, corrected/revised data packages, closure reports, status reports, invoices, etc. shall be sent to: [mailto:~CPP\\_Sample\\_Management@rl.gov](mailto:~CPP_Sample_Management@rl.gov)

REVISION 1, DRmz 03/02/18: Task Order revised to indicate additional samples were received on 03/02/18, which have been grouped with SDG 628100, located in Task Order # 180302-4, SRR 61268.  
 REVISION 2, DRmz 03/08/18: Task Order revised to indicate additional samples were received on 03/08/18, which have been grouped with SDG 628100, located in Task Order # 180308-5, SRR 61303.

Documents Related to this task order: 238499[COC for SRR 61231], 238500[Paperwork for SRR 61231]

Deliverables --> Hard Copy: no EDD: -YES- PDF: -YES-

Test: CN\_9012 Holding: 14 days from CED  
 Section: WETCHEM

Cyanide by Method 9012 (Automated)

Cnt: 2

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
628100		1	Water	B3H5Y3	20 Feb 18	06 Mar 18
628101		1	Water	B3H6J9	20 Feb 18	06 Mar 18

Test: CN\_9014 Holding: 14 days from CED  
 Section: WETCHEM

FREE Cyanide by SW846 9014

Cnt: 2

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
628100		1	Water	B3H5Y3	20 Feb 18	06 Mar 18
628101		1	Water	B3H6J9	20 Feb 18	06 Mar 18



3/21/2018

19165

REV.0

CH2MHill Plateau  
Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

010007 C.O.C.#

S18-002-253

Page 1 of 22

<b>Collector:</b> Juan Aguilar ICHPRC	<b>Contact/Requester:</b> Karen Waters-Husted	<b>Telephone No.:</b> 509-376-4650
<b>SAF No.:</b> S18-002	<b>Sampling Origin:</b> Hanford Site	<b>Purchase Order/Charge Code:</b> 300071
<b>Project Title:</b> Sitewide Surv, February 2018	<b>Logbook No.:</b> HNF-N-506 -98142	<b>Ice Chest No.:</b> 605-713
<b>Shipped To (Lab):</b> Southwest Research Institute	<b>Method of Shipment:</b> Commercial Carrier	<b>Bill of Lading/Air Bill No.:</b> 771537747066
<b>Protocol:</b> SURV	<b>Priority:</b> 30 Days	<b>Offsite Property No.:</b> 9074

POSSIBLE SAMPLE HAZARDS/REMARK

\*\* \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS

N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H6J9	N	W	2-20-18	0959	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

CHPRC  
SRR # 61231

SwRI Prjct # 20859.01.00X  
TO: 180222-2

SDG # 628100

SWRI

Relinquished By: Juan Aguilar ICHPRC Signature: [Signature] Date/Time: FEB 20 2018 1200	Received By: Troy Bacon CHPRC Signature: [Signature] Date/Time: FEB 20 2018 1200	<b>Matrix *</b> S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other	
Relinquished By: Troy Bacon CHPRC Signature: [Signature] Date/Time: FEB 20 2018 1240	Received By: SSU-1 Signature: [Signature] Date/Time: FEB 20 2018 1240		
Relinquished By: SSU-1 Signature: [Signature] Date/Time: FEB 21 2018 0730	Received By: Lesly Wall ICHPRC Signature: [Signature] Date/Time: FEB 21 2018 0730		
Relinquished By: Lesly Wall ICHPRC Signature: [Signature] Date/Time: FEB 21 2018 1400	Received By: FEDEX Signature: [Signature] Date/Time: [Signature]		
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:



CH2MHill Plateau  
Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

010009 O.C.#  
S18-002-255

Page 1 of 22

Collector: Juan Aguilar /CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: S18-002	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071
Project Title: Sitewide Surv, February 2018	Logbook No.: HNF-N-506 - 98/42	Ice Chest No.: GWS-713
Shipped To (Lab): Southwest Research Institute	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No.: 771537747066
Protocol SURV	Priority: 30 Days	Offsite Property No.: 9074

**POSSIBLE SAMPLE HAZARDS/REMARK**  
 \*\* \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

**SPECIAL INSTRUCTIONS**  
 N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H5Y3	N	W	2-20-18	1144	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

CHPRC SRR # 61231  
 SDG # 628100  
 SwRI Prjct # 20859.01.00X  
 TO: 180222-2

Relinquished By: Juan Aguilar /CHPRC Signature: [Signature] Date/Time: FEB 20 2018 1200	Received By: Troy Bacon /CHPRC Signature: [Signature] Date/Time: FEB 20 2018 1200	<b>Matrix *</b> S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other	
Relinquished By: Troy Bacon /CHPRC Signature: [Signature] Date/Time: FEB 20 2018 1240	Received By: SSU-1 Signature: [Signature] Date/Time: FEB 20 2018 1240		
Relinquished By: SSU-1 Signature: [Signature] Date/Time: FEB 21 2018 0730	Received By: Lesly Wall /CHPRC Signature: [Signature] Date/Time: FEB 21 2018 0730		
Relinquished By: Lesly Wall /CHPRC Signature: [Signature] Date/Time: FEB 21 2018 1400	Received By: FEDEX Signature: [Signature] Date/Time: [Signature]		
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:



Southwest Research Institute  
Traffic Report

Sample Custodian Signature: David Garvin



- 1. Custody Seal Present
- 2. Chain of Custody Present
- 3. Sample Tags Not Present *N/A*  
Sample Tag Numbers Not on COC
- 4. SMO Forms Present

Client: CH2M Hill Plateau Remediation Company

Project: 20859.01.00X *See T.O.*

Case: CHPRC / SDG: *See T.O.*

Sample Receipt: 61231

Airbill: 7715 3774 7066

Custody Seal #(s): N/A

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
02/22/18	09:00:00	S18-010-731	B3D9K2	N/A	628098	YES	Intact
02/22/18	09:00:00	S18-010-732	B3D9K3	N/A	628099	YES	Intact
02/22/18	09:00:00	S18-002-255	B3H5Y3	N/A	628100	YES	Intact
02/22/18	09:00:00	S18-002-253	B3H6J9	N/A	628101	YES	Intact

SAMPLE LOG-IN SHEET

Lab Name Southwest Research Institute			Page 1 of 1		
Received By (Print Name) David Garcia			Log-in Date 02/22/2018		
Received By (Signature) <i>David Garcia</i>					
Case Number CHPRC		Sample Delivery Group No. N/A		SAS Number N/A	
Remarks: 20859.01.00X					
		Corresponding		Remarks: Condition of Sample Shipment, etc	
	EPA Sample #	Sample Tag #	Assigned Lab #		
1. Custody Seal(s)	<del>Present</del> / Absent* <del>Intact</del> / Broken	B3D9K2	N/A	628098	Intact
2. Custody Seal Nos.	N/A	B3D9K3	N/A	628099	Intact
		B3H5Y3	N/A	628100	Intact
3. Chain-of Custody Records	<del>Present</del> / Absent*	B3H6J9	N/A	628101	Intact
4. Traffic Reports or Packing Lists	<del>Present</del> / Absent*				
5. Airbill	Airbill/Sticker <del>Present</del> / Absent*				
6. Airbill No.	7715 3774 7066				
7. Sample Tags	Present / <del>Absent</del> N/A				
Sample Tag Numbers	Listed / <del>Not</del> listed on Chain of Custody				
8. Sample Condition	<del>Intact</del> / Broken* / Leaking				
9. Cooler Temperature	1.0C				
10. Does Information on custody records, traffic reports, and sample tags agree?	<del>Yes</del> / No*				
11. Date Received at Lab	02/22/2018				
12. Time Received	09:00:00				
Sample Transfer					
Fraction	<i>T-0029</i>	Fraction			
Area #	<i>R-13</i>	Area #			
By	David Garcia	By			
On	02/22/2018	On			

\* Contact SMO and attach record of resolution

Reviewed By <i>Det. [Signature]</i>	Logbook No. Sample Receipt (61231)
Date <i>2.22.18</i>	Logbook Page No. <i>10104 Sec 1 of 4</i>

### Sample Receipt

Southwest Research Institute

Sample Receipt Number: 61268

VTSR: 03/02/18

Time: 09:00:00

Project: 20859.01.00X

Manager: SPIES, RADONNA

Case #: CHPRC

Logged in by: DXGARCIA

Client: CH2M Hill Plateau Remediation Company

Creation Date: 03/02/18

#### Notes

amples were received intact,

Fed Ex Tracking #(s):  
7716 6248 6562\_ 1.1°C (wet ice)

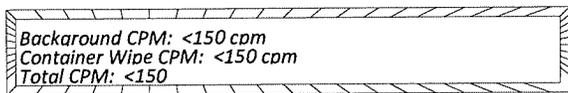
pH Test Paper 0.0- 13.0  
Lot - 230016  
Exp: 10/30/2019

Ice Chest No.:  
GWS-442

Test requirements located on the applicable Task Order.

See chain-of-custody as part of the SRR system for more information.

ALL SAMPLE CONTAINERS / APPLICABLE ITEMS WERE RECEIVED OK.



System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
628368	B3FXM2	02/28/18	Water	1	
628369	B3H609	02/28/18	Water	1	

Containers: 2

Samples: 2

These documents are associated with this receipt: 238902[COC for SRR 61268], 238903[Paperwork for SRR 61268]

Thermometer: 021056  
Temperature: 1.1

61268 CH2M Hill Plateau Remediation

Southwest Research Institute

# Laboratory Task Order

TO #: 180302-4 Revision: 1

Project(s): 20859.01.00X  
 Manager(s): SPIES, RADONNA  
 To Client: 03/21/18

SDG: 628100  
 VTSR: 03/02/18  
 SAF: S18-002

SRR #'s: 61268  
 Client(s): CH2M Hill Plateau Remediation Company

## Instructions

CH2MHill Plateau Remediation Company. 300071  
 SAF No. S18-002

SDG 628100 is open until 03/08/18

GROUPED \_ with samples in SDG 628100, located in Task Order # 180222-2, SRR 61231.

