SOUTHWEST RESEARCH INSTITUTE®

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

March 20, 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:	W18-012
	SDG Number:	624991
	SwRI Project Number:	20859.01.00X
	SwRI Task Order Number:	171212-5, 171214-9
	SwRI Sample Receipt Number:	60874, 60889
	Samples Received	12.12.17, 12.14.17
	Fraction:	Dioxin EPA Method 8290A

Dear Ms. Waters-Husted:

Attached is the revised data package, which includes the updated report forms, which have been modified to have the "CONC" column populated. If you should have any questions, please do not hesitate to contact me at (210) 522-3242, or at radonna.spies@swri.org.

Sincerely,

Radonna Spies
Principal Scientist

APPROVED:

Michael J. Dammann
Director

RPS: mg
Encl

PROBLEM AND DISCREPANCY (P&D) REPORT

P&D Number:	PD18-0081
Rev. Number:	0
Laboratory:	SWRI
SDG Number:	SWRI624991
Date Initiated:	01/18/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): W18-012

SAMPLING INFORMATION

NUMBER OF SAMPLES: 4

SAMPLE MATRIX: WATER

ISSUE BACKGROUND

CLASS: Data Issues

TYPE: Missing sample data

DESCRIPTION: The result forms are not reporting a numerical value in the Conc column in the hard copy. EDD is reporting a numerical value in the concentration field. In addition each sample has a Toxicity Equivalence Summary report in the hardcopy which is not needed.

RESOLUTION

PROPOSED RESOLUTION: Please correct the issue and resubmit the hard copy and electronic copy data packages

FINAL RESOLUTION: accept proposed resolution

SUBMITTED BY:

MEDLEY, HA 01/18/2018

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

Registered to ISO 9001:2008

December 27, 2017

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

Attn: Ms. Karen Waters-Husted

Subject:	SAF No:	W18-012
	SDG Number:	624991
	SwRI Project Number:	20859.01.00X
	SwRI Task Order Number:	171212-5, 171214-9
	SwRI Sample Receipt Number:	60874, 60889
	Samples Received	12.12.17, 12.14.17
	Fraction:	Dioxin EPA Method 8290A

Dear Ms. Waters-Husted:

Please find the enclosed results for the four (04) 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.

Sincerely,

for Radonna Spies
Principal Scientist

APPROVED:

Michael J. Dammann
Director

RPS: mg
Encl

SOUTHWEST RESEARCH INSTITUTE
CLIENT: CH2M Hill Plateau Remediation Company
SwRI PROJECT#: 20859.01.00X
SwRI TASK ORDER: 171212-5, 171214-9
SwRI SRR: 60874, 60889
SDG: 624991
SAF: W18-012
VTSR: 12.12.2017, 12.14.2017

CHAIN-OF-CUSTODY & SAMPLE RECEIPT PAPERWORK

Total Page Count:
Fraction: 8290A Pages: 010001-010056
Report

CH2MHill Plateau Remediation Company	50lbs	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 010002 010002	C.O.C.# W18-012-104 Page 1 of 1

Collector:	Juan Aguilar /CHPRC	**Contact/Requester:**	Karen Waters-Husted	**Telephone No.:**	509-376-4650
SAF No.:	W18-012	**Sampling Origin:**	Hanford Site	**Purchase Order/Charge Code:**	300071
Project Title:	RCRA, DECEMBER 2017	**Logbook No.:**	HNF-N-506-97132	**Ice Chest No.:**	GWS-600
Shipped To (Lab):	Southwest Research Institute	**Method of Shipment**	Commercial Carrier	**Bill of Lading/Air Bill No.:**	7709 6163 2604
Protocol	RCRA	**Priority:**	15 Days PRIORITY	**Offsite Property No.:**	8844

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
B3FKF0	N	W	12-11-17	0956	4x1-L aG	8290_DIOXINS_GCMS: COMMON	30/45 Days	Cool <=6C

CHPRC
SRR # 60874
SDG # 624991

SwRI Prjct # 20859.01.00X
TO: 171212-5

SwRI

Relinquished By	Signature	Date/Time	Received By	Signature	Date/Time
Juan Aguilar /CHPRC	DEC 1 1 2017	1120	Jeff Tucksen CHPRC	DEC 1 1 2017	1120
Jeff Tucksen CHPRC	DEC 1 1 2017	1400	FEDEX		
FED EX			D HARRIA	DHm2 for DH	12/12/2017 0830
			~~Daniel Garcia~~	~~Daniel Garcia~~	~~12-12-2017 08:30~~

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

DHm2 12/12/17 (TE)

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

Printed On 10/25/2017 FSR ID = FSR52917 A-6004-842 (REV 3)

CH2MHill Plateau Remediation Company

66 LBS-

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

010003 010003

C.O.C.# W18-012-107

TLB 12-12-17 Page 1 of ~~1~~ 2

Collector:	Juan Aguilar /CHPRC	Contact/Requester:	Karen Waters-Husted	Telephone No.:	509-376-4650
SAF No.:	W18-012	Sampling Origin:	Hanford Site	Purchase Order/Charge Code:	300071
Project Title:	RCRA, DECEMBER 2017	Logbook No.:	HNF-N-506-97133	Ice Chest No.:	GWS-390
Shipped To (Lab):	Southwest Research Institute	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.:	7709 72554172
Protocol	RCRA	Priority:	15 Days PRIORITY	Offsite Property No.:	8853

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
B3FJW7	N	W	12-12-17	0936	4x1-L aG	8290_DIOXINS_GCMS: COMMON	30/45 Days	Cool <=6C

CHPRC
SRR # 60889
SDG # 624991

SwRI Prjct # 20859.01.00X
TO: 171214-9

SwRI

Relinquished By	Signature	Date/Time	Received By	Signature	Date/Time
Juan Aguilar /CHPRC	DEC 12 2017	1036	Jeff Tucksen CHPRC	DEC 12 2017	1036
Jeff Tucksen CHPRC	DEC 12 2017	1055	SSU-1	DEC 12 2017	1055
SSU-1	DEC 12 2017	1135	Troy Bacon CHPRC	DEC 12 2017	1135
Troy Bacon CHPRC	DEC 12 2017	1400	FEDEX		

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

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST (continued)

010004

C.O.C. No. W18-012-107

Page 2 of 2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
	FEDEX				David Garcia	David Garcia	12-14-2017 08:40
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time

A-6003-962 (03/05)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 010005

C.O.C. # W18-012-100

Collector: Juan Aguilar /CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: W18-012	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: RCRA, DECEMBER 2017	**Logbook No.:** HNF-N-506 - 97/32	**Ice Chest No.:** GWS-390
Shipped To (Lab): Southwest Research Institute	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 7709 7255 4172
Protocol RCRA	**Priority:** 15 Days PRIORITY	**Offsite Property No.:** 8853

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
B3FKB9	N	W	12-11-17	1205	4x1-L aG	8290_DIOXINS_GCMS: COMMON	30/45 Days	Cool <=6C

CHPRC
SRR # 60889
SDG # 624991

SwRI Prjct # 20859.01.00X
TO: 171214-9

SwRI

Relinquished By	Signature	Date/Time	Received By	Signature	Date/Time
Juan Aguilar /CHPRC	DEC 1 1 2017	1400	SSU-1	DEC 1 1 2017	1400
SSU-1	DEC 1 2 2017	1135	Troy Bacon CHPRC	Troy L. Bacon	DEC 1 2 2017 1135
Troy Bacon CHPRC	Troy L. Bacon	DEC 1 2 2017 1400	FEDEX		
FEDEX			Daniel Gonzales	Daniel Gonzales	12-14-2017 08:40

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

FINAL SAMPLE DISPOSITION	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 010006	C.O.C. # W18-012-103 Page 1 of 1/2

Collector:	Juan Aguilar /CHPRC	Contact/Requester:	Karen Waters-Husted	Telephone No.:	509-376-4650
SAF No.:	W18-012	Sampling Origin:	Hanford Site	Purchase Order/Charge Code:	300071
Project Title:	RCRA, DECEMBER 2017	Logbook No.:	HNF-N-506-97133	Ice Chest No.:	GWS-236
Shipped To (Lab):	Southwest Research Institute	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	~~8859~~ 77698398 5445
Protocol	RCRA	Priority:	15 Days PRIORITY	Offsite Property No.:	8859

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
B3FKD5	N	W	12-12-17	1125	4x1-L aG	8290_DIOXINS_GCMS: COMMON	30/45 Days	Cool <=6C

CHPRC
SRR # 60889
SDG # 624991

SwRI Prjct # 20859.01.00X
TO: 171214-9

Relinquished By	Signature	Date/Time	Received By	Signature	Date/Time
Juan Aguilar /CHPRC	DEC 12 2017	1246	Jeff Lucas /CHPRC	DEC 12 2017	1246
Jeff Lucas /CHPRC	DEC 12 2017	1320	SSU-1	DEC 12 2017	1320
SSU-1	DEC 13 2017	0820	Jeff Tucksen CHPRC	DEC 13 2017	0820
Jeff Tucksen CHPRC	DEC 13 2017	1400	FEDEX		

Matrix *
S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air
DS = Drum Solids, DL = Drum Liquid, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST (continued) 010007

C.O.C. No. W18-012-103

Page 2 of 2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
	FED EX			David Garcia	David Garcia		12-14-2017 08:40
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time

A-6003-962 (03/05)

Southwest Research Institute

Laboratory Task Order

010008

TO #: 171212-5 Revision: 1

Project(s): 20859.01.00X
Manager(s): SPIES, RADONNA
To Client: 12/26/17

SDG: 624991
VTSR: 12/12/17
SAF: W18-012

SRR #'s: 60874
Client(s): CH2M Hill Plateau Remediation Company

Instructions

CH2MHill Plateau Remediation Company. 300071
SAF No. W18-012

SDG 624991 is open until 12/15/17

15-day TAT.
CURRENTLY, FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 12/27/2017.

17 overall samples (21 containers) were received on 12/12/2017.
OUT of the 17 samples, ONLY the 1 sample listed under W18-012, which requires 8290, is listed here.

Sample Analysis REQUIRED
8290_DIOXINS_GCMS

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
REVISION 1, DRmz 12/14/17: Task Order revised to indicate additional samples were received on 12/14/17, which have been grouped with SDG 624991, located in Task Order # 171214-9, SRR 60889.

Documents Related to this task order: 234288[COC for SRR 60874], 234289[Paperwork for SRR 60874]

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

Test: D8290A
Section: DIOXIN
Holding: 45 days from E8290W
Analysis by SW846 Method 8290A
Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
624991		1	Water	B3FKF0	19 Dec 17	02 Feb 18
624991		2	Water	B3FKF0	19 Dec 17	02 Feb 18
624991		3	Water	B3FKF0	19 Dec 17	02 Feb 18
624991		4	Water	B3FKF0	19 Dec 17	02 Feb 18

Test: E8290W
Section: EXTLAB
Holding: 30 days from CED
Extraction for SW846 Method 8290A
Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
624991		1	Water	B3FKF0	11 Dec 17	10 Jan 18
624991		2	Water	B3FKF0	11 Dec 17	10 Jan 18
624991		3	Water	B3FKF0	11 Dec 17	10 Jan 18
624991		4	Water	B3FKF0	11 Dec 17	10 Jan 18

010009

Sample Receipt

Southwest Research Institute

Sample Receipt Number: 60874
Revision: 1

This Receipt was Revised 12/27/2017

VTSR: 12/12/17

Time: 08:30:00

Project: 20859.01.00X
Case #: CHPRC
Client: CH2M Hill Plateau Remediation Company

Manager: SPIES, RADONNA
Logged in by: DXGARCIA
Creation Date: 12/12/17

Notes

Samples were received intact.

Fed Ex tracking #:
7709 5580 8775 _ 2.0°C (wet ice)
7709 6163 2666 _ 2.0°C (wet ice)

Ice Chest No:
GWS-394
GWS-600

pH Test Paper 0.0 to 3.0
Lot - 230315
Exp: 10/30/2018

pH Test Paper 0.0 to 13.0
Lot - 230016 _ Inventory # 83485
Exp: 10/30/2019

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

Test requirements located on Task Order.
REVISION 1, DRmz 12/27/17: SRR revised to clarify times.

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

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
624981	B3D7C2	12/07/17	Water	1	
624982	B3D7D8	12/07/17	Water	1	
624983	B3D9J0	12/07/17	Water	2	
624984	B3FD12	12/07/17	Water	1	
624985	B3FJX6	12/08/17	Water	1	
624986	B3FJY0	12/08/17	Water	1	
624987	B3FJY5	12/08/17	Water	1	
624988	B3FJY8	12/08/17	Water	1	
624989	B3FK74	12/08/17	Water	1	
624990	B3FK78	12/08/17	Water	1	
624991	B3FKF0	12/11/17	Water	4	
624992	B3FKJ6	12/08/17	Water	1	
624993	B3FKJ7	12/08/17	Water	1	
624994	B3FM48	12/08/17	Water	1	
624995	B3FM49	12/08/17	Water	1	
624996	B3FM50	12/08/17	Water	1	
624997	B3FM79	12/08/17	Water	1	

Containers: 21 **Samples: 17**

60874 CH2M Hill Plateau Remediatio

Page Printed: 12/27/2017 15:10
ver: (4/10/2017)

010010

Sample Receipt

Southwest Research Institute

Sample Receipt Number: 60874
Revision: 1

This Receipt was Revised 12/27/2017

VTSR: 12/12/17

Time: 08:30:00

Project: **20859.01.00X**
Case #: **CHPRC**
Client: **CH2M Hill Plateau Remediation Company**

Manager: SPIES, RADONNA
Logged in by: DXGARCIA
Creation Date: 12/12/17

These documents are associated with this receipt: 234288[COC for SRR 60874], 234289[Paperwork for SRR 60874]

Thermometer: 021056
Temperature: 2.0

60874 CH2M Hill Plateau Remediatio

Page Printed: 12/27/2017 15:10
ver: (4/10/2017)

Southwest Research Institute
Traffic Report

010011

Sample Custodian Signature: D Lamiry for Rev 1

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: CHPRC / SDG: SEE 70
Sample Receipt: 60874
Airbill: 770955808775,770961632666

Custody Seal #(s): N/A

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
12/12/17	08:30:00	S18-010-542	B3D7C2	N/A	624981	YES	Intact
12/12/17	08:30:00	S18-010-549	B3D7D8	N/A	624982	YES	Intact
12/12/17	08:30:00	S18-010-721	B3D9J0	N/A	624983	YES	Intact
12/12/17	08:30:00	S18-011-838	B3FD12	N/A	624984	YES	Intact
12/12/17	08:30:00	W18-012-054	B3FJX6	N/A	624985	YES	Intact
12/12/17	08:30:00	W18-012-054	B3FJY0	N/A	624986	YES	Intact
12/12/17	08:30:00	W18-012-056	B3FJY5	N/A	624987	YES	Intact
12/12/17	08:30:00	W18-012-056	B3FJY8	N/A	624988	YES	Intact
12/12/17	08:30:00	W18-012-104	B3FK74	N/A	624989	YES	Intact
12/12/17	08:30:00	W18-012-104	B3FK78	N/A	624990	YES	Intact
12/12/17	08:30:00	W18-012-104	B3FKF0	N/A	624991	YES	Intact
12/12/17	08:30:00	W18-012-196	B3FKJ6	N/A	624992	YES	Intact
12/12/17	08:30:00	W18-012-195	B3FKJ7	N/A	624993	YES	Intact
12/12/17	08:30:00	W18-012-196	B3FM48	N/A	624994	YES	Intact
12/12/17	08:30:00	W18-012-195	B3FM49	N/A	624995	YES	Intact
12/12/17	08:30:00	W18-012-197	B3FM50	N/A	624996	YES	Intact
12/12/17	08:30:00	W18-012-197	B3FM79	N/A	624997	YES	Intact

SAMPLE LOG-IN SHEET

010012

Lab Name: Southwest Research Institute	Page 1 of 1
Received By (Print Name): DAVID GARCIA	Log-in Date: 12/12/2017
Received By (Signature): D Ramirez for Rev 1	
Case Number: CHPRC	Sample Delivery Group No.: SEE TO
	SAS Number: N/A

Remarks: 20859.01.00X

1.	Custody Seal(s)	Present/Absent* Intact/Broken
2.	Custody Seal Nos.	N/A
3.	Chain-of Custody Records	Present/Absent*
4.	Traffic Reports or Packing Lists	Present/Absent*
5.	Airbill	Airbill/Sticker Present/Absent*
6.	Airbill No.	770955808775,770961632666
7.	Sample Tags	Present/Absent N/A
	Sample Tag Numbers	Listed/Not listed on Chain of Custody
8.	Sample Condition	Intact/Broken*/Leaking
9.	Cooler Temperature	2.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*
11.	Date Received at Lab	12/12/2017
12.	Time Received	08:30:00

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
B3D7C2	N/A	624981	Intact
B3D7D8	N/A	624982	Intact
B3D9J0	N/A	624983	Intact
B3FD12	N/A	624984	Intact
B3FJX6	N/A	624985	Intact
B3FJY0	N/A	624986	Intact
B3FJY5	N/A	624987	Intact
B3FJY8	N/A	624988	Intact
B3FK74	N/A	624989	Intact
B3FK78	N/A	624990	Intact
B3FKF0	N/A	624991	Intact
B3FKJ6	N/A	624992	Intact
B3FKJ7	N/A	624993	Intact
B3FM48	N/A	624994	Intact
B3FM49	N/A	624995	Intact
B3FM50	N/A	624996	Intact
B3FM79	N/A	624997	Intact

Sample Transfer

Fraction: ORG & Inorg	Fraction
Area #: R40 & R13	Area #
By: DAVID GARCIA	By
On: 12/12/2017	On

* Contact SMO and attach record of resolution

Reviewed By: M. Demaly	Logbook No.: Sample Receipt (60874)
Date: 12-27-2017	Logbook Page No.: 10032

FORM DC-1

OLMO4.2

Southwest Research Institute

Laboratory Task Order

010013

TO #: 171214-9 Revision: 0

Project(s): 20859.01.00X
Manager(s): SPIES, RADONNA
To Client: 12/26/17

SDG: 624991
VTSR: 12/14/17
SAF: W18-012

SRR #'s: 60889
Client(s): CH2M Hill Plateau Remediation Company

Instructions

```
CH2MHill Plateau Remediation Company. 300071
  SAF No. W18-012

  SDG 624991 is open until 12/15/17

  GROUPED _ with samples in SDG 624991, located in Task Order # 171212-5, SRR 60874.

  15-day TAT.
  CURRENTLY, FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 12/27/2017.

  3 overall samples (12 containers) were received on 12/14/2017, which are ALL listed here.

Sample Analysis REQUIRED
 8290_DIOXINS_GCMS

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
```

Documents Related to this task order: 234462[COC for SRR 60889], 234463[Paperwork for SRR 60889]

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

Test: D8290A
Section: DIOXIN

Holding: 45 days from E8290W

Analysis by SW846 Method 8290A.

Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
625170		1	Water	B3FJW7	19 Dec 17	02 Feb 18
625170		2	Water	B3FJW7	19 Dec 17	02 Feb 18
625170		3	Water	B3FJW7	19 Dec 17	02 Feb 18
625170		4	Water	B3FJW7	19 Dec 17	02 Feb 18
625171		1	Water	B3FKB9	19 Dec 17	02 Feb 18
625171		2	Water	B3FKB9	19 Dec 17	02 Feb 18
625171		3	Water	B3FKB9	19 Dec 17	02 Feb 18
625171		4	Water	B3FKB9	19 Dec 17	02 Feb 18
625172		1	Water	B3FKD5	19 Dec 17	02 Feb 18
625172		2	Water	B3FKD5	19 Dec 17	02 Feb 18
625172		3	Water	B3FKD5	19 Dec 17	02 Feb 18
625172		4	Water	B3FKD5	19 Dec 17	02 Feb 18

Test: E8290W
Section: EXTLAB

Holding: 30 days from CED

Extraction for SW846 Method 8290A

Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
625170		1	Water	B3FJW7	12 Dec 17	11 Jan 18
625170		2	Water	B3FJW7	12 Dec 17	11 Jan 18
625170		3	Water	B3FJW7	12 Dec 17	11 Jan 18

Southwest Research Institute

Laboratory Task Order

010014

TO #: 171214-9 Revision: 0

Project(s): 20859.01.00X
Manager(s): SPIES, RADONNA
To Client: 12/26/17

SDG: 624991
VTSR: 12/14/17
SAF: W18-012

SRR #'s: 60889
Client(s): CH2M Hill Plateau Remediation Company

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
625170		4	Water	B3FJW7	12 Dec 17	11 Jan 18
625171		1	Water	B3FKB9	11 Dec 17	10 Jan 18
625171		2	Water	B3FKB9	11 Dec 17	10 Jan 18
625171		3	Water	B3FKB9	11 Dec 17	10 Jan 18
625171		4	Water	B3FKB9	11 Dec 17	10 Jan 18
625172		1	Water	B3FKD5	12 Dec 17	11 Jan 18
625172		2	Water	B3FKD5	12 Dec 17	11 Jan 18
625172		3	Water	B3FKD5	12 Dec 17	11 Jan 18
625172		4	Water	B3FKD5	12 Dec 17	11 Jan 18

010015

Sample Receipt

Southwest Research Institute

Sample Receipt Number: 60889
Revision: 1

This Receipt was Revised 12/27/2017

VTSR: 12/14/17

Time: 08:40:00

Project: **20859.01.00X**
Case #: **W18-012**
Client: **CH2M Hill Plateau Remediation Company**

Manager: SPIES, RADONNA
Logged in by: DXGARCIA
Creation Date: 12/14/17

Notes

Samples were received intact.