30-day TAT.

FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 03/22/2018.

2 overall samples (2 containers) were received on 03/02/2018.

OUT of the 2 samples, ONLY the 1 sample for CN, under S18-002, is listed here.

Sample Analysis REQUIRED

9014 \_ FREE-CN Cyanide (Free)  
 9012 \_ 57-12-5 Cyanide (Total)

DATA DELIVERABLE \_ Summary (Narrative / Results only)  
 REQUESTER \_ Karen Waters-Husted

ATTACHMENT C - QC Requirements for Chemical and Radiochemical Analysis  
 Section 7.2.2 Sample Data Packages  
 Section 7.2.3 Hard Copy Deliverable format  
 Section 7.2.4 Final Data Package Requirements  
 Section 8.8 CHPRC Electronic Address

Electronic copies of all sample receipt information, COCs, priority data packages, final data packages, corrected/revise data packages, closure reports, status reports, invoices, etc. shall be sent to: [mailto:CPP\\_Sample\\_Management@rl.gov](mailto:CPP_Sample_Management@rl.gov)

REVISION 1, DRmz 03/08/18: Task Order revised to indicate additional samples were received on 03/08/18, which have been grouped with SDG 628100, located in Task Order # 180308-5, SRR 61303.

Documents Related to this task order: 238902[COC for SRR 61268], 238903[Paperwork for SRR 61268]

Deliverables --> Hard Copy: no EDD: -YES- PDF: -YES-

Test: CN\_9012 Holding: 14 days from CED  
 Section: WETCHEM Cyanide by Method 9012 (Automated)

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
628369		1	Water	B3H609	28 Feb 18	14 Mar 18

Test: CN\_9014 Holding: 14 days from CED  
 Section: WETCHEM Free Cyanide by SW846 9014

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
628369		1	Water	B3H609	28 Feb 18	14 Mar 18



3/21/2018

16165

REV.0

CH2MHill Plateau  
Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

010015 C.O.C.#  
S18-002-256

Page 1 of 1

Collector: <b>Juan Aguilar</b> /CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: S18-002	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071
Project Title: Sitewide Surv, February 2018	Logbook No.: HNF-N-506-98-48	Ice Chest No.: 605-442
Shipped To (Lab): Southwest Research Institute	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No.: 771662486562
Protocol SURV	Priority: 30 Days	Offsite Property No.: 9095

**POSSIBLE SAMPLE HAZARDS/REMARK**  
\*\* \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

**SPECIAL INSTRUCTIONS**  
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H609	N	W	FEB 28 2018	1146	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

CHPRC  
SRR # 61268

SwRI Prjct # 20859.01.00X  
TO: 180302-4

SDG # 628100

SwRI

Relinquished By: <b>Juan Aguilar</b> /CHPRC Signature: <i>Juan Aguilar</i> Date/Time: FEB 28 2018 1216	Received By: <b>SSU-1</b> Signature: <i>SSU-1</i> Date/Time: FEB 28 2018 1216	<b>Matrix *</b> S = Soil      DS = Drum Solids SE = Sediment   DL = Drum Liquid SO = Solid      T = Tissue SL = Sludge     WI = Wipe W = Water       L = Liquid O = Oil          V = Vegetation A = Air          X = Other	
Relinquished By: <b>SSU-1</b> Signature: <i>SSU-1</i> Date/Time: MAR 01 2018 0725	Received By: <b>Lesly Wall</b> /CHPRC Signature: <i>Lesly Wall</i> Date/Time: MAR 01 2018 0725		
Relinquished By: <b>Lesly Wall</b> /CHPRC Signature: <i>Lesly Wall</i> Date/Time: MAR 01 2018 1400	Received By: <b>FEDEX</b> Signature: <i>FEDEX</i> Date/Time: <i>FEDEX</i>		
Relinquished By: <b>FEDEX</b> Signature: <i>FEDEX</i> Date/Time: <i>FEDEX</i>	Received By: <b>David Garcia</b> Signature: <i>David Garcia</i> Date/Time: 03-02-2018 09:00		
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

Southwest Research Institute

Traffic Report

Sample Custodian Signature:

*David Garcia*



- 1. Custody Seal                      Not Present or Damaged
- 2. Chain of Custody                Present
- 3. Sample Tags                      Not Present *N/A*  
    Sample Tag Numbers          Not on COC
- 4. SMO Forms                        Not Present

Client: CH2M Hill Plateau Remediation Company  
 Project: 20859.01.00X  
 Case: CHPRC / SDG: See T.O.  
 Sample Receipt: 61268  
 Airbill: 7716 6248 6562

Custody Seal #(s): N/A

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
03/02/18	09:00:00	S18-001-347	B3FXM2	N/A	628368	YES	Intact
03/02/18	09:00:00	S18-002-256	B3H609	N/A	628369	YES	Intact

SAMPLE LOG-IN SHEET

Lab Name Southwest Research Institute			Page 1 of 1		
Received By (Print Name) David Garcia			Log-in Date 03/02/2018		
Received By (Signature) <i>David Garcia</i>					
Case Number CHPRC		Sample Delivery Group No. N/A		SAS Number N/A	
Remarks: 20859.01.00X					
		Corresponding		Remarks: Condition of Sample Shipment, etc	
		EPA Sample #	Sample Tag #	Assigned Lab #	
1. Custody Seal(s)	Present <input checked="" type="checkbox"/> Absent* Intact/Broken	B3FXM2	N/A	628368	Intact
2. Custody Seal Nos.	N/A	B3H609	N/A	628369	Intact
3. Chain-of Custody Records	<input checked="" type="checkbox"/> Present / Absent*				
4. Traffic Reports or Packing Lists	Present <input checked="" type="checkbox"/> Absent				
5. Airbill	Airbill/Sticker <input checked="" type="checkbox"/> Present / Absent*				
6. Airbill No.	7716 6248 6562				
7. Sample Tags	Present <input checked="" type="checkbox"/> Absent				
Sample Tag Numbers	Listed <input checked="" type="checkbox"/> Not listed on Chain of Custody				
8. Sample Condition	<input checked="" type="checkbox"/> Intact / Broken* / Leaking				
9. Cooler Temperature	1.1C				
10. Does Information on custody records, traffic reports, and sample tags agree?	<input checked="" type="checkbox"/> Yes / No*				
11. Date Received at Lab	03/02/2018				
12. Time Received	09:00:00				
Sample Transfer					
Fraction Inorg	Fraction				
Area # R.13	Area #				
By David Garcia	By				
On 03/02/2018	On				

\* Contact SMO and attach record of resolution

Reviewed By <i>David Garcia</i>	Logbook No.	Sample Receipt (61268)
Date 3.2.18	Logbook Page No.	✓ 10112 sec 1 of 2

### Sample Receipt

Southwest Research Institute

Sample Receipt Number: 61303

VTSR: 03/08/18

Time: 08:20:00

Project: 20859.01.00X

Manager: SPIES, RADONNA

Case #: W18-002

Logged in by: DXGARCIA

Client: CH2M Hill Plateau Remediation Company

Creation Date: 03/08/18

#### Notes

Samples were received intact,

Fed Ex Tracking #(s):

7717 4029 2229\_1.5°C (wet ice)

pH Test Paper 0.0- 13.0

Lot - 230016

Exp: 10/30/2019

Ice Chest No.:

GWS-701

Test requirements located on the applicable Task Order.

See chain-of-custody as part of the SRR system for more information.

ALL SAMPLE CONTAINERS / APPLICABLE ITEMS WERE RECEIVED OK.

Backaround CPM: <150 cpm Container Wipe CPM: <150 cpm Total CPM: <150
---

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
628745	B3H397	03/06/18	Water	1	
628746	B3H381	03/06/18	Water	1	
628747	B3H3P5	03/06/18	Water	1	
628748	B3H3P9	03/06/18	Water	1	

Containers: 4

Samples: 4

These documents are associated with this receipt: 239240[COC for SRR 61303], 239241[Papwerwork for SRR 61303]

Thermometer: 021056
Temperature: 1.5

61303 CH2M Hill Plateau Remediation

Southwest Research Institute

# Laboratory Task Order

TO #: 180308-5 Revision: 0

Project(s): 20859.01.00X  
 Manager(s): SPIES, RADONNA  
 To Client: 03/21/18

SDG: 628100  
 VTSR: 03/08/18  
 SAF: W18-002

SRR #'s: 61303  
 Client(s): CH2M Hill Plateau Remediation Company

## Instructions

CH2MHill Plateau Remediation Company. 300071  
 SAF No. W18-002

SDG 628100 is open until 03/08/18

GROUPED \_ with samples in SDG 628100, located in Task Order # 180222-2, SRR 61231; Task Order # 180302-4, SRR 61268.

30-day TAT.  
 FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 03/22/2018.

4 overall samples (4 containers) were received on 03/08/2018, which are ALL listed here.