Fed Ex tracking #:
7709 7255 4172 _ 2.0°C (wet ice)
7709 8398 5445 _ 2.0°C (wet ice)

Ice Chest No:
GWS-236
GWS-390

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

Test requirements located on Task Order.
REVISION 1, DRmz 12/27/17: SRR revised to clarify the Notes.

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

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
625170	B3FJW7	12/12/17	Water	4	
625171	B3FKB9	12/11/17	Water	4	
625172	B3FKD5	12/12/17	Water	4	

Containers: 12 **Samples: 3**

These documents are associated with this receipt: 234462[COC for SRR 60889], 234463[Paperwork for SRR 60889]

Thermometer: 021056
Temperature: 2.0

Page Printed: 12/27/2017 15:53
ver: (4/10/2017)

60889 CH2M Hill Plateau Remediatio

Southwest Research Institute
Traffic Report

010016

Sample Custodian Signature: David Zorn

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: W18-012 / SDG: SEE TO
Sample Receipt: 60889
Airbill: 7709,72554172,770983985445

Custody Seal #(s): N/A

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
12/14/17	08:40:00	W18-012-107	B3FJW7	N/A	625170	YES	Intact
12/14/17	08:40:00	W18-012-100	B3FKB9	N/A	625171	YES	Intact
12/14/17	08:40:00	W18-012-103	B3FKD5	N/A	625172	YES	Intact

SAMPLE LOG-IN SHEET **010017**

Lab Name: Southwest Research Institute	Page 1 of 1
Received By (Print Name): DAVID GARCIA	Log-in Date: 12/14/2017
Received By (Signature): David Garcia	
Case Number: W18-012	Sample Delivery Group No.: N/A
Remarks: 20859.01.00X	SAS Number: N/A

1. Custody Seal(s)	Present/Absent* Intact/Broken	
2. Custody Seal Nos.	N/A	
3. Chain-of Custody Records	Present/Absent*	
4. Traffic Reports or Packing Lists	Present/Absent*	
5. Airbill	Airbill/Sticker Present/Absent*	
6. Airbill No.	7709,72554172,7709839 85445	
7. Sample Tags	Present/Absent	N/A
Sample Tag Numbers	Listed/Not listed on Chain of Custody	
8. Sample Condition	Intact/Broken*/ Leaking	
9. Cooler Temperature	2.0C	
10. Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*	
11. Date Received at Lab	12/14/2017	
12. Time Received	08:40:00	

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
B3FJW7	N/A	625170	Intact
B3FKB9	N/A	625171	Intact
B3FKD5	N/A	625172	Intact

Sample Transfer	
Fraction: ORG	Fraction:
Area #: R-40	Area #:
By: DAVID GARCIA	By:
On: 12/14/2017	On:

* Contact SMO and attach record of resolution

Reviewed By: [signature]	Logbook No.: Sample Receipt (60889)
Date: 12.14.17	Logbook Page No.: 10034 Sec 2006

FORM DC-1 OLMO4.2

010018

SOUTHWEST RESEARCH INSTITUTE
CLIENT: CH2M Hill Plateau Remediation Company
SwRI PROJECT#: 20859.01.00X
SwRI TASK ORDER: 171212-5, 171214-9
SwRI SRR: 60874, 60889
SDG: 624991
SAF: W18-012
VTSR: 12.12.2017, 12.14.2017

EPA METHOD 8290A
Case Narrative

CLIENT: CH2M Hill Plateau Remediation Company
SDG: 624991
SwRI Project Number: 20859.01.00X
SwRI Sample Receipt Number: 60874, 60889
Page#: 1

SwRI CASE NARRATIVE

1. Four (04) samples were received for SW846 Method 8290A:

SwRI ID	Customer ID	Matrix
624991	B3FKF0	Water
625170	B3FJW7	Water
625171	B3FKB9	Water
625172	B3FKD5	Water

Client: CH2M Hill Plateau Remediation Company
SDG: 624991
SwRI Project Number: 20859.01.00X
SwRI Task Order Number: 171212-5, 171214-9

DIOXIN ANALYSIS

Four water samples were analyzed for target and total chlorinated dibenzo-p-dioxins and dibenzofurans according to EPA Method 8290A – "Polychlorinated Dibenzo-p-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High Resolution Gas Chromatography / High Resolution Mass Spectrometry (HRGC/HRMS)" and SwRI TAP-01-0403-014. The instrument used was a Micromass Autospec M series high-resolution gas chromatograph/high-resolution mass spectrometer (HRGC/HRMS), operated at 10,000 resolution power throughout the analysis. The analytical column used was a Phenomenex ZB-5 (60 m, 0.32 mm ID, 0.25 μm film thickness).

The samples were extracted within 30 days of CED and analyzed within 45 days of extraction.

The samples were reported on an as-received basis in the method units of pg/L.

The initial calibration met the QC requirement of ≤ 20 % relative standard deviation (RSD) for unlabeled standards and ≤ 20 % RSD for labeled standards. The calibration verification standards met the Quality Control (QC) criteria of ≤ 20 % for native target compounds and ≤ 30 % for internal standards. Sample quantitations are based on the mean RRF from the corresponding ICAL. The CRQLs were based on concentrations of 0.500 pg/μL, 1.25 pg/μL, and 2.50 pg/μL for tetra-, penta- through hepta-, and octa-substituted compounds, respectively. Note that the ^{37}Cl-2,3,7,8-TCDD cleanup standard is not present in one or more of the calibration standards. This compound is used as a diagnostic tool by the laboratory and is not required by the method. The absence of the compound in the specified standards has no impact on the data.

The analytical sequences met the chromatographic resolution QC criteria of ≤ 25 % for 2,3,7,8-TCDD and its closest eluting isomer, as well as the beginning and ending mass resolution checks.

The samples, extraction blank, matrix spike (MS), matrix spike duplicate (MSD), and laboratory control sample (LCS) were spiked with 10 μL of carbon-13 labeled internal standard mixture at the beginning of extraction. This internal standard mixture contained:

$^{13}C_{12}$-2378-TCDD	50 pg/μL
$^{13}C_{12}$-2378-TCDF	50 pg/μL
$^{13}C_{12}$-12378-PeCDD	50 pg/μL
$^{13}C_{12}$-12378-PeCDF	50 pg/μL
$^{13}C_{12}$-123678-HxCDD	125 pg/μL
$^{13}C_{12}$-123478-HxCDF	125 pg/μL
$^{13}C_{12}$-1234678-HpCDD	125 pg/μL
$^{13}C_{12}$-1234678-HpCDF	125 pg/μL
$^{13}C_{12}$-OCDD	250 pg/μL

Client: CH2M Hill Plateau Remediation Company
SDG: 624991
SwRI Project Number: 20859.01.00X
SwRI Task Order Number: 171212-5, 171214-9

The MS, MSD, and LCS were spiked with 10 µL of the following matrix spiking solution:

2,3,7,8-TCDD	10 pg/µL
1,2,3,7,8-PeCDD	25 pg/µL
1,2,3,4,7,8-HxCDD	25 pg/µL
1,2,3,6,7,8-HxCDD	25 pg/µL
1,2,3,7,8,9-HxCDD	25 pg/µL
1,2,3,4,6,7,8-HpCDD	25 pg/µL
OCDD	50 pg/µL
2,3,7,8-TCDF	10 pg/µL
1,2,3,7,8-PeCDF	25 pg/µL
2,3,4,7,8-PeCDF	25 pg/µL
1,2,3,4,7,8-HxCDF	25 pg/µL
1,2,3,6,7,8-HxCDF	25 pg/µL
1,2,3,7,8,9-HxCDF	25 pg/µL
2,3,4,6,7,8-HxCDF	25 pg/µL
1,2,3,4,6,7,8-HpCDF	25 pg/µL
1,2,3,4,7,8,9-HpCDF	25 pg/µL
OCDF	50 pg/µL

The sample extracts were spiked with 25 µL of cleanup standard containing ^{37}Cl-2,3,7,8-TCDD at 4.0 pg/µL prior to putting them through a series of clean-up processes, which included H_2SO_4 wash, silica gel column chromatography, alumina column chromatography, and, if necessary, activated carbon on silica column chromatography. The final sample extract residues were reconstituted into 40 µL of solution by adding 10 µL of recovery standard mixture and 30 µL of nonane. The addition of nonane prior to injection does not constitute a physical dilution of the sample and only serves to help minimize potential matrix effects in the extract. The recovery standard mixture contains $^{13}C_{12}$-1234-TCDD at 50 pg/µL. One (1) µL of each well-mixed final sample extract was then injected into HRGC/HRMS.

The total pg concentration of a particular PCDD/PCDF in a sample can be obtained simply by multiplying the pg/µL value in the "Amount" column of the quantitation summary by 10 (the final effective extract volume). The concentration values in pg/L can be obtained by dividing this total pg value with sample volume (L).