Sample Analysis REQUIRED  
 9012 \_ CATC Cyanide (Amenable)  
 9014 \_ FREE-CN Cyanide (Free)  
 9012 \_ 57-12-5 Cyanide (Total)

DATA DELIVERABLE \_ Summary (Narrative / Results only)  
 REQUESTER \_ Karen Waters-Husted

ATTACHMENT C - QC Requirements for Chemical and Radiochemical Analysis  
 Section 7.2.2 Sample Data Packages  
 Section 7.2.3 Hard Copy Deliverable format  
 Section 7.2.4 Final Data Package Requirements  
 Section 8.8 CHPRC Electronic Address  
 Electronic copies of all sample receipt information, COCs, priority data packages, final data packages, corrected/revise data packages, closure reports, status reports, invoices, etc. shall be sent to: [mailto:CPP\\_Sample\\_Management@rl.gov](mailto:CPP_Sample_Management@rl.gov)

Documents Related to this task order: 239240[COC for SRR 61303], 239241[Papwerwork for SRR 61303]

Deliverables --> Hard Copy: no EDD: -YES- PDF: -YES-

Test: AMENCN\_9012  
 Section: WETCHEM

Holding: 14 days from CED  
**Amenable Cyanide by SW846 9012**

Cnt: 4

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
628745		1	Water	B3H397	06 Mar 18	20 Mar 18
628746		1	Water	B3H3B1	06 Mar 18	20 Mar 18
628747		1	Water	B3H3P5	06 Mar 18	20 Mar 18
628748		1	Water	B3H3P9	06 Mar 18	20 Mar 18

Test: CN\_9012  
 Section: WETCHEM

Holding: 14 days from CED  
**Cyanide by Method 9012 (Automated)**

Cnt: 4

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
628745		1	Water	B3H397	06 Mar 18	20 Mar 18
628746		1	Water	B3H3B1	06 Mar 18	20 Mar 18
628747		1	Water	B3H3P5	06 Mar 18	20 Mar 18
628748		1	Water	B3H3P9	06 Mar 18	20 Mar 18

Test: CN\_9014  
 Section: WETCHEM

Holding: 14 days from CED  
**FREE Cyanide by SW846 9014**

Cnt: 4

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
628745		1	Water	B3H397	06 Mar 18	20 Mar 18



Southwest Research Institute

# Laboratory Task Order

TO #: 180308-5 Revision: 0

Project(s): 20859.01.00X  
Manager(s): SPIES, RADONNA  
To Client: 03/21/18

SDG: 628100  
VTSR: 03/08/18  
SAF: W18-002

SRR #'s: 61303  
Client(s): CH2M Hill Plateau Remediation Company

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
628746		1	Water	B3H3B1	06 Mar 18	20 Mar 18
628747		1	Water	B3H3P5	06 Mar 18	20 Mar 18
628748		1	Water	B3H3P9	06 Mar 18	20 Mar 18



CH2M Hill Plateau  
Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

010021

C.O.C.#  
W18-002-073

Page 1 of 2

Collector: Juan Aguilar /CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: W18-002	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071
Project Title: RCRA, February 2018	Logbook No.: HNF-N-506-9914	Ice Chest No.: GWS-701
Shipped To (Lab): Southwest Research Institute	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No.: 77174029 2229
Protocol RCRA	Priority: 30 Days	Offsite Property No.: 9124

POSSIBLE SAMPLE HAZARDS/REMARK  
\*\* \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS  
Low Volume Wells. Do not use for QC.

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H397	N	W	3-6-18	1011	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C
B3H3B1	Y	W	3-6-18	1011	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

CHPRC  
SRR # 61303  
SDG # 628100

SwRI Prjct # 20859.01.00X  
TO: 180308-5

SWRI

Relinquished By: Juan Aguilar /CHPRC Signature: [Signature] Date/Time: MAR 06 2018 1150	Received By: Troy Bacon /CHPRC Signature: [Signature] Date/Time: MAR 06 2018 1150	Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other	
Relinquished By: Troy Bacon /CHPRC Signature: [Signature] Date/Time: MAR 06 2018 1209	Received By: SSU-1 Signature: [Signature] Date/Time: MAR 06 2018 1209		
Relinquished By: Lesly Wall /CHPRC Signature: [Signature] Date/Time: MAR 07 2018 0740	Received By: Lesly Wall /CHPRC Signature: [Signature] Date/Time: MAR 07 2018 0740		
Relinquished By: Lesly Wall /CHPRC Signature: [Signature] Date/Time: MAR 07 2018 1400	Received By: FEDEX Signature: [Signature] Date/Time: [Signature]		
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:



CH2M Hill Plateau  
Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

010023 O.C.#

W18-002-079

Page 1 of 1

<b>Collector:</b> Juan Aguilar ICHPRC	<b>Contact/Requester:</b> Karen Waters-Husted	<b>Telephone No.:</b> 509-376-4650
<b>SAF No.:</b> W18-002	<b>Sampling Origin:</b> Hanford Site	<b>Purchase Order/Charge Code:</b> 300071
<b>Project Title:</b> RCRA, February 2018	<b>Logbook No.:</b> HNF-N-506-9917	<b>Ice Chest No.:</b> GWS-701
<b>Shipped To (Lab):</b> Southwest Research Institute	<b>Method of Shipment:</b> Commercial Carrier	<b>Bill of Lading/Air Bill No.:</b> 77174029 2229
<b>Protocol:</b> RCRA	<b>Priority:</b> 30 Days	<b>Offsite Property No.:</b> 9124

**POSSIBLE SAMPLE HAZARDS/REMARK**  
 \*\* \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

**SPECIAL INSTRUCTIONS**  
 Low Volume Wells. Do not use for QC.

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H3P5	N	W	3-6-18	1357	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C
B3H3P9	Y	W	3-6-18	1357	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

CHPRC  
SRR # 61303  
SDG # 628100

SwRI Prjct # 20859.01.00X  
TO: 180308-5

SwRI

Relinquished By: Juan Aguilar ICHPRC Signature: [Signature] Date/Time: MAR 06 2018 1440	Received By: SSU #1 Signature: [Signature] Date/Time: MAR 06 2018 1440	<b>Matrix *</b> S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other	
Relinquished By: SSU-1 Signature: [Signature] Date/Time: MAR 07 2018 0740	Received By: Lesly Wall ICHPRC Signature: [Signature] Date/Time: MAR 06 2018 0740		
Relinquished By: Lesly Wall ICHPRC Signature: [Signature] Date/Time: MAR 06 2018 1400	Received By: FEDEX Signature: [Signature] Date/Time: [Signature]		
Relinquished By: FEDEX Signature: [Signature] Date/Time: [Signature]	Received By: David Garcia Signature: [Signature] Date/Time: 03-08-2018 08:20		
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

Southwest Research Institute

Traffic Report

Sample Custodian Signature: David Garcia



- 1. Custody Seal Present
- 2. Chain of Custody Present
- 3. Sample Tags Not Present  
Sample Tag Numbers Not on COC *N/A*
- 4. SMO Forms Present

Client: CH2M Hill Plateau Remediation Company

Project: 20859.01.00X

Case: W18-002 / SDG: SEE TO

Sample Receipt: 61303

Airbill: 1717 4029 2229

Custody Seal #(s): N/A

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
03/08/18	08:20:00	W18-002-073	B3H397	N/A	628745	YES	Intact
03/08/18	08:20:00	W18-002-073	B3H3B1	N/A	628746	YES	Intact
03/08/18	08:20:00	W18-002-079	B3H3P5	N/A	628747	YES	Intact
03/08/18	08:20:00	W18-002-079	B3H3P9	N/A	628748	YES	Intact

SAMPLE LOG-IN SHEET

Lab Name Southwest Research Institute			Page 1 of 1		
Received By (Print Name) David Garcia			Log-in Date 03/08/2018		
Received By (Signature) <i>David Garcia</i>					
Case Number W18-002		Sample Delivery Group No. N/A		SAS Number N/A	
Remarks: 20859.01.00X		Corresponding		Remarks: Condition of Sample Shipment, etc	
		EPA Sample #	Sample Tag #		Assigned Lab #
1. Custody Seal(s)	<input checked="" type="radio"/> Present / <input type="radio"/> Absent* <input checked="" type="radio"/> Intact / <input type="radio"/> Broken	B3H397	N/A	628745	Intact
2. Custody Seal Nos.	N/A	B3H3B1	N/A	628746	Intact
		B3H3P5	N/A	628747	Intact
3. Chain-of Custody Records	<input checked="" type="radio"/> Present / <input type="radio"/> Absent*	B3H3P9	N/A	628748	Intact
4. Traffic Reports or Packing Lists	<input checked="" type="radio"/> Present / <input type="radio"/> Absent*				
5. Airbill	Airbill/Sticker <input checked="" type="radio"/> Present / <input type="radio"/> Absent*				
6. Airbill No.	1717 4029 2229				
7. Sample Tags	Present / <input checked="" type="radio"/> Absent* N/A				
Sample Tag Numbers	Listed / <input checked="" type="radio"/> Not listed on Chain of Custody				
8. Sample Condition	<input checked="" type="radio"/> Intact / <input type="radio"/> Broken* / Leaking				
9. Cooler Temperature	1.5C				
10. Does Information on custody records, traffic reports, and sample tags agree?	<input checked="" type="radio"/> Yes / <input type="radio"/> No*				
11. Date Received at Lab	03/08/2018				
12. Time Received	08:20:00				
Sample Transfer					
Fraction INORG	Fraction				
Area # R.13	Area #				
By David Garcia	By				
On 03/08/2018	On				

\* Contact SMO and attach record of resolution

Reviewed By <i>Pat Aguel</i>	Logbook No. <input checked="" type="checkbox"/> Sample Receipt (61303)
Date 3. 8. 18	Logbook Page No. <input checked="" type="checkbox"/> 10118 <i>Sec 10#1</i>

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: CH2M Hill Plateau Remediation**  
**Company**  
**TASK ORDER(s): 180222-2, 180302-4,**  
**180308-5**  
**SRR: 61231, 61268, 61303**  
**SDG: 628100**  
**VTSR: 02.22.18, 03.02.18, 03.08.18**  
**PROJECT#: 20859.01.00X**

## **SAMPLE DATA**

SOUTHWEST RESEARCH INSTITUTE  
WetChem Report  
Cover Page

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180222-2

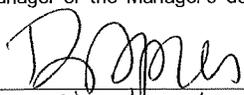
SDG: 628100  
SRR: 61231

Case: CHPRC  
Project: 20859.01.00X

Client Sample ID	Lab Sample ID
B3H5Y3	628100
B3H5Y3D	628100D
B3H6J9	628101

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and the electronic data submitted has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature:   
Date: 3/9/18

Name: Radonna Spies  
Title: Principal Scientist

Cover Page

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010028 Client Sample ID  
B3H5Y3

**Type: Unknown**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: 628100  
 Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 % Solids: NA

Case: CHPRC  
 Project: 20859.01.00X  
 Receipt Date: 02/22/2018  
 Collection Date: 02/20/2018

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
57-12-5	Free Cyanide	0.00500	UN	KNO	0.00500	1	NA	02/28/2018 10:53
57-12-5	Total Cyanide	0.694	D	KNO	0.0250	5	20180305-P002	02/28/2018 11:46

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form I-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010029 Client Sample ID  
B3H6J9

**Type: Unknown**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: 628101  
 Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 % Solids: NA

Case: CHPRC  
 Project: 20859.01.00X  
 Receipt Date: 02/22/2018  
 Collection Date: 02/20/2018

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
57-12-5	Free Cyanide	0.00500	UN	KNO	0.00500	1	NA	02/28/2018 11:46
57-12-5	Total Cyanide	0.170		KNO	0.00500	1	20180305-P002	02/28/2018 10:53

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form I-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010030  
**SwRI ID**  
**PB18B28JH3**  
**Type: Blank**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: PB18B28JH3  
 Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 % Solids: NA

Case: CHPRC  
 Project: 20859.01.00X  
 Receipt Date: NA  
 Collection Date: NA

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
57-12-5	Total Cyanide	0.00500	U	KNO	0.00500	1	20180305-P002	02/28/2018 10:13

<b>Data Reporting Qualifiers (Qual)</b>	<b>Columns</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form I-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010031 **REV 0**  
**SwRI ID**  
**CN-ICB**  
**Type: ICB/Blank**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: CN-ICB  
 Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 % Solids: NA

Case: CHPRC  
 Project: 20859.01.00X  
 Receipt Date: NA  
 Collection Date: NA

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
57-12-5	Free Cyanide	0.00500	U	KNO	0.00500	1	NA	02/28/2018 10:13

<b>Data Reporting Qualifiers (Qual)</b>	<b>Columns</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 NA - Not Applicable

*Initial and Continuing Calibration Verification*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Result Units: mg/L  
 Associated Analytical Batches: 20180305-A003

SDG: 628100  
 SRR: 61231  
 Initial Calibration Source: See Raw Data  
 Continuing Calibration Source: See Raw Data

Case: CHPRC  
 Project: 20859.01.00X

Analyte	Initial Calibration Verification				Continuing Calibration Verification						
	True	Found	%Rec	Limit	True	Found1	%Rec	Found2	%Rec	Limit	M
Total Cyanide	0.581	0.543	93.5%	90%-110%	0.581	0.546	94.0%	0.562	96.7%	90%-110%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form IIA-IN

*Initial and Continuing Calibration Verification*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Result Units: mg/L  
 Associated Analytical Batches: 20180305-A003

SDG: 628100  
 SRR: 61231  
 Initial Calibration Source: See Raw Data  
 Continuing Calibration Source: See Raw Data

Case: CHPRC  
 Project: 20859.01.00X

Continuing Calibration Verification					
Analyte	True	Found3	%Rec	Limit	M
Total Cyanide	0.581	0.550	94.7%	90%-110%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form IIA-IN

*Initial and Continuing Calibration Verification*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Result Units: mg/L  
 Associated Analytical Batches: 20180305-A004

SDG: 628100  
 SRR: 61231  
 Initial Calibration Source: See Raw Data  
 Continuing Calibration Source: See Raw Data

Case: CHPRC  
 Project: 20859.01.00X

Analyte	Initial Calibration Verification				Continuing Calibration Verification						
	True	Found	%Rec	Limit	True	Found1	%Rec	Found2	%Rec	Limit	M
Free Cyanide	0.581	0.543	93.5%	90%-110%	0.581	0.546	94.0%	0.562	96.7%	90%-110%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form IIA-IN

*Initial and Continuing Calibration Verification*

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180222-2  
Result Units: mg/L  
Associated Analytical Batches: 20180305-A004

SDG: 628100  
SRR: 61231  
Initial Calibration Source: See Raw Data  
Continuing Calibration Source: See Raw Data

Case: CHPRC  
Project: 20859.01.00X

Continuing Calibration Verification					
Analyte	True	Found3	%Rec	Limit	M
Free Cyanide	0.581	0.550	94.7%	90%-110%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form IIA-IN

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180222-2  
Result Units: mg/L  
Associated Analytical Batch: 20180305-A003

SDG: 628100  
SRR: 61231

Case: CHPRC  
Project: 20859.01.00X

LLC Standards					
Analyte	True	Found1	%Rec	Limit	M
Total Cyanide	0.00500	0.00595	119.0%	50%-150%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form IIB-IN

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Result Units: mg/L  
 Associated Analytical Batch: 20180305-A004

SDG: 628100  
 SRR: 61231

Case: CHPRC  
 Project: 20859.01.00X

LLC Standards					
Analyte	True	Found1	%Rec	Limit	M
Free Cyanide	0.00500	0.00595	119.0%	50%-150%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
NA - Not Applicable

Form IIB-IN

*Blanks*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Preparation Blank Result Units: mg/L  
 Initial/Continuing Blank Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Preparation Blank Matrix: Water  
 Associated Prep Batches: 20180305-P002

Case: CHPRC  
 Project: 20859.01.00X  
 Associated Analytical Batches: 20180305-A003

Analyte	Preparation Blank		Initial Calibration Blank		Continuing Calibration Blank						M
	Result	Qual	Found	Qual	Found1	Qual	Found2	Qual	Found3	Qual	
Total Cyanide	0.00500	U	0.00500	U	0.00500	U	0.00500	U	0.00500	U	KNO

<b>Data Reporting Qualifiers (Qual)</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	KNO - Konelab/Cyanide 9012 NA - Not Applicable

*Blanks*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Preparation Blank Result Units: mg/L  
 Initial/Continuing Blank Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Preparation Blank Matrix: Water  
 Associated Prep Batches: 20180305-P002

Case: CHPRC  
 Project: 20859.01.00X  
 Associated Analytical Batches: 20180305-A004

Analyte	Preparation Blank		Initial Calibration Blank		Continuing Calibration Blank						M
	Result	Qual	Found	Qual	Found1	Qual	Found2	Qual	Found3	Qual	
Free Cyanide	0.00500	U	0.00500	U	0.00500	U	0.00500	U	0.00500	U	KNO

<b>Data Reporting Qualifiers (Qual)</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	KNO - Konelab/Cyanide 9012 NA - Not Applicable

*Matrix Spike/Matrix Spike Duplicate Sample Recovery*

Client: CH2M Hill Plateau Remediation Company    SGD: 628100  
 Task Order: 180222-2    SRR: 61231  
 Lab ID: 628100S-F R    Matrix: Water  
 Result Units: mg/L    % Solids: NA

Case: CHPRC  
 Project: 20859.01.00X

Analyte	Parent Sample Result	Qual	MS Result	MS Spike Added	MS %Rec	MSD Result	MSD Spike Added	MSD %Rec	%RPD	Control Limit %Rec	Control Limit %RPD	M	Note
Free Cyanide	0.00500	UN	0.128	0.100	128.0%	-	-	-	-	75%-125%	-	KNO	
Total Cyanide	0.694	D	0.732	0.0400	95.0%	-	-	-	-	75%-125%	-	KNO	#

# Parent value exceeded 4 times the spike added, therefore MS/MSD %Recovery and %RPD are not required for evaluation.

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	M - Instrument MS - Matrix Spike MSD - Matrix Spike Duplicate Q - Qualifier RPD - Relative Percent Difference	KNO - Konelab/Cyanide 9012 NA - Not Applicable

*Duplicates*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: 628100D-F  
 Result Units:

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 % Solids: NA

Case: CHPRC  
 Project: 20859.01.00X

Analyte	Parent Sample Result	Qual	Duplicate Result	Qual	RPD	RPD Limit	Control Limit	M	Note
Free Cyanide	0.00500	UN	0.00500	UN	0.00%	20%	-	KNO	#
Total Cyanide	0.694	D	0.692	D	0.289%	20%	-	KNO	

# indicates that both the parent and duplicate sample results are below the RL, therefore no RPD limit or control limit is applicable.

Data Reporting Qualifiers (Qual)	Columns	Instruments/Method (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	M - Instrument RPD - Relative Percent Difference	KNO - Konelab/Cyanide 9012 NA - Not Applicable

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form VII  
*Laboratory Control Sample*

010042 **REV 0**  
 SWRI ID  
**LCS18B28JH3**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: LCS18B28JH3  
 Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 Associated Prep Batches: 20180305-P002

Case: CHPRC  
 Project: 20859.01.00X  
 LCS Source: ERA

Analyte	True	Found	Qual	%Rec.	Limit	M	Analysis Date/Time
Total Cyanide	0.581	0.572	D	98.5%	85%-115%	KNO	02/28/2018 10:13

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form VII-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form VII  
*Laboratory Control Sample*

010043 **REV 0**  
 SWRI ID  
**LCS18B28JH4**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: LCS18B28JH4  
 Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 Associated Prep Batches: 20180305-P002

Case: CHPRC  
 Project: 20859.01.00X  
 LCS Source:

Analyte	True	Found	Qual	%Rec.	Limit	M	Analysis Date/Time
Total Cyanide	0.500	0.452		90.4%	90%-110%	KNO	02/28/2018 10:13

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form VII-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form VII  
*Laboratory Control Sample*

010044  
**REV 0**  
**SWRI ID**  
**LCS18B28JH5**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: LCS18B28JH5  
 Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 Associated Prep Batches: 20180305-P002

Case: CHPRC  
 Project: 20859.01.00X  
 LCS Source:

Analyte	True	Found	Qual	%Rec.	Limit	M	Analysis Date/Time
Total Cyanide	0.0500	0.0513		102.6%	90%-110%	KNO	02/28/2018 10:13