Three types of detection limits are reported.

a. CRQL (derived from CLP's contract required quantitation limits). CRQL was calculated based on the concentration of the lowest point calibration standard, final

Client: CH2M Hill Plateau Remediation Company
SDG: 624991
SwRI Project Number: 20859.01.00X
SwRI Task Order Number: 171212-5, 171214-9

extract volume, sample size, and % dry weight (if applicable).

b. EMPC (Estimated Maximum Possible Concentration). EMPC was reported when signals of both ions of a target PCDD/PCDF were detected with everything meeting identification criteria except the isotope ratio. The EMPC was calculated the same way a positive result was calculated.

c. An EDL (Estimated Detection Limit) was calculated when no signals for the monitored ions were detected for a target PCDD/PCDF. EDL was calculated based on noise level at the retention time of the target PCDD/PCDF, peak height of the C-13 labeled internal standard, RRF of the target PCDD/PCDF, final extract volume, sample size, and % dry weight (if applicable). Note that the calculated detection limit on the data system has only two decimal places, and noise levels below 0.01 will register a zero EDL.

CRQL will be reported for every target PCDD/PCDF of every sample. EMPC or EDL will be reported only for target PCDD/PCDF not meeting isotope ratio (EMPC) or simply not found (EDL).

Possible qualifiers:

U Target compound not detected.
J Target compound found at the concentration below the calibration range.
E Target compound found at the concentration above the calibration range.
D Target compound concentration reported based on dilution analysis that brought the concentration within calibration range.
B Target compound was detected in the associated blank.

The blank was free of target analytes.

The internal standards were within the QC limits of 40-135% for all samples and QC.

Analysis Reports were modified to include CRQL values for Total PCDD's and PCDF's that were not detected. These values are based on a single congener at the same level of chlorination. These values have also been included in the electronic deliverable. This modification was made at the request of the client.

Spike recoveries for the MS and MSD were within the DOE QSM 8290 water QC limits for all

Client: CH2M Hill Plateau Remediation Company
SDG: 624991
SwRI Project Number: 20859.01.00X
SwRI Task Order Number: 171212-5, 171214-9

analytes. The relative percent difference (RPD) between the MS and MSD was within the QC limit of 20% for all analytes.

Spike recoveries for the LCS were within the DOE QSM 8290 water QC limits for all analytes.

Sample Calculations:

Positive result (or EMPC) calculation
(minor differences to the Form I are due to rounding)

Sample: LCS_18DEC17
Lab ID: 625414
Analyte: 2,3,7,8-TCDD
Response$_{(NAT)}$: 7.023e3
Response$_{(IS)}$: 3.494e4

Native RRF: 0.976
IS Conc.: 50.0 pg/µL
Sample Weight/Vol: 1.00 L
Extract Vol: 10 µL
Percent Dry: N/A

$$Conc(pg/\mu L) = \frac{(Area_{Nat})(Conc_{IS})}{(Area_{IS})(RRF_{Nat})} = \frac{(7.023e3)(50.0)}{(3.494e4)(0.976)} = 10.3 pg/\mu L$$

$$Conc(pg/L) = \frac{(Conc_{pg/\mu L})(Vol_{Ext})}{(SampleVol)} = \frac{(10.3 pg/\mu L)(10\mu L)}{(1.00L)} = 103 pg/L$$

"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 in the computer-readable data submitted on diskette 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."

Matthew Bradera for Acheller
Manager

12/27/2017
Date

010024

SOUTHWEST RESEARCH INSTITUTE
CLIENT: CH2M Hill Plateau Remediation Company
SwRI PROJECT#: 20859.01.00X
SwRI TASK ORDER: 171212-5, 171214-9
SwRI SRR: 60874, 60889
SDG: 624991
SAF: W18-012
VTSR: 12.12.2017, 12.14.2017

ANALYSIS BY EPA METHOD 8290A

010025

SOUTHWEST RESEARCH INSTITUTE
CLIENT: CH2M Hill Plateau Remediation Company
SwRI PROJECT#: 20859.01.00X
SwRI TASK ORDER: 171212-5, 171214-9
SwRI SRR: 60874, 60889
SDG: 624991
SAF: W18-012
VTSR: 12.12.2017, 12.14.2017

EPA METHOD 8290A
QC Summary

010026

Southwest Research Institute

Matrix Spike Evaluation Form

Client ID: CH2M Hill Plateau Remedia Lab Sample ID: 625414 Project: 20859.01.00X
Case: CHPRC Sample ID: LCS_18DEC17 Matrix: Water
Sample Wt/Vol: 1.00 L Final Extraction Vol: 10 uL Concentration Unit: pg/L

ANALYTE	Amount Added	Amount Unspiked Sample	Amount Detected	Amount Recovered	% Recovery	Target Recovery (Advisory)
2,3,7,8-TCDD	100	0	103	103	103	71 - 125
1,2,3,7,8-PeCDD	250	0	246	246	98.4	76 - 121
1,2,3,4,7,8-HxCDD	250	0	303	303	121	80 - 126
1,2,3,6,7,8-HxCDD	250	0	243	243	97.2	78 - 134
1,2,3,7,8,9-HxCDD	250	0	259	259	104	76 - 137
1,2,3,4,6,7,8-HpCDD	250	0	227	227	90.8	79 - 122
OCDD	500	0	515	515	103	81 - 135
2,3,7,8-TCDF	100	0	98.9	98.9	98.9	72 - 138
1,2,3,7,8-PeCDF	250	0	241	241	96.4	82 - 130
2,3,4,7,8-PeCDF	250	0	240	240	96.0	77 - 129
1,2,3,4,7,8-HxCDF	250	0	258	258	103	80 - 130
1,2,3,6,7,8-HxCDF	250	0	257	257	103	79 - 131
1,2,3,7,8,9-HxCDF	250	0	214	214	85.6	83 - 130
2,3,4,6,7,8-HxCDF	250	0	234	234	93.6	81 - 130
1,2,3,4,6,7,8-HpCDF	250	0	243	243	97.2	81 - 130
1,2,3,4,7,8,9-HpCDF	250	0	265	265	106	77 - 128
OCDF	500	0	517	517	103	66 - 150

010027

Southwest Research Institute

Matrix Spike Evaluation Form

Client ID: CH2M Hill Plateau Remedia Lab Sample ID: 625172 MS Project: 20859.01.00X
Case: W18-012 Sample ID: B3FKD5 MS Matrix: Water
Sample Wt/Vol: 1.03 L Final Extraction Vol: 10 uL Concentration Unit: pg/L

ANALYTE	Amount Added	Amount Unspiked Sample	Amount Detected	Amount Recovered	% Recovery	Target Recovery (Advisory)
2,3,7,8-TCDD	97.1	0	105	105	108	71 - 125
1,2,3,7,8-PeCDD	243	0	245	245	101	76 - 121
1,2,3,4,7,8-HxCDD	243	0	288	288	119	80 - 126
1,2,3,6,7,8-HxCDD	243	0	244	244	100	78 - 134
1,2,3,7,8,9-HxCDD	243	0	261	261	107	76 - 137
1,2,3,4,6,7,8-HpCDD	243	0	241	241	99.2	79 - 122
OCDD	485	0	518	518	107	81 - 135
2,3,7,8-TCDF	97.1	0	101	101	104	72 - 138
1,2,3,7,8-PeCDF	243	0	251	251	103	82 - 130
2,3,4,7,8-PeCDF	243	0	260	260	107	77 - 129
1,2,3,4,7,8-HxCDF	243	0	253	253	104	80 - 130
1,2,3,6,7,8-HxCDF	243	0	263	263	108	79 - 131
1,2,3,7,8,9-HxCDF	243	0	218	218	89.7	83 - 130
2,3,4,6,7,8-HxCDF	243	0	244	244	100	81 - 130
1,2,3,4,6,7,8-HpCDF	243	0	244	244	100	81 - 130
1,2,3,4,7,8,9-HpCDF	243	0	268	268	110	77 - 128
OCDF	485	0	511	511	105	66 - 150

010028

Southwest Research Institute

Matrix Spike Evaluation Form

Client ID: CH2M Hill Plateau Remedia Lab Sample ID: 625172 MSD Project: 20859.01.00X
Case: W18-012 Sample ID: B3FKD5 MSD Matrix: Water
Sample Wt/Vol: 1.02 L Final Extraction Vol: 10 uL Concentration Unit: pg/L

ANALYTE	Amount Added	Amount Unspiked Sample	Amount Detected	Amount Recovered	% Recovery	Target Recovery (Advisory)
2,3,7,8-TCDD	98.0	0	105	105	107	71 - 125
1,2,3,7,8-PeCDD	245	0	256	256	104	76 - 121
1,2,3,4,7,8-HxCDD	245	0	284	284	116	80 - 126
1,2,3,6,7,8-HxCDD	245	0	268	268	109	78 - 134
1,2,3,7,8,9-HxCDD	245	0	260	260	106	76 - 137
1,2,3,4,6,7,8-HpCDD	245	0	243	243	99.2	79 - 122
OCDD	490	0	499	499	102	81 - 135
2,3,7,8-TCDF	98.0	0	102	102	104	72 - 138
1,2,3,7,8-PeCDF	245	0	258	258	105	82 - 130
2,3,4,7,8-PeCDF	245	0	270	270	110	77 - 129
1,2,3,4,7,8-HxCDF	245	0	240	240	98.0	80 - 130
1,2,3,6,7,8-HxCDF	245	0	259	259	106	79 - 131
1,2,3,7,8,9-HxCDF	245	0	234	234	95.5	83 - 130
2,3,4,6,7,8-HxCDF	245	0	277	277	113	81 - 130
1,2,3,4,6,7,8-HpCDF	245	0	255	255	104	81 - 130
1,2,3,4,7,8,9-HpCDF	245	0	281	281	115	77 - 128
OCDF	490	0	487	487	99.4	66 - 150

010029

Southwest Research Institute

Duplicate Sample Evaluation

Client ID: CH2M Hill Plateau Remediation Coupa Lab Sample ID: 625172 Project: 20859.01.00X
Case: W18-012 Sample ID: B3FKD5 Matrix: Water
Sample Wt/Vol: 1.02 L Final Extraction Vol: 10 uL Concentration Unit: pg/L

CAS No.	ANALYTE	% Recovery from Sample (MS)	% Recovery from Sample (MSD)	RPD	QC RPD Limit
1746-01-6	2,3,7,8-TCDD	108	107	0.930	20
40321-76-4	1,2,3,7,8-PeCDD	101	104	2.93	20
39227-28-6	1,2,3,4,7,8-HxCDD	119	116	2.55	20
57653-85-7	1,2,3,6,7,8-HxCDD	100	109	8.61	20
19408-74-3	1,2,3,7,8,9-HxCDD	107	106	0.939	20
35822-46-9	1,2,3,4,6,7,8-HpCDD	99.2	99.2	0	20
3268-87-9	OCDD	107	102	4.78	20
51207-31-9	2,3,7,8-TCDF	104	104	0	20
57117-41-6	1,2,3,7,8-PeCDF	103	105	1.92	20
57117-31-4	2,3,4,7,8-PeCDF	107	110	2.76	20
70648-26-9	1,2,3,4,7,8-HxCDF	104	98.0	5.94	20
57117-44-9	1,2,3,6,7,8-HxCDF	108	106	1.87	20
72918-21-9	1,2,3,7,8,9-HxCDF	89.7	95.5	6.26	20
60851-34-5	2,3,4,6,7,8-HxCDF	100	113	12.2	20
67562-39-4	1,2,3,4,6,7,8-HpCDF	100	104	3.92	20
55673-89-7	1,2,3,4,7,8,9-HpCDF	110	115	4.44	20
39001-02-0	OCDF	105	99.4	5.48	20

Southwest Research Institute

Method 8290A Blank Summary

Blank ID: BLANK_18DEC17
Lab Sample ID: 625413
Client: CH2M Hill Plateau Remediation Company
Matrix: Water

Project: 20859.01.00X
CASE #: CHPRC
SDG: 624991
Analyzed: 20-Dec-17 20:38:25

This method blank applies to the following samples, MS, and MSD's

Client Sample ID	Lab Sample ID	Date Analyzed	File ID
B3FKF0	624991	12/20/2017	P12207P2_03
B3FJW7	625170	12/20/2017	P12207P2_04
B3FKB9	625171	12/20/2017	P12207P2_05
B3FKD5	625172	12/21/2017	P12207P2_06
B3FKD5 MS	625172 MS	12/21/2017	P12207P2_07
LCS_18DEC17	625414	12/21/2017	P12207P2_09
B3FKD5 MSD	625172 MSD	12/21/2017	P12217P2_02

SOUTHWEST RESEARCH INSTITUTE
CLIENT: CH2M Hill Plateau Remediation Company
SwRI PROJECT#: 20859.01.00X
SwRI TASK ORDER: 171212-5, 171214-9
SwRI SRR: 60874, 60889
SDG: 624991
SAF: W18-012
VTSR: 12.12.2017, 12.14.2017

EPA METHOD 8290A
Sample Results

Southwest Research Institute

Method 8290A PCDD/PCDF Analysis Report

Sample ID: B3FKF0

Client ID: CH2M Hill Plateau Remediat
Project: 20859.01.00X
Lab Sample ID: 624991
Case: CHPRC
Date Received: 12/12/2017
Lab File Name: P12207P2_03
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/20/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.03 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONC	Q	EMPC	EDL	CRQL	RATIO	RT
1746-01-6	2,3,7,8-TCDD	4.85	U		1.17	4.85		
40321-76-4	1,2,3,7,8-PeCDD	12.1	U		1.16	12.1		
39227-28-6	1,2,3,4,7,8-HxCDD	12.1	U		1.18	12.1		
57653-85-7	1,2,3,6,7,8-HxCDD	12.1	U		0.859	12.1		
19408-74-3	1,2,3,7,8,9-HxCDD	12.1	U		0.927	12.1		
35822-46-9	1,2,3,4,6,7,8-HpCDD	12.1	U		0.689	12.1		
3268-87-9	OCDD	24.3	U		0.729	24.3		
51207-31-9	2,3,7,8-TCDF	4.85	U		0.557	4.85		
57117-41-6	1,2,3,7,8-PeCDF	12.1	U		0.720	12.1		
57117-31-4	2,3,4,7,8-PeCDF	12.1	U		0.791	12.1		
70648-26-9	1,2,3,4,7,8-HxCDF	12.1	U		0.447	12.1		
57117-44-9	1,2,3,6,7,8-HxCDF	12.1	U		0.436	12.1		
72918-21-9	1,2,3,7,8,9-HxCDF	12.1	U		0.524	12.1		
60851-34-5	2,3,4,6,7,8-HxCDF	12.1	U		0.496	12.1		
67562-39-4	1,2,3,4,6,7,8-HpCDF	12.1	U		0.534	12.1		
55673-89-7	1,2,3,4,7,8,9-HpCDF	12.1	U		0.671	12.1		
39001-02-0	OCDF	24.3	U		0.585	24.3		

Total Dioxin	CONC	Q	Total Dibenzofuran	CONC	Q
Total Tetra-Dioxins	4.85	U	Total Tetra-Furans	12.1	U
Total Penta-Dioxins	12.1	U	Total Penta-Furans	12.1	U
Total Hexa-Dioxins	12.1	U	Total Hexa-Furans	12.1	U
Total Hepta-Dioxins	12.1	U	Total Hepta-Furans	12.1	U

Internal Standard % Recovery

13C-2,3,7,8-TCDD	78.6	13C-1,2,3,4,7,8-HxCDF	128	13C-1,2,3,7,8-PeCDF	88.2
13C-1,2,3,6,7,8-HxCDD	106	13C-1,2,3,7,8-PeCDD	100	13C-1,2,3,4,6,7,8-HpCDF	115
13C-2,3,7,8-TCDF	89.6	13C-1,2,3,4,6,7,8-HpCDD	118	13C-OCDD	123

Clean-Up Standard % Recovery

37Cl-2,3,7,8-TCDD 69.4

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010033

Southwest Research Institute

Method 8290A Toxicity Equivalence Summary

Sample ID: B3FKF0

Client ID: CH2M Hill Plateau Remedi
Project: 20859.01.00X
Case: CHPRC
Date Received: 12/12/2017
SDG: 624991
Date Extracted: 12/18/2017
Matrix: Water
Date Analyzed: 12/20/2017
Sample Wt/Vol: 1.03 L
Concentration Unit: pg/L

Lab Sample ID: 624991
Lab File Name: P12207P2_03
Final Extraction Vol: 10 uL
Dilution Factor: 1.0
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONCENTRATION	TEF (1)	ADJUSTED CONC
1746-01-6	2,3,7,8-TCDD	0	1	0
40321-76-4	1,2,3,7,8-PeCDD	0	0.5	0
39227-28-6	1,2,3,4,7,8-HxCDD	0	0.1	0
57653-85-7	1,2,3,6,7,8-HxCDD	0	0.1	0
19408-74-3	1,2,3,7,8,9-HxCDD	0	0.1	0
35822-46-9	1,2,3,4,6,7,8-HpCDD	0	0.01	0
3268-87-9	OCDD	0	0.001	0
51207-31-9	2,3,7,8-TCDF	0	0.1	0
57117-41-6	1,2,3,7,8-PeCDF	0	0.05	0
57117-31-4	2,3,4,7,8-PeCDF	0	0.5	0
70648-26-9	1,2,3,4,7,8-HxCDF	0	0.1	0
57117-44-9	1,2,3,6,7,8-HxCDF	0	0.1	0
72918-21-9	1,2,3,7,8,9-HxCDF	0	0.1	0
60851-34-5	2,3,4,6,7,8-HxCDF	0	0.1	0
67562-39-4	1,2,3,4,6,7,8-HpCDF	0	0.01	0
55673-89-7	1,2,3,4,7,8,9-HpCDF	0	0.01	0
39001-02-0	OCDF	0	0.001	0
			Total	0

(1) - Taken from "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds", (EPA/100/R 10/005, December 2010).

Southwest Research Institute

Method 8290A PCDD/PCDF Analysis Report

Sample ID: B3FJW7

Client ID: CH2M Hill Plateau Remediat
Project: 20859.01.00X
Lab Sample ID: 625170
Case: W18-012
Date Received: 12/14/2017
Lab File Name: P12207P2_04
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/20/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.04 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONC	Q	EMPC	EDL	CRQL	RATIO	RT
1746-01-6	2,3,7,8-TCDD	4.81	U		1.75	4.81		
40321-76-4	1,2,3,7,8-PeCDD	12.0	U		1.91	12.0		
39227-28-6	1,2,3,4,7,8-HxCDD	12.0	U		1.21	12.0		
57653-85-7	1,2,3,6,7,8-HxCDD	12.0	U		0.881	12.0		
19408-74-3	1,2,3,7,8,9-HxCDD	12.0	U		0.950	12.0		
35822-46-9	1,2,3,4,6,7,8-HpCDD	12.0	U		0.779	12.0		
3268-87-9	OCDD	24.0	U		0.823	24.0		
51207-31-9	2,3,7,8-TCDF	4.81	U		0.912	4.81		
57117-41-6	1,2,3,7,8-PeCDF	12.0	U		1.13	12.0		
57117-31-4	2,3,4,7,8-PeCDF	12.0	U		1.24	12.0		
70648-26-9	1,2,3,4,7,8-HxCDF	12.0	U		0.513	12.0		
57117-44-9	1,2,3,6,7,8-HxCDF	12.0	U		0.500	12.0		
72918-21-9	1,2,3,7,8,9-HxCDF	12.0	U		0.601	12.0		
60851-34-5	2,3,4,6,7,8-HxCDF	12.0	U		0.569	12.0		
67562-39-4	1,2,3,4,6,7,8-HpCDF	12.0	U		0.494	12.0		
55673-89-7	1,2,3,4,7,8,9-HpCDF	12.0	U		0.621	12.0		
39001-02-0	OCDF	24.0	U		0.561	24.0		

Total Dioxin	CONC	Q	Total Dibenzofuran	CONC	Q
Total Tetra-Dioxins	4.81	U	Total Tetra-Furans	4.81	U
Total Penta-Dioxins	12.0	U	Total Penta-Furans	12.0	U
Total Hexa-Dioxins	12.0	U	Total Hexa-Furans	12.0	U
Total Hepta-Dioxins	12.0	U	Total Hepta-Furans	12.0	U

Internal Standard % Recovery

13C-2,3,7,8-TCDD	81.0	13C-1,2,3,4,7,8-HxCDF	121	13C-1,2,3,7,8-PeCDF	95.7
13C-1,2,3,6,7,8-HxCDD	104	13C-1,2,3,7,8-PeCDD	110	13C-1,2,3,4,6,7,8-HpCDF	112
13C-2,3,7,8-TCDF	84.8	13C-1,2,3,4,6,7,8-HpCDD	117	13C-OCDD	125