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form VII-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form VII  
*Laboratory Control Sample*

010045 **REV 0**  
**SWRI ID**  
**CN-ICV**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Lab ID: CN-ICV  
 Result Units: mg/L

SDG: 628100  
 SRR: 61231  
 Matrix: Water  
 Associated Prep Batches: 20180305-P002

Case: CHPRC  
 Project: 20859.01.00X  
 LCS Source: ERA

Analyte	True	Found	Qual	%Rec.	Limit	M	Analysis Date/Time
Free Cyanide	0.581	0.543	D	93.5%	85%-115%	KNO	02/28/2018 10:12

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012 NA - Not Applicable

Form VII-IN

*Detection Limits*

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180222-2  
Result Units: mg/L

SDG: 628100  
SRR: 61231  
Instrument: Konelab

Case: CHPRC  
Project: 20859.01.00X  
Date: 01/09/2014

Analyte	Wavelength	RL
Free Cyanide	575 nm	0.00500
Total Cyanide	575 nm	0.00500

<b>Columns</b>	
RL	- SwRI Reporting Limit

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Analytical Batch: 20180305-A004  
 Analysis Method: Cyanide 9012

SDG: 628100  
 SRR: 61202, 61231  
 Instrument: Konelab

Case: CHPRC  
 Project: 20859.01.00X  
 Start Date: 02/28/2018  
 End Date: 02/28/2018

Lab Sample ID	Client Sample ID	Time	DF	T C N	T C N
CN-0	CN-0	09:21	1	X	
CN-0.005	CN-0.005	09:21	1	X	
CN-0.01	CN-0.01	09:21	1	X	
CN-0.05	CN-0.05	09:21	1	X	
CN-0.1	CN-0.1	09:21	1	X	
CN-0.25	CN-0.25	09:21	1	X	
CN-0.5	CN-0.5	09:21	1	X	
CN-ICV	NA	10:12	2	X	
CN-ICB	NA	10:13	1	X	
CN-LLC	NA	10:13	1	X	
PB18B28JH3	NA	10:13	1		
LCS18B28JH3	NA	10:13	2		
LCS18B28JH4	NA	10:13	1		
LCS18B28JH5	NA	10:13	1		
Z	Z	10:13	1		
Z	Z	10:13	1		
Z	Z	10:13	1		
Z	Z	10:13	1		
PB18B28PB1	NA	10:13	1		
CN-CCV	CN-CCV	10:53	2	X	
CN-CCB	CN-CCB	10:53	1	X	
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
628100-F	B3H5Y3	10:53	1	X	
628100D-F	B3H5Y3D	10:53	1	X	
Z	Z	10:53	1		
CN-CCV2	CN-CCV2	11:46	2	X	
CN-CCB2	CN-CCB2	11:46	1	X	
628101-F	B3H6J9	11:46	1	X	
Z	Z	11:46	5		
Z	Z	11:46	5		
Z	Z	11:46	5		
Z	Z	11:46	1		
Z	Z	11:46	1		
CN-CCV3	CN-CCV3	12:08	2	X	
CN-CCB3	CN-CCB3	12:08	1	X	
628100S-F R	B3H5Y3MS	13:29	1	X	
CN-CCV4	CN-CCV4	13:29	2		
CN-CCB4	CN-CCB4	13:29	1		
Z	Z	14:57	1		
CN-CCV5	CN-CCV5	14:57	2		
CN-CCB5	CN-CCB5	14:57	1		

Analysis Run Log

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180222-2  
 Analytical Batch: 20180305-A003  
 Analysis Method: Cyanide 9012

SDG: 628100  
 SRR: 61202, 61231  
 Instrument: Konelab

Case: CHPRC  
 Project: 20859.01.00X  
 Start Date: 02/28/2018  
 End Date: 02/28/2018

Lab Sample ID	Client Sample ID	Time	DF	T C N	T C N
CN-0	CN-0	09:21	1		X
CN-0.005	CN-0.005	09:21	1		X
CN-0.01	CN-0.01	09:21	1		X
CN-0.05	CN-0.05	09:21	1		X
CN-0.1	CN-0.1	09:21	1		X
CN-0.25	CN-0.25	09:21	1		X
CN-0.5	CN-0.5	09:21	1		X
CN-ICV	CN-ICV	10:12	2		X
CN-ICB	CN-ICB	10:13	1		X
CN-LLC	NA	10:13	1		X
PB18B28JH3	NA	10:13	1		X
LCS18B28JH3	NA	10:13	2		X
LCS18B28JH4	NA	10:13	1		X
LCS18B28JH5	NA	10:13	1		X
Z	Z	10:13	1		
Z	Z	10:13	1		
Z	Z	10:13	1		
Z	Z	10:13	1		
PB18B28PB1	NA	10:13	1		
CN-CCV	CN-CCV	10:53	2		X
CN-CCB	CN-CCB	10:53	1		X
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
628101	B3H6J9	10:53	1		X
Z	Z	10:53	1		
Z	Z	10:53	1		
Z	Z	10:53	1		
CN-CCV2	CN-CCV2	11:46	2		X
CN-CCB2	CN-CCB2	11:46	1		X
Z	Z	11:46	1		
628100	B3H5Y3	11:46	5		X
628100D	B3H5Y3D	11:46	5		X
628100S	B3H5Y3MS	11:46	5		X
Z	Z	11:46	1		
Z	Z	11:46	1		
CN-CCV3	CN-CCV3	12:08	2		X
CN-CCB3	CN-CCB3	12:08	1		X
Z	Z	13:29	1		
CN-CCV4	CN-CCV4	13:29	2		
CN-CCB4	CN-CCB4	13:29	1		
Z	Z	14:57	1		
CN-CCV5	CN-CCV5	14:57	2		
CN-CCB5	CN-CCB5	14:57	1		

3/21/2018  
SOUTHWEST RESEARCH INSTITUTE  
WetChem Report - Form XVIII  
*Preparation/Digestion Summary*

010049

REV.0

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180222-2

SDG: 628100  
SRR: 61231

Case: CHPRC  
Project: 20859.01.00X

Prep Batch	Method	Preparation Date
20180305-P002	CN prep	02/28/2018

# 3/21/2018 Digestion Log

010050

REV.0

Southwest Research Institute  
San Antonio, Texas 78228

Batch: 20180305-P002 (Ver. 1)  
Status: CONSUMED

Client(s): CH2M Hill Plateau Remediation Company  
 Task Order(s): 180216-3, 180222-2  
 SDG(s): 627168, 628100  
 Project(s): 20859.01.00X  
 Method(s): CN prep (TAP: 01-0406-134)  
 Matrix(s): Water  
 Reagent(s): (CN) 1M NaOH #83-01-WCS14, (CN) 0.25N NaOH #128-01-WCS14, (CN) Releasing Reagent #104-01-WCS14  
 Pipette(s): 5000-12, 1000-1, 200-H  
 Heating Device: MIDI-STIL Temperature (C): 125C  
 Time In: 02/28/2018 10:53:58 Time Out: NA

Sample Identification	Client Identification	Initial Volume (mL)	Final Volume (mL)
PB18B28JH3	NA	6	6
LCS18B28JH3 ①	NA	6	6
LCS18B28JH4 ②	NA	6	6
LCS18B28JH5 ③	NA	6	6
627754	B3H3D3	6	6
627755	B3H3D4	6	6
627756	B3H3D9	6	6
627757	B3H3F0	6	6
628100	B3H5Y3	6	6
628100D	B3H5Y3	6	6
628100MS ④	B3H5Y3	6	6
628101	B3H6J9	6	6
PB18B28PB1	NA	6	6
627754-C	B3H3D3	6	6
627754D-C	B3H3D3	6	6
627754S-C ④	B3H3D3	6	6

- ① spiked 6 mL of Cl# 91846 Total Cyanide (Lot# P249-502, Source: ERA, Exp: 07/31/2018)
- ② spiked 6 mL of LCSH (Lot# 125-02-WCS14, Source: ERA, Exp: 10/31/2018)
- ③ spiked 6 mL of LCSL (Lot# 125-02-WCS14, Source: ERA, Exp: 10/31/2018)
- ④ spiked 6 mL of Cyanid Spike (125-02-WCS14) (Lot# 125-02-WCS14, Source: ERA, Exp: 10/31/2018)

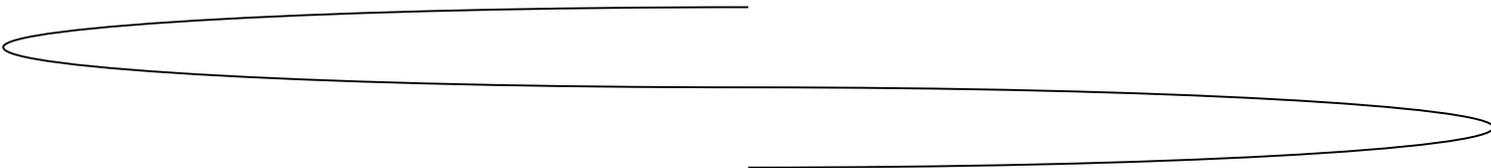
Comments:  
 All samples had a ph>12 (pH Lot#206416 Exp. date 03/01/19)  
 All samples had negative lead acetate and KI test papers (Lead Acetate #85205, KI#85038)

Distillation Start: 14:00 Stop: 14:30

Amenable Start: 11:30 Stop: 12:30

LCS18B28JH3: 0.250 mL #91846 to final volume 50 ml with 0.25N NaOH  
 LCS18B28JH4: 0.250 mL #125-02-WCS14 to final volume 50 ml with 0.25N NaOH  
 LCS18B28JH5: 0.025 mL #125-02-WCS14 to final volume 50 ml with 0.25N NaOH