Clean-Up Standard % Recovery

37Cl-2,3,7,8-TCDD 74.4

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Southwest Research Institute

Method 8290A Toxicity Equivalence Summary

Sample ID: B3FJW7

Client ID: CH2M Hill Plateau Remedi
Project: 20859.01.00X
Lab Sample ID: 625170
Case: W18-012
Date Received: 12/14/2017
Lab File Name: P12207P2_04
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/20/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.04 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONCENTRATION	TEF (1)	ADJUSTED CONC
1746-01-6	2,3,7,8-TCDD	0	1	0
40321-76-4	1,2,3,7,8-PeCDD	0	0.5	0
39227-28-6	1,2,3,4,7,8-HxCDD	0	0.1	0
57653-85-7	1,2,3,6,7,8-HxCDD	0	0.1	0
19408-74-3	1,2,3,7,8,9-HxCDD	0	0.1	0
35822-46-9	1,2,3,4,6,7,8-HpCDD	0	0.01	0
3268-87-9	OCDD	0	0.001	0
51207-31-9	2,3,7,8-TCDF	0	0.1	0
57117-41-6	1,2,3,7,8-PeCDF	0	0.05	0
57117-31-4	2,3,4,7,8-PeCDF	0	0.5	0
70648-26-9	1,2,3,4,7,8-HxCDF	0	0.1	0
57117-44-9	1,2,3,6,7,8-HxCDF	0	0.1	0
72918-21-9	1,2,3,7,8,9-HxCDF	0	0.1	0
60851-34-5	2,3,4,6,7,8-HxCDF	0	0.1	0
67562-39-4	1,2,3,4,6,7,8-HpCDF	0	0.01	0
55673-89-7	1,2,3,4,7,8,9-HpCDF	0	0.01	0
39001-02-0	OCDF	0	0.001	0
			Total	0

(1) - Taken from "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds", (EPA/100/R 10/005, December 2010).

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Method 8290A PCDD/PCDF Analysis Report

Sample ID: B3FKB9

Client ID: CH2M Hill Plateau Remediat
Project: 20859.01.00X
Lab Sample ID: 625171
Case: W18-012
Date Received: 12/14/2017
Lab File Name: P12207P2_05
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/20/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.05 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONC	Q	EMPC	EDL	CRQL	RATIO	RT
1746-01-6	2,3,7,8-TCDD	4.76	U		1.14	4.76		
40321-76-4	1,2,3,7,8-PeCDD	11.9	U		1.29	11.9		
39227-28-6	1,2,3,4,7,8-HxCDD	11.9	U		0.773	11.9		
57653-85-7	1,2,3,6,7,8-HxCDD	11.9	U		0.561	11.9		
19408-74-3	1,2,3,7,8,9-HxCDD	11.9	U		0.606	11.9		
35822-46-9	1,2,3,4,6,7,8-HpCDD	11.9	U		0.434	11.9		
3268-87-9	OCDD	23.8	U		0.771	23.8		
51207-31-9	2,3,7,8-TCDF	4.76	U		0.601	4.76		
57117-41-6	1,2,3,7,8-PeCDF	11.9	U		0.645	11.9		
57117-31-4	2,3,4,7,8-PeCDF	11.9	U		0.709	11.9		
70648-26-9	1,2,3,4,7,8-HxCDF	11.9	U		0.388	11.9		
57117-44-9	1,2,3,6,7,8-HxCDF	11.9	U		0.379	11.9		
72918-21-9	1,2,3,7,8,9-HxCDF	11.9	U		0.455	11.9		
60851-34-5	2,3,4,6,7,8-HxCDF	11.9	U		0.431	11.9		
67562-39-4	1,2,3,4,6,7,8-HpCDF	11.9	U		0.266	11.9		
55673-89-7	1,2,3,4,7,8,9-HpCDF	11.9	U		0.334	11.9		
39001-02-0	OCDF	23.8	U		0.722	23.8		

Total Dioxin	CONC	Q	Total Dibenzofuran	CONC	Q
Total Tetra-Dioxins	4.76	U	Total Tetra-Furans	4.76	U
Total Penta-Dioxins	11.9	U	Total Penta-Furans	11.9	U
Total Hexa-Dioxins	11.9	U	Total Hexa-Furans	11.9	U
Total Hepta-Dioxins	11.9	U	Total Hepta-Furans	11.9	U

Internal Standard % Recovery

13C-2,3,7,8-TCDD	81.0	13C-1,2,3,4,7,8-HxCDF	127	13C-1,2,3,7,8-PeCDF	105
13C-1,2,3,6,7,8-HxCDD	110	13C-1,2,3,7,8-PeCDD	113	13C-1,2,3,4,6,7,8-HpCDF	128
13C-2,3,7,8-TCDF	93.1	13C-1,2,3,4,6,7,8-HpCDD	124	13C-OCDD	127

Clean-Up Standard % Recovery

37Cl-2,3,7,8-TCDD 75.7

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010037

Southwest Research Institute

Method 8290A Toxicity Equivalence Summary

Sample ID: B3FKB9

Client ID: CH2M Hill Plateau Remedi Project: 20859.01.00X
Case: W18-012
SDG: 624991
Matrix: Water
Sample Wt/Vol: 1.05 L

Date Received: 12/14/2017
Date Extracted: 12/18/2017
Date Analyzed: 12/20/2017
Concentration Unit: pg/L

Lab Sample ID: 625171
Lab File Name: P12207P2_05
Final Extraction Vol: 10 uL
Dilution Factor: 1.0
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONCENTRATION	TEF (1)	ADJUSTED CONC
1746-01-6	2,3,7,8-TCDD	0	1	0
40321-76-4	1,2,3,7,8-PeCDD	0	0.5	0
39227-28-6	1,2,3,4,7,8-HxCDD	0	0.1	0
57653-85-7	1,2,3,6,7,8-HxCDD	0	0.1	0
19408-74-3	1,2,3,7,8,9-HxCDD	0	0.1	0
35822-46-9	1,2,3,4,6,7,8-HpCDD	0	0.01	0
3268-87-9	OCDD	0	0.001	0
51207-31-9	2,3,7,8-TCDF	0	0.1	0
57117-41-6	1,2,3,7,8-PeCDF	0	0.05	0
57117-31-4	2,3,4,7,8-PeCDF	0	0.5	0
70648-26-9	1,2,3,4,7,8-HxCDF	0	0.1	0
57117-44-9	1,2,3,6,7,8-HxCDF	0	0.1	0
72918-21-9	1,2,3,7,8,9-HxCDF	0	0.1	0
60851-34-5	2,3,4,6,7,8-HxCDF	0	0.1	0
67562-39-4	1,2,3,4,6,7,8-HpCDF	0	0.01	0
55673-89-7	1,2,3,4,7,8,9-HpCDF	0	0.01	0
39001-02-0	OCDF	0	0.001	0
			Total	0

(1) - Taken from "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds", (EPA/100/R 10/005, December 2010).

Southwest Research Institute

Method 8290A PCDD/PCDF Analysis Report

Sample ID: B3FKD5

Client ID: CH2M Hill Plateau Remediat
Project: 20859.01.00X
Lab Sample ID: 625172
Case: W18-012
Date Received: 12/14/2017
Lab File Name: P12207P2_06
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/21/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.03 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONC	Q	EMPC	EDL	CRQL	RATIO	RT
1746-01-6	2,3,7,8-TCDD	4.85	U		1.18	4.85		
40321-76-4	1,2,3,7,8-PeCDD	12.1	U		1.07	12.1		
39227-28-6	1,2,3,4,7,8-HxCDD	12.1	U		1.09	12.1		
57653-85-7	1,2,3,6,7,8-HxCDD	12.1	U		0.792	12.1		
19408-74-3	1,2,3,7,8,9-HxCDD	12.1	U		0.854	12.1		
35822-46-9	1,2,3,4,6,7,8-HpCDD	12.1	U		0.557	12.1		
3268-87-9	OCDD	24.3	U		0.706	24.3		
51207-31-9	2,3,7,8-TCDF	4.85	U		0.625	4.85		
57117-41-6	1,2,3,7,8-PeCDF	12.1	U		0.623	12.1		
57117-31-4	2,3,4,7,8-PeCDF	12.1	U		0.685	12.1		
70648-26-9	1,2,3,4,7,8-HxCDF	12.1	U		0.366	12.1		
57117-44-9	1,2,3,6,7,8-HxCDF	12.1	U		0.357	12.1		
72918-21-9	1,2,3,7,8,9-HxCDF	12.1	U		0.429	12.1		
60851-34-5	2,3,4,6,7,8-HxCDF	12.1	U		0.406	12.1		
67562-39-4	1,2,3,4,6,7,8-HpCDF	12.1	U		0.454	12.1		
55673-89-7	1,2,3,4,7,8,9-HpCDF	12.1	U		0.571	12.1		
39001-02-0	OCDF	24.3	U		0.567	24.3		

Total Dioxin	CONC	Q	Total Dibenzofuran	CONC	Q
Total Tetra-Dioxins	4.85	U	Total Tetra-Furans	4.85	U
Total Penta-Dioxins	12.1	U	Total Penta-Furans	12.1	U
Total Hexa-Dioxins	12.1	U	Total Hexa-Furans	12.1	U
Total Hepta-Dioxins	12.1	U	Total Hepta-Furans	12.1	U

Internal Standard % Recovery

13C-2,3,7,8-TCDD	80.9	13C-1,2,3,4,7,8-HxCDF	127	13C-1,2,3,7,8-PeCDF	91.2
13C-1,2,3,6,7,8-HxCDD	105	13C-1,2,3,7,8-PeCDD	101	13C-1,2,3,4,6,7,8-HpCDF	114
13C-2,3,7,8-TCDF	83.8	13C-1,2,3,4,6,7,8-HpCDD	120	13C-OCDD	124

Clean-Up Standard % Recovery

37Cl-2,3,7,8-TCDD 73.6

MG 03-20-2018

010039

Southwest Research Institute

Method 8290A Toxicity Equivalence Summary

Sample ID: B3FKD5

Client ID: CH2M Hill Plateau Remedi
Project: 20859.01.00X
Lab Sample ID: 625172
Case: W18-012
Date Received: 12/14/2017
Lab File Name: P12207P2_06
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/21/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.03 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONCENTRATION	TEF (1)	ADJUSTED CONC
1746-01-6	2,3,7,8-TCDD	0	1	0
40321-76-4	1,2,3,7,8-PeCDD	0	0.5	0
39227-28-6	1,2,3,4,7,8-HxCDD	0	0.1	0
57653-85-7	1,2,3,6,7,8-HxCDD	0	0.1	0
19408-74-3	1,2,3,7,8,9-HxCDD	0	0.1	0
35822-46-9	1,2,3,4,6,7,8-HpCDD	0	0.01	0
3268-87-9	OCDD	0	0.001	0
51207-31-9	2,3,7,8-TCDF	0	0.1	0
57117-41-6	1,2,3,7,8-PeCDF	0	0.05	0
57117-31-4	2,3,4,7,8-PeCDF	0	0.5	0
70648-26-9	1,2,3,4,7,8-HxCDF	0	0.1	0
57117-44-9	1,2,3,6,7,8-HxCDF	0	0.1	0
72918-21-9	1,2,3,7,8,9-HxCDF	0	0.1	0
60851-34-5	2,3,4,6,7,8-HxCDF	0	0.1	0
67562-39-4	1,2,3,4,6,7,8-HpCDF	0	0.01	0
55673-89-7	1,2,3,4,7,8,9-HpCDF	0	0.01	0
39001-02-0	OCDF	0	0.001	0
			Total	0

(1) - Taken from "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds", (EPA/100/R 10/005, December 2010).

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SOUTHWEST RESEARCH INSTITUTE
CLIENT: CH2M Hill Plateau Remediation Company
SwRI PROJECT#: 20859.01.00X
SwRI TASK ORDER: 171212-5, 171214-9
SwRI SRR: 60874, 60889
SDG: 624991
SAF: W18-012
VTSR: 12.12.2017, 12.14.2017

EPA METHOD 8290A
QC Sample Data

Southwest Research Institute

Method 8290A PCDD/PCDF Analysis Report

Sample ID: BLANK_18DEC17

Client ID: CH2M Hill Plateau Remediat
Project: 20859.01.00X
Lab Sample ID: 625413
Case: CHPRC
Date Received: N/A
Lab File Name: P12207P2_02
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/20/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.00 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONC	Q	EMPC	EDL	CRQL	RATIO	RT
1746-01-6	2,3,7,8-TCDD	5.00	U		1.23	5.00		
40321-76-4	1,2,3,7,8-PeCDD	12.5	U		1.79	12.5		
39227-28-6	1,2,3,4,7,8-HxCDD	12.5	U		1.67	12.5		
57653-85-7	1,2,3,6,7,8-HxCDD	12.5	U		1.21	12.5		
19408-74-3	1,2,3,7,8,9-HxCDD	12.5	U		1.31	12.5		
35822-46-9	1,2,3,4,6,7,8-HpCDD	12.5	U		0.810	12.5		
3268-87-9	OCDD	25.0	U		1.01	25.0		
51207-31-9	2,3,7,8-TCDF	5.00	U		0.632	5.00		
57117-41-6	1,2,3,7,8-PeCDF	12.5	U		0.872	12.5		
57117-31-4	2,3,4,7,8-PeCDF	12.5	U		0.958	12.5		
70648-26-9	1,2,3,4,7,8-HxCDF	12.5	U		0.721	12.5		
57117-44-9	1,2,3,6,7,8-HxCDF	12.5	U		0.703	12.5		
72918-21-9	1,2,3,7,8,9-HxCDF	12.5	U		0.845	12.5		
60851-34-5	2,3,4,6,7,8-HxCDF	12.5	U		0.800	12.5		
67562-39-4	1,2,3,4,6,7,8-HpCDF	12.5	U		0.556	12.5		
55673-89-7	1,2,3,4,7,8,9-HpCDF	12.5	U		0.699	12.5		
39001-02-0	OCDF	25.0	U		0.805	25.0		

Total Dioxin	CONC	Q	Total Dibenzofuran	CONC	Q
Total Tetra-Dioxins	5.00	U	Total Tetra-Furans	5.00	U
Total Penta-Dioxins	12.5	U	Total Penta-Furans	12.5	U
Total Hexa-Dioxins	12.5	U	Total Hexa-Furans	12.5	U
Total Hepta-Dioxins	12.5	U	Total Hepta-Furans	12.5	U

Internal Standard % Recovery

13C-2,3,7,8-TCDD	78.5	13C-1,2,3,4,7,8-HxCDF	122	13C-1,2,3,7,8-PeCDF	85.2
13C-1,2,3,6,7,8-HxCDD	100	13C-1,2,3,7,8-PeCDD	85.9	13C-1,2,3,4,6,7,8-HpCDF	116
13C-2,3,7,8-TCDF	87.0	13C-1,2,3,4,6,7,8-HpCDD	111	13C-OCDD	108

Clean-Up Standard % Recovery

37Cl-2,3,7,8-TCDD 75.5

MG 03-20-2018

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Southwest Research Institute

Method 8290A Toxicity Equivalence Summary

Sample ID: BLANK_18DEC17

Client ID: CH2M Hill Plateau Remedi
Project: 20859.01.00X
Case: CHPRC
Date Received: N/A
SDG: 624991
Date Extracted: 12/18/2017
Matrix: Water
Date Analyzed: 12/20/2017
Sample Wt/Vol: 1.00 L
Concentration Unit: pg/L

Lab Sample ID: 625413
Lab File Name: P12207P2_02
Final Extraction Vol: 10 uL
Dilution Factor: 1.0
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONCENTRATION	TEF (1)	ADJUSTED CONC
1746-01-6	2,3,7,8-TCDD	0	1	0
40321-76-4	1,2,3,7,8-PeCDD	0	0.5	0
39227-28-6	1,2,3,4,7,8-HxCDD	0	0.1	0
57653-85-7	1,2,3,6,7,8-HxCDD	0	0.1	0
19408-74-3	1,2,3,7,8,9-HxCDD	0	0.1	0
35822-46-9	1,2,3,4,6,7,8-HpCDD	0	0.01	0
3268-87-9	OCDD	0	0.001	0
51207-31-9	2,3,7,8-TCDF	0	0.1	0
57117-41-6	1,2,3,7,8-PeCDF	0	0.05	0
57117-31-4	2,3,4,7,8-PeCDF	0	0.5	0
70648-26-9	1,2,3,4,7,8-HxCDF	0	0.1	0
57117-44-9	1,2,3,6,7,8-HxCDF	0	0.1	0
72918-21-9	1,2,3,7,8,9-HxCDF	0	0.1	0
60851-34-5	2,3,4,6,7,8-HxCDF	0	0.1	0
67562-39-4	1,2,3,4,6,7,8-HpCDF	0	0.01	0
55673-89-7	1,2,3,4,7,8,9-HpCDF	0	0.01	0
39001-02-0	OCDF	0	0.001	0
			Total	0

(1) - Taken from "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds", (EPA/100/R 10/005, December 2010).

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Southwest Research Institute

Method 8290A PCDD/PCDF Analysis Report

Sample ID: LCS_18DEC17

Client ID: CH2M Hill Plateau Remediat
Project: 20859.01.00X
Lab Sample ID: 625414
Case: CHPRC
Date Received: N/A
Lab File Name: P12207P2_09
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/21/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.00 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONC	Q	EMPC	EDL	CRQL	RATIO	RT
1746-01-6	2,3,7,8-TCDD	103				5.00	0.772	31.82
40321-76-4	1,2,3,7,8-PeCDD	246				12.5	1.46	39.22
39227-28-6	1,2,3,4,7,8-HxCDD	303				12.5	1.23	43.73
57653-85-7	1,2,3,6,7,8-HxCDD	243				12.5	1.28	43.81
19408-74-3	1,2,3,7,8,9-HxCDD	259				12.5	1.21	44.06
35822-46-9	1,2,3,4,6,7,8-HpCDD	227				12.5	1.03	46.21
3268-87-9	OCDD	515				25.0	0.858	48.44
51207-31-9	2,3,7,8-TCDF	98.9				5.00	0.813	30.61
57117-41-6	1,2,3,7,8-PeCDF	241				12.5	1.60	37.25
57117-31-4	2,3,4,7,8-PeCDF	240				12.5	1.62	38.57
70648-26-9	1,2,3,4,7,8-HxCDF	258				12.5	1.22	42.93
57117-44-9	1,2,3,6,7,8-HxCDF	257				12.5	1.21	43.04
72918-21-9	1,2,3,7,8,9-HxCDF	214				12.5	1.22	44.22
60851-34-5	2,3,4,6,7,8-HxCDF	234				12.5	1.29	43.60
67562-39-4	1,2,3,4,6,7,8-HpCDF	243				12.5	1.01	45.48
55673-89-7	1,2,3,4,7,8,9-HpCDF	265				12.5	0.995	46.49
39001-02-0	OCDF	517				25.0	0.907	48.53

Total Dioxin	CONC	Q	Total Dibenzofuran	CONC	Q
Total Tetra-Dioxins			Total Tetra-Furans		
Total Penta-Dioxins			Total Penta-Furans		
Total Hexa-Dioxins			Total Hexa-Furans		
Total Hepta-Dioxins			Total Hepta-Furans		

Internal Standard % Recovery

13C-2,3,7,8-TCDD	91.0	13C-1,2,3,4,7,8-HxCDF	126	13C-1,2,3,7,8-PeCDF	96.3
13C-1,2,3,6,7,8-HxCDD	99.6	13C-1,2,3,7,8-PeCDD	96.5	13C-1,2,3,4,6,7,8-HpCDF	117
13C-2,3,7,8-TCDF	86.3	13C-1,2,3,4,6,7,8-HpCDD	125	13C-OCDD	128

Clean-Up Standard % Recovery

37Cl-2,3,7,8-TCDD 86.2

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Southwest Research Institute

Method 8290A Toxicity Equivalence Summary

Sample ID: LCS_18DEC17

Client ID: CH2M Hill Plateau Remedi
Project: 20859.01.00X
Case: CHPRC
Date Received: N/A
SDG: 624991
Date Extracted: 12/18/2017
Matrix: Water
Date Analyzed: 12/21/2017
Sample Wt/Vol: 1.00 L
Concentration Unit: pg/L

Lab Sample ID: 625414
Lab File Name: P12207P2_09
Final Extraction Vol: 10 uL
Dilution Factor: 1.0
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONCENTRATION	TEF (1)	ADJUSTED CONC
1746-01-6	2,3,7,8-TCDD	103	1	103
40321-76-4	1,2,3,7,8-PeCDD	246	0.5	123
39227-28-6	1,2,3,4,7,8-HxCDD	303	0.1	30.3
57653-85-7	1,2,3,6,7,8-HxCDD	243	0.1	24.3
19408-74-3	1,2,3,7,8,9-HxCDD	259	0.1	25.9
35822-46-9	1,2,3,4,6,7,8-HpCDD	227	0.01	2.27
3268-87-9	OCDD	515	0.001	0.515
51207-31-9	2,3,7,8-TCDF	98.9	0.1	9.89
57117-41-6	1,2,3,7,8-PeCDF	241	0.05	12.1
57117-31-4	2,3,4,7,8-PeCDF	240	0.5	120
70648-26-9	1,2,3,4,7,8-HxCDF	258	0.1	25.8
57117-44-9	1,2,3,6,7,8-HxCDF	257	0.1	25.7
72918-21-9	1,2,3,7,8,9-HxCDF	214	0.1	21.4
60851-34-5	2,3,4,6,7,8-HxCDF	234	0.1	23.4
67562-39-4	1,2,3,4,6,7,8-HpCDF	243	0.01	2.43
55673-89-7	1,2,3,4,7,8,9-HpCDF	265	0.01	2.65
39001-02-0	OCDF	517	0.001	0.517
			Total	553

(1) - Taken from "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds", (EPA/100/R 10/005, December 2010).