All spikes: 0.020 mL #125-02-WCS14 to final volume 50 mL with 0.25N NaOH



Prepared by: HERRERA, JUDY

Date: 02/28/2018

Reviewed by: MOKEN, JAMES

Date: 03/08/2018

Disposal Int/Date/Loc: JM / 03/08/2018 / NA - Consumed

SOUTHWEST RESEARCH INSTITUTE

WetChem Report

Cover Page

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180308-5, 180302-4

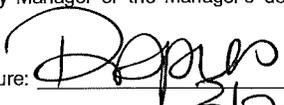
SDG: 628100  
SRR: 61303, 61268

Case: W18-002, CHPRC  
Project: 20859.01.00X

Client Sample ID	Lab Sample ID
B3H397	628745
B3H397D	628745D
B3H3B1	628746
B3H3P5	628747
B3H3P9	628748
B3H609	628369

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and the electronic data submitted has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature:   
Date: 3/20/18

Name: Radonna Spies  
Title: Principal Scientist

Cover Page

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010052 Client Sample ID  
B3H397

**Type: Unknown**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5  
 Lab ID: 628745  
 Result Units: mg/L

SDG: 628100  
 SRR: 61303  
 Matrix: Water  
 % Solids: NA

Case: CHPRC, W18-002  
 Project: 20859.01.00X  
 Receipt Date: 03/08/2018  
 Collection Date: 03/06/2018

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
	Amenable Cyanide	0.00500	U	NA	0.00500	1	NA	03/14/2018 16:15
57-12-5	Free Cyanide	0.00500	U*	KNO	0.00500	1	NA	03/14/2018 13:22
57-12-5	Total Cyanide	0.00500	U	KNO	0.00500	1	20180315-P001	03/14/2018 10:05

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

Form I-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010053 Client Sample ID  
B3H3B1

**Type: Unknown**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5  
 Lab ID: 628746  
 Result Units: mg/L

SDG: 628100  
 SRR: 61303  
 Matrix: Water  
 % Solids: NA

Case: CHPRC, W18-002  
 Project: 20859.01.00X  
 Receipt Date: 03/08/2018  
 Collection Date: 03/06/2018

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
	Amenable Cyanide	0.00500	U	NA	0.00500	1	NA	03/14/2018 16:15
57-12-5	Free Cyanide	0.00500	U*	KNO	0.00500	1	NA	03/14/2018 13:22
57-12-5	Total Cyanide	0.00500	U	KNO	0.00500	1	20180315-P001	03/14/2018 10:05

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

Form I-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010054 Client Sample ID  
REV 0  
 B3H3P5

**Type: Unknown**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5  
 Lab ID: 628747  
 Result Units: mg/L

SDG: 628100  
 SRR: 61303  
 Matrix: Water  
 % Solids: NA

Case: CHPRC, W18-002  
 Project: 20859.01.00X  
 Receipt Date: 03/08/2018  
 Collection Date: 03/06/2018

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
	Amenable Cyanide	0.00500	U	NA	0.00500	1	NA	03/14/2018 16:15
57-12-5	Free Cyanide	0.00500	U*	KNO	0.00500	1	NA	03/14/2018 13:22
57-12-5	Total Cyanide	0.00500	U	KNO	0.00500	1	20180315-P001	03/14/2018 14:31

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

Form I-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010055 Client Sample ID  
B3H3P9

**Type: Unknown**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5  
 Lab ID: 628748  
 Result Units: mg/L

SDG: 628100  
 SRR: 61303  
 Matrix: Water  
 % Solids: NA

Case: CHPRC, W18-002  
 Project: 20859.01.00X  
 Receipt Date: 03/08/2018  
 Collection Date: 03/06/2018

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
	Amenable Cyanide	0.00500	U	NA	0.00500	1	NA	03/14/2018 16:15
57-12-5	Free Cyanide	0.00500	U*	KNO	0.00500	1	NA	03/14/2018 13:23
57-12-5	Total Cyanide	0.00500	U	KNO	0.00500	1	20180315-P001	03/14/2018 14:31

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

Form I-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010056 Client Sample ID  
B3H609

**Type: Unknown**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180302-4  
 Lab ID: 628369  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268  
 Matrix: Water  
 % Solids: NA

Case: CHPRC, W18-002  
 Project: 20859.01.00X  
 Receipt Date: 03/02/2018  
 Collection Date: 02/28/2018

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
57-12-5	Free Cyanide	0.00500	U*	KNO	0.00500	1	NA	03/14/2018 13:23
57-12-5	Total Cyanide	0.0325		KNO	0.00500	1	20180315-P001	03/14/2018 10:35

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

Form I-IN

3/21/2018  
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 WetChem Report - Form I  
 Certificate of Analysis

010057 **REV 0**  
**SwRI ID**  
**PB18C14JH1**  
**Type: Blank**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Lab ID: PB18C14JH1  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 % Solids: NA

Case: CHPRC, W18-002  
 Project: 20859.01.00X  
 Receipt Date: NA  
 Collection Date: NA

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
57-12-5	Total Cyanide	0.00500	U	KNO	0.00500	1	20180315-P001	03/14/2018 14:03

Data Reporting Qualifiers (Qual)	Columns	Instruments/Methods (M)
U - Result is less than the SwRI Reporting Limit (RL)	RL - SwRI Reporting Limit	KNO - Konelab/Cyanide 9012
N - Matrix spike and/or matrix spike duplicate criteria was not met	DF - Dilution Factor	KNO - Konelab/Cyanide 9014
X - Analytical spike criteria was not met	M - Instrument	NA - Not Applicable/Amenable Cyanide
E - Result is estimated due to interferences		
D - Result is reported from a dilution		
* - Duplicate criteria was not met		

Form I-IN

3/21/2018  
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 WetChem Report - Form I  
 Certificate of Analysis

010058 **REV 0**  
**SwRI ID**  
**CN-ICB2**

**Type: ICB/Blank**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Lab ID: CN-ICB2  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 % Solids: NA

Case: CHPRC, W18-002  
 Project: 20859.01.00X  
 Receipt Date: NA  
 Collection Date: NA

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
57-12-5	Free Cyanide	0.00500	U	KNO	0.00500	1	NA	03/14/2018 10:05

<b>Data Reporting Qualifiers (Qual)</b>	<b>Columns</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

Form I-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form I  
 Certificate of Analysis

010059 **REV 0**  
 SwRI ID  
**PB18C15JH1**  
**Type: Blank**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Lab ID: PB18C15JH1  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 % Solids: NA

Case: CHPRC, W18-002  
 Project: 20859.01.00X  
 Receipt Date: NA  
 Collection Date: NA

CAS No.	Analyte	Result	Qual	M	RL	DF	Prep Batch	Analysis Date/Time
	Amenable Cyanide	0.00500	U	NA	0.00500	1	NA	03/14/2018 16:15

<b>Data Reporting Qualifiers (Qual)</b>	<b>Columns</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	RL - SwRI Reporting Limit DF - Dilution Factor M - Instrument	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

Form I-IN

*Initial and Continuing Calibration Verification*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Result Units: mg/L  
 Associated Analytical Batches: 20180315-A001

SDG: 628100  
 SRR: 61268, 61303  
 Initial Calibration Source: See Raw Data  
 Continuing Calibration Source: See Raw Data

Case: CHPRC, W18-002  
 Project: 20859.01.00X

Analyte	Initial Calibration Verification				Continuing Calibration Verification						
	True	Found	%Rec	Limit	True	Found1	%Rec	Found2	%Rec	Limit	M
Total Cyanide	0.581	0.583	100.3%	90%-110%	0.581	0.576	99.1%	0.603	103.8%	90%-110%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form IIA-IN

*Initial and Continuing Calibration Verification*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Result Units: mg/L  
 Associated Analytical Batches: 20180315-A001

SDG: 628100  
 SRR: 61268, 61303  
 Initial Calibration Source: See Raw Data  
 Continuing Calibration Source: See Raw Data

Case: CHPRC, W18-002  
 Project: 20859.01.00X

Continuing Calibration Verification							
Analyte	True	Found3	%Rec	Found4	%Rec	Limit	M
Total Cyanide	0.581	0.581	100.0%	0.594	102.2%	90%-110%	KNO

<b><i>Instruments/Methods (M)</i></b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form IIA-IN

*Initial and Continuing Calibration Verification*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Result Units: mg/L  
 Associated Analytical Batches: 20180315-A002

SDG: 628100  
 SRR: 61268, 61303  
 Initial Calibration Source: See Raw Data  
 Continuing Calibration Source: See Raw Data

Case: CHPRC, W18-002  
 Project: 20859.01.00X

Analyte	Initial Calibration Verification				Continuing Calibration Verification						
	True	Found	%Rec	Limit	True	Found1	%Rec	Found2	%Rec	Limit	M
Free Cyanide	0.581	0.583	100.3%	90%-110%	0.581	0.576	99.1%	0.603	103.8%	90%-110%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form IIA-IN

*Initial and Continuing Calibration Verification*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Result Units: mg/L  
 Associated Analytical Batches: 20180315-A002

SDG: 628100  
 SRR: 61268, 61303  
 Initial Calibration Source: See Raw Data  
 Continuing Calibration Source: See Raw Data

Case: CHPRC, W18-002  
 Project: 20859.01.00X

Continuing Calibration Verification							
Analyte	True	Found3	%Rec	Found4	%Rec	Limit	M
Free Cyanide	0.581	0.581	100.0%	0.594	102.2%	90%-110%	KNO

<b><i>Instruments/Methods (M)</i></b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form IIA-IN

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Result Units: mg/L  
 Associated Analytical Batch: 20180315-A001

SDG: 628100  
 SRR: 61268, 61303

Case: CHPRC, W18-002  
 Project: 20859.01.00X

LLC Standards					
Analyte	True	Found1	%Rec	Limit	M
Total Cyanide	0.00500	0.00463	92.6%	50%-150%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form IIB-IN

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Result Units: mg/L  
 Associated Analytical Batch: 20180315-A002

SDG: 628100  
 SRR: 61268, 61303

Case: CHPRC, W18-002  
 Project: 20859.01.00X

LLC Standards					
Analyte	True	Found1	%Rec	Limit	M
Free Cyanide	0.00500	0.00463	92.6%	50%-150%	KNO

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form IIB-IN

*Blanks*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Preparation Blank Result Units: mg/L  
 Initial/Continuing Blank Result Units: mg/L

SDG: 628100  
 SRR: 61303, 61268  
 Preparation Blank Matrix: Water  
 Associated Prep Batches: 20180315-P001

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 Associated Analytical Batches: 20180315-A001

Analyte	Preparation Blank		Initial Calibration Blank		Continuing Calibration Blank								M
	Result	Qual	Found	Qual	Found1	Qual	Found2	Qual	Found3	Qual	Found4	Qual	
Total Cyanide	0.00500	U	0.00500	U	0.00500	U	0.00500	U	0.00500	U	0.00500	U	KNO

<b>Data Reporting Qualifiers (Qual)</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

*Blanks*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Preparation Blank Result Units: mg/L  
 Initial/Continuing Blank Result Units: mg/L

SDG: 628100  
 SRR: 61303, 61268  
 Preparation Blank Matrix: Water  
 Associated Prep Batches: 20180315-P001

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 Associated Analytical Batches: 20180315-A002

Analyte	Preparation Blank		Initial Calibration Blank		Continuing Calibration Blank								M
	Result	Qual	Found	Qual	Found1	Qual	Found2	Qual	Found3	Qual	Found4	Qual	
Free Cyanide	0.00500	U	0.00500	U	0.00500	U	0.00500	U	0.00500	U	0.00500	U	KNO

<b>Data Reporting Qualifiers (Qual)</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

*Blanks*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Preparation Blank Result Units: mg/L  
 Initial/Continuing Blank Result Units: mg/L

SDG: 628100  
 SRR: 61303, 61268  
 Preparation Blank Matrix: Water  
 Associated Prep Batches: NA

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 Associated Analytical Batches: 20180315-A003

Analyte	Preparation Blank		Initial Calibration Blank		Continuing Calibration Blank		M
	Result	Qual	Found	Qual	Found1	Qual	
Amenable Cyanide	0.00500	U	-	-	-	-	

<b>Data Reporting Qualifiers (Qual)</b>	<b>Instruments/Methods (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

*Matrix Spike/Matrix Spike Duplicate Sample Recovery*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5  
 Lab ID: 628745S-F  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 % Solids: NA

Case: W18-002, CHPRC  
 Project: 20859.01.00X

Analyte	Parent Sample Result	Qual	MS Result	MS Spike Added	MS %Rec	MSD Result	MSD Spike Added	MSD %Rec	%RPD	Control Limit %Rec	Control Limit %RPD	M	Note
Free Cyanide	0.00500	U*	0.250	0.250	100.0%	-	-	-	-	75%-125%	-	KNO	
Total Cyanide	0.00500	U	0.0353	0.0400	88.2%	-	-	-	-	75%-125%	-	KNO	

<i>Data Reporting Qualifiers (Qual)</i>	<i>Columns</i>	<i>Instruments/Methods (M)</i>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	M - Instrument MS - Matrix Spike MSD - Matrix Spike Duplicate Q - Qualifier RPD - Relative Percent Difference	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

*Duplicates*

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5  
 Lab ID: 628745D  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 % Solids: NA

Case: W18-002, CHPRC  
 Project: 20859.01.00X

Analyte	Parent Sample Result	Qual	Duplicate Result	Qual	RPD	RPD Limit	Control Limit	M	Note
Amenable Cyanide	0.00500	U	0.00500	U	0.00%	-	-	NA	
Free Cyanide	0.00500	U*	0.00791	*	200%	20%	0.00500	KNO	
Total Cyanide	0.00500	U	0.00500	U	0.00%	20%	-	KNO	#

# indicates that both the parent and duplicate sample results are below the RL, therefore no RPD limit or control limit is applicable.

<b>Data Reporting Qualifiers (Qual)</b>	<b>Columns</b>	<b>Instruments/Method (M)</b>
U - Result is less than the SwRI Reporting Limit (RL) N - Matrix spike and/or matrix spike duplicate criteria was not met X - Analytical spike criteria was not met E - Result is estimated due to interferences D - Result is reported from a dilution * - Duplicate criteria was not met	M - Instrument RPD - Relative Percent Difference	KNO - Konelab/Cyanide 9012 KNO - Konelab/Cyanide 9014 NA - Not Applicable/Amenable Cyanide

3/21/2018  
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 WetChem Report - Form VII  
*Laboratory Control Sample*

010071  
SWRI ID  
**CN-ICV2**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Lab ID: CN-ICV2  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 Associated Prep Batches: 20180315-P001

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 LCS Source: ERA

Analyte	True	Found	Qual	%Rec.	Limit	M	Analysis Date/Time
Free Cyanide	0.581	0.583	D	100.3%	85%-115%	KNO	03/14/2018 10:05

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form VII-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form VII  
*Laboratory Control Sample*

010072 **REV 0**  
 SWRI ID  
**LCS18C14JH1**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Lab ID: LCS18C14JH1  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 Associated Prep Batches: 20180315-P001

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 LCS Source:

Analyte	True	Found	Qual	%Rec.	Limit	M	Analysis Date/Time
Total Cyanide	0.500	0.488		97.6%	90%-110%	KNO	03/14/2018 10:05

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form VII-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form VII  
*Laboratory Control Sample*

010073 **REV 0**  
 SWRI ID  
**LCS18C14JH2**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Lab ID: LCS18C14JH2  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 Associated Prep Batches: 20180315-P001

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 LCS Source: ERA

Analyte	True	Found	Qual	%Rec.	Limit	M	Analysis Date/Time
Total Cyanide	0.581	0.561	D	96.6%	85%-115%	KNO	03/14/2018 10:05

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form VII-IN

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form VII  
*Laboratory Control Sample*

010074  
**REV 0**  
 SWRI ID  
**LCS18C14JH3**

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Lab ID: LCS18C14JH3  
 Result Units: mg/L

SDG: 628100  
 SRR: 61268, 61303  
 Matrix: Water  
 Associated Prep Batches: 20180315-P001

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 LCS Source:

Analyte	True	Found	Qual	%Rec.	Limit	M	Analysis Date/Time
Total Cyanide	0.0500	0.0479		95.8%	90%-110%	KNO	03/14/2018 10:05

<b>Instruments/Methods (M)</b>
KNO - Konelab/Cyanide 9012
KNO - Konelab/Cyanide 9014
NA - Not Applicable/Amenable Cyanide

Form VII-IN

*Detection Limits*

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180222-2,180302-4,180308-5  
Result Units: mg/L

SDG: 628100  
SRR: 61268, 61303  
Instrument: Konelab

Case: W18-002, CHPRC  
Project: 20859.01.00X  
Date: 01/09/2014

Analyte	Wavelength	RL
Free Cyanide	575 nm	0.00500
Total Cyanide	575 nm	0.00500

<b>Columns</b>
RL - SwRI Reporting Limit

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180222-2,180302-4,180308-5  
Result Units: mg/L

SDG: 628100  
SRR: 61268, 61303  
Instrument:

Case: W18-002, CHPRC  
Project: 20859.01.00X

Analyte	RL
Amenable Cyanide	0.00500

<b>Columns</b>	
RL	- SwRI Reporting Limit

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form XII  
 Analysis Run Log

010077

REV.0

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Analytical Batch: 20180315-A002  
 Analysis Method: Cyanide 9014

SDG: 628100  
 SRR: 61268, 61303  
 Instrument: Konelab

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 Start Date: 03/14/2018  
 End Date: 03/14/2018

Lab Sample ID	Client Sample ID	Time	DF	ATT CCN NNN	T C N
CN-0	CN-0	09:37	1	X	
CN-0.005	CN-0.005	09:37	1	X	
CN-0.01	CN-0.01	09:37	1	X	
CN-0.05	CN-0.05	09:37	1	X	
CN-0.1	CN-0.1	09:37	1	X	
CN-0.25	CN-0.25	09:37	1	X	
CN-0.5	CN-0.5	09:37	1	X	
CN-ICV2	NA	10:05	2	X	
CN-ICB2	NA	10:05	1	X	
CN-LLC	NA	10:05	1	X	
PB18C14JH1	NA	10:05	1		
LCS18C14JH2	NA	10:05	2		
LCS18C14JH1	NA	10:05	1		
LCS18C14JH3	NA	10:05	1		
Z	Z	10:05	1		
Z	Z	10:05	1		
Z	Z	10:05	1		
Z	Z	10:05	1		
Z	Z	10:05	1		
CN-CCV	CN-CCV	10:35	2	X	
CN-CCB	CN-CCB	10:35	1	X	
Z	Z	10:35	1		
Z	Z	10:35	1		
PB18C14PB1	NA	10:35	1		
Z	Z	10:35	1		
Z	Z	10:35	1		
Z	Z	10:35	1		
Z	Z	10:35	1		
Z	Z	10:35	1		
Z	Z	10:35	1		
CN-CCV2	CN-CCV2	13:22	2	X	
CN-CCB2	CN-CCB2	13:22	1	X	
628745-F	B3H397	13:22	1	X	
628745D-F	B3H397D	13:22	1	X	
Z	Z	13:22	1		
628746-F	B3H3B1	13:22	1	X	
628747-F	B3H3P5	13:22	1	X	
628748-F	B3H3P9	13:23	1	X	
628369-F	B3H609	13:23	1	X	
Z	Z	13:23	1		
Z	Z	13:23	1		
CN-CCV3	CN-CCV3	14:03	2	X	
CN-CCB3	CN-CCB3	14:03	1	X	
PB18C14JH1	NA	14:03	1		
PB18C14PB1	NA	14:03	1		
Z	Z	14:31	1		
Z	Z	14:31	1		
Z	Z	14:31	1		
Z	Z	14:31	1		
628745S-F	B3H397MS	14:31	1	X	
Z	Z	14:56	1		
Z	Z	14:56	1		
CN-CCV4	CN-CCV4	14:56	2	X	
CN-CCB4	CN-CCB4	14:56	1	X	
Z	Z	15:49	1		
CN-CCV5	CN-CCV5	16:10	2		

3/21/2018  
SOUTHWEST RESEARCH INSTITUTE  
WetChem Report - Form XII  
*Analysis Run Log*

010078

REV.0

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180308-5, 180302-4  
Analytical Batch: 20180315-A002  
Analysis Method: Cyanide 9014

SDG: 628100  
SRR: 61268, 61303  
Instrument: Konelab

Case: W18-002, CHPRC  
Project: 20859.01.00X  
Start Date: 03/14/2018  
End Date: 03/14/2018

Lab Sample ID	Client Sample ID	Time	DF	A	T	T
CN-CCB5	CN-CCB5	16:10	1	C	C	C
				N	N	N

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Analytical Batch: 20180315-A001  
 Analysis Method: Cyanide 9012

SDG: 628100  
 SRR: 61268, 61303  
 Instrument: Konelab

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 Start Date: 03/14/2018  
 End Date: 03/14/2018

Lab Sample ID	Client Sample ID	Time	DF	AT	CC	TT
				NN	NN	NN
CN-0	CN-0	09:37	1			X
CN-0.005	CN-0.005	09:37	1			X
CN-0.01	CN-0.01	09:37	1			X
CN-0.05	CN-0.05	09:37	1			X
CN-0.1	CN-0.1	09:37	1			X
CN-0.25	CN-0.25	09:37	1			X
CN-0.5	CN-0.5	09:37	1			X
CN-ICV	CN-ICV	10:05	2			X
CN-ICB	CN-ICB	10:05	1			X
CN-LLC	NA	10:05	1			X
PB18C14JH1	NA	10:05	1			X
LCS18C14JH2	NA	10:05	2			X
LCS18C14JH1	NA	10:05	1			X
LCS18C14JH3	NA	10:05	1			X
628745	B3H397	10:05	1			X
628745D	B3H397D	10:05	1			X
Z	Z	10:05	1			
628746	B3H3B1	10:05	1			X
Z	Z	10:05	1			
CN-CCV	CN-CCV	10:35	2			X
CN-CCB	CN-CCB	10:35	1			X
Z	Z	10:35	1			
628369	B3H609	10:35	1			X
PB18C14PB1	NA	10:35	1			
Z	Z	10:35	1			
Z	Z	10:35	1			
Z	Z	10:35	1			
Z	Z	10:35	1			
Z	Z	10:35	1			
Z	Z	10:35	1			
CN-CCV2	CN-CCV2	13:22	2			X
CN-CCB2	CN-CCB2	13:22	1			X
Z	Z	13:22	1			
Z	Z	13:22	1			
Z	Z	13:22	1			
Z	Z	13:22	1			
Z	Z	13:22	1			
Z	Z	13:23	1			
Z	Z	13:23	1			
Z	Z	13:23	1			
Z	Z	13:23	1			
CN-CCV3	CN-CCV3	14:03	2			X
CN-CCB3	CN-CCB3	14:03	1			X
PB18C14JH1	NA	14:03	1			X
PB18C14PB1	NA	14:03	1			
628745S	B3H397MS	14:31	1			X
628747	B3H3P5	14:31	1			X
628748	B3H3P9	14:31	1			X
Z	Z	14:31	1			
Z	Z	14:31	1			
Z	Z	14:56	1			
Z	Z	14:56	1			
CN-CCV4	CN-CCV4	14:56	2			X
CN-CCB4	CN-CCB4	14:56	1			X
Z	Z	15:49	1			
CN-CCV5	CN-CCV5	16:10	2			

3/21/2018  
SOUTHWEST RESEARCH INSTITUTE  
WetChem Report - Form XII  
*Analysis Run Log*

010080

REV.0

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180308-5, 180302-4  
Analytical Batch: 20180315-A001  
Analysis Method: Cyanide 9012

SDG: 628100  
SRR: 61268, 61303  
Instrument: Konelab

Case: W18-002, CHPRC  
Project: 20859.01.00X  
Start Date: 03/14/2018  
End Date: 03/14/2018

Lab Sample ID	Client Sample ID	Time	DF	A	T	T
CN-CCB5	CN-CCB5	16:10	1	C	C	C
				N	N	N

3/21/2018  
**SOUTHWEST RESEARCH INSTITUTE**  
 WetChem Report - Form XII  
*Analysis Run Log*

010081

REV.0

Client: CH2M Hill Plateau Remediation Company  
 Task Order: 180308-5, 180302-4  
 Analytical Batch: 20180315-A003  
 Analysis Method: Amenable Cyanide

SDG: 628100  
 SRR: 61303, 61268  
 Instrument:

Case: W18-002, CHPRC  
 Project: 20859.01.00X  
 Start Date: 03/15/2018  
 End Date: 03/14/2018

Lab Sample ID	Client Sample ID	Time	DF	A	T	T
				C	C	C
				N	N	N
PB18C15JH1	NA	16:15	1	X		
628745	B3H397	16:15	1	X		
628745D	B3H397D	16:15	1	X		
628746	B3H3B1	16:15	1	X		
628747	B3H3P5	16:15	1	X		
628748	B3H3P9	16:15	1	X		

3/21/2018  
SOUTHWEST RESEARCH INSTITUTE  
WetChem Report - Form XVIII  
*Preparation/Digestion Summary*

010082

REV.0

Client: CH2M Hill Plateau Remediation Company  
Task Order: 180308-5, 180302-4

SDG: 628100  
SRR: 61303, 61268

Case: W18-002, CHPRC  
Project: 20859.01.00X

Prep Batch	Method	Preparation Date
20180315-P001	CN prep	03/14/2018

3/21/2018  
Digestion Log

010083

REV.0

Southwest Research Institute  
San Antonio, Texas 78228

Batch: 20180315-P001 (Ver. 3)  
Status: DISPOSED

Client(s): CH2M Hill Plateau Remediation Company  
Task Order(s): 180302-4, 180308-5  
SDG(s): 628100  
Project(s): 20859.01.00X  
Method(s): CN prep (TAP: 01-0406-134)  
Matrix(s): Water  
Reagent(s): 1N NaOH #83-01-WCS14, Releasing Reagent #104-01-WCS14, 0.25N NaOH#135-02-WCS14  
Pipette(s): 5000-12, 1000-1, 200-H  
Heating Device: MIDI-STIL Temperature (C): 125C  
Time In: 03/14/2018 10:22:23 Time Out: NA

Sample Identification	Client Identification	Initial Volume (mL)	Final Volume (mL)
PB18C14JH1	NA	6	6
LCS18C14JH2 ①	NA	6	6
LCS18C14JH1 ②	NA	6	6
LCS18C14JH3 ③	NA	6	6
628369	B3H609	6	6
628745	B3H397	6	6
628745D	B3H397	6	6
628745MS ④	B3H397	6	6
628746	B3H3B1	6	6
628747	B3H3P5	6	6
628748	B3H3P9	6	6
PB18C14PB1	NA	6	6
628745-CL	B3H397	6	6
628745D-CL	B3H397	6	6
628745MS-CL ④	B3H397	6	6
628746-CL	B3H3B1	6	6
628747-CL	B3H3P5	6	6
628748-CL	B3H3P9	6	6

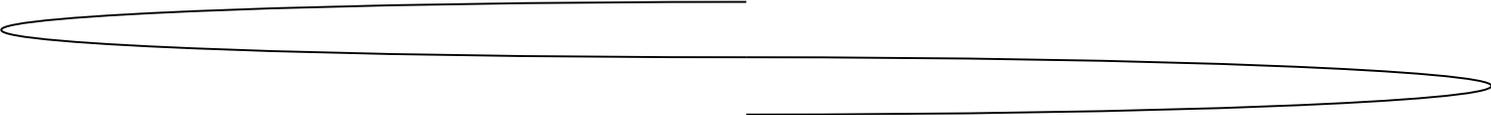
- ① spiked 6 mL of Cl# 91846 LCSW 145-02-WCS14 (Lot# P249-502, Source: ERA, Exp: 07/31/2018)
- ② spiked 6 mL of LCSH 145-03-WCS14 (Lot# 94147, Source: ERA, Exp: 10/31/2018)
- ③ spiked 6 mL of LCSL 145-04-WCS14 (Lot# 94147, Source: ERA, Exp: 10/31/2018)
- ④ spiked 6 mL of Cyanid Spike (0.04 ppm) (Lot# 125-02-WCS14, Source: ERA, Exp: 10/31/2018)

Comments:  
All samples had a ph>12 (pH Lot#208515 Exp. date 03/30/18)  
All samples had negative lead acetate and KI test papers (Lead Acetate #85205, KI#85038)

Distillation Start: 15:30 Stop: 16:00

Amenable Start: 13:49 Stop: 14:49

6 ml of Laboratory Control samples & Matrix Spikes prepared by:  
1 LCSW = 0.250 ml of Total Cyanide #91846 to final volume 50 ml with 0.25N NaOH #135-02-WCS14  
2 LCSH = 0.250 ml of 100ppm Cyanide #125-02-WCS14 to final volume 50 ml with 0.25N NaOH #135-02-WCS14  
3 LCSL = 0.025 ml of 100ppm Cyanide #125-02-WCS14 to final volume 50 ml with 0.25N NaOH #135-02-WCS14  
Sample spikes = 0.020 ml of 100ppm Cyanide #125-02-WCS14 to final volume 50 ml with sample



Prepared by: HERRERA, JUDY  
Reviewed by: MOKEN, JAMES

Date: 03/14/2018  
Date: 03/20/2018

Disposal Int/Date/Loc: JM / 03/20/2018 / NA - Consumed