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Southwest Research Institute

Method 8290A PCDD/PCDF Analysis Report

Sample ID: B3FKD5 MS

Client ID: CH2M Hill Plateau Remediat
Project: 20859.01.00X
Case: W18-012
Date Received: 12/14/2017
SDG: 624991
Date Extracted: 12/18/2017
Matrix: Water
Date Analyzed: 12/21/2017
Sample Wt/Vol: 1.03 L
Concentration Unit: pg/L

Lab Sample ID: 625172 MS
Lab File Name: P12207P2_07
Final Extraction Vol: 10 uL
Dilution Factor: 1.0
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONC	Q	EMPC	EDL	CRQL	RATIO	RT
1746-01-6	2,3,7,8-TCDD	105				4.85	0.759	31.82
40321-76-4	1,2,3,7,8-PeCDD	245				12.1	1.43	39.22
39227-28-6	1,2,3,4,7,8-HxCDD	288				12.1	1.28	43.73
57653-85-7	1,2,3,6,7,8-HxCDD	244				12.1	1.29	43.81
19408-74-3	1,2,3,7,8,9-HxCDD	261				12.1	1.27	44.06
35822-46-9	1,2,3,4,6,7,8-HpCDD	241				12.1	1.04	46.21
3268-87-9	OCDD	518				24.3	0.886	48.42
51207-31-9	2,3,7,8-TCDF	101				4.85	0.846	30.59
57117-41-6	1,2,3,7,8-PeCDF	251				12.1	1.57	37.25
57117-31-4	2,3,4,7,8-PeCDF	260				12.1	1.52	38.57
70648-26-9	1,2,3,4,7,8-HxCDF	253				12.1	1.25	42.93
57117-44-9	1,2,3,6,7,8-HxCDF	263				12.1	1.23	43.04
72918-21-9	1,2,3,7,8,9-HxCDF	218				12.1	1.25	44.22
60851-34-5	2,3,4,6,7,8-HxCDF	244				12.1	1.28	43.60
67562-39-4	1,2,3,4,6,7,8-HpCDF	244				12.1	1.06	45.48
55673-89-7	1,2,3,4,7,8,9-HpCDF	268				12.1	1.04	46.49
39001-02-0	OCDF	511				24.3	0.889	48.52

Total Dioxin	CONC	Q	Total Dibenzofuran	CONC	Q
Total Tetra-Dioxins			Total Tetra-Furans		
Total Penta-Dioxins			Total Penta-Furans		
Total Hexa-Dioxins			Total Hexa-Furans		
Total Hepta-Dioxins			Total Hepta-Furans		

Internal Standard % Recovery

13C-2,3,7,8-TCDD	81.7	13C-1,2,3,4,7,8-HxCDF	126	13C-1,2,3,7,8-PeCDF	103
13C-1,2,3,6,7,8-HxCDD	102	13C-1,2,3,7,8-PeCDD	109	13C-1,2,3,4,6,7,8-HpCDF	116
13C-2,3,7,8-TCDF	86.1	13C-1,2,3,4,6,7,8-HpCDD	126	13C-OCDD	120

Clean-Up Standard % Recovery

37Cl-2,3,7,8-TCDD 74.7

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Southwest Research Institute

Method 8290A Toxicity Equivalence Summary

Sample ID: B3FKD5 MS

Client ID: CH2M Hill Plateau Remedi
Project: 20859.01.00X
Case: W18-012
Date Received: 12/14/2017
SDG: 624991
Date Extracted: 12/18/2017
Matrix: Water
Date Analyzed: 12/21/2017
Sample Wt/Vol: 1.03 L
Concentration Unit: pg/L

Lab Sample ID: 625172 MS
Lab File Name: P12207P2_07
Final Extraction Vol: 10 uL
Dilution Factor: 1.0
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONCENTRATION	TEF (1)	ADJUSTED CONC
1746-01-6	2,3,7,8-TCDD	105	1	105
40321-76-4	1,2,3,7,8-PeCDD	245	0.5	123
39227-28-6	1,2,3,4,7,8-HxCDD	288	0.1	28.8
57653-85-7	1,2,3,6,7,8-HxCDD	244	0.1	24.4
19408-74-3	1,2,3,7,8,9-HxCDD	261	0.1	26.1
35822-46-9	1,2,3,4,6,7,8-HpCDD	241	0.01	2.41
3268-87-9	OCDD	518	0.001	0.518
51207-31-9	2,3,7,8-TCDF	101	0.1	10.1
57117-41-6	1,2,3,7,8-PeCDF	251	0.05	12.6
57117-31-4	2,3,4,7,8-PeCDF	260	0.5	130
70648-26-9	1,2,3,4,7,8-HxCDF	253	0.1	25.3
57117-44-9	1,2,3,6,7,8-HxCDF	263	0.1	26.3
72918-21-9	1,2,3,7,8,9-HxCDF	218	0.1	21.8
60851-34-5	2,3,4,6,7,8-HxCDF	244	0.1	24.4
67562-39-4	1,2,3,4,6,7,8-HpCDF	244	0.01	2.44
55673-89-7	1,2,3,4,7,8,9-HpCDF	268	0.01	2.68
39001-02-0	OCDF	511	0.001	0.511
			Total	566

(1) - Taken from "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds", (EPA/100/R 10/005, December 2010).

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Southwest Research Institute

Method 8290A PCDD/PCDF Analysis Report

Sample ID: B3FKD5 MSD

Client ID: CH2M Hill Plateau Remediat
Project: 20859.01.00X
Case: W18-012
Date Received: 12/14/2017
SDG: 624991
Date Extracted: 12/18/2017
Matrix: Water
Date Analyzed: 12/21/2017
Sample Wt/Vol: 1.02 L
Concentration Unit: pg/L

Lab Sample ID: 625172 MSD
Lab File Name: P12217P2_02
Final Extraction Vol: 10 uL
Dilution Factor: 1.0
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONC	Q	EMPC	EDL	CRQL	RATIO	RT
1746-01-6	2,3,7,8-TCDD	105				4.90	0.739	31.82
40321-76-4	1,2,3,7,8-PeCDD	256				12.3	1.45	39.21
39227-28-6	1,2,3,4,7,8-HxCDD	284				12.3	1.23	43.72
57653-85-7	1,2,3,6,7,8-HxCDD	268				12.3	1.26	43.80
19408-74-3	1,2,3,7,8,9-HxCDD	260				12.3	1.23	44.05
35822-46-9	1,2,3,4,6,7,8-HpCDD	243				12.3	1.07	46.20
3268-87-9	OCDD	499				24.5	0.877	48.41
51207-31-9	2,3,7,8-TCDF	102				4.90	0.869	30.61
57117-41-6	1,2,3,7,8-PeCDF	258				12.3	1.62	37.25
57117-31-4	2,3,4,7,8-PeCDF	270				12.3	1.60	38.57
70648-26-9	1,2,3,4,7,8-HxCDF	240				12.3	1.27	42.92
57117-44-9	1,2,3,6,7,8-HxCDF	259				12.3	1.27	43.03
72918-21-9	1,2,3,7,8,9-HxCDF	234				12.3	1.28	44.21
60851-34-5	2,3,4,6,7,8-HxCDF	277				12.3	1.18	43.58
67562-39-4	1,2,3,4,6,7,8-HpCDF	255				12.3	1.09	45.48
55673-89-7	1,2,3,4,7,8,9-HpCDF	281				12.3	1.09	46.47
39001-02-0	OCDF	487				24.5	0.925	48.50

Total Dioxin	CONC	Q	Total Dibenzofuran	CONC	Q
Total Tetra-Dioxins			Total Tetra-Furans		
Total Penta-Dioxins			Total Penta-Furans		
Total Hexa-Dioxins			Total Hexa-Furans		
Total Hepta-Dioxins			Total Hepta-Furans		

Internal Standard % Recovery

13C-2,3,7,8-TCDD	73.9	13C-1,2,3,4,7,8-HxCDF	124	13C-1,2,3,7,8-PeCDF	86.9
13C-1,2,3,6,7,8-HxCDD	100	13C-1,2,3,7,8-PeCDD	86.9	13C-1,2,3,4,6,7,8-HpCDF	112
13C-2,3,7,8-TCDF	77.9	13C-1,2,3,4,6,7,8-HpCDD	110	13C-OCDD	123

Clean-Up Standard % Recovery

37Cl-2,3,7,8-TCDD 67.3

010048

Southwest Research Institute

Method 8290A Toxicity Equivalence Summary

Sample ID: B3FKD5 MSD

Client ID: CH2M Hill Plateau Remedi
Project: 20859.01.00X
Lab Sample ID: 625172 MSD
Case: W18-012
Date Received: 12/14/2017
Lab File Name: P12217P2_02
SDG: 624991
Date Extracted: 12/18/2017
Final Extraction Vol: 10 uL
Matrix: Water
Date Analyzed: 12/21/2017
Dilution Factor: 1.0
Sample Wt/Vol: 1.02 L
Concentration Unit: pg/L
Split Factor: 1.0
Percent Dry: N/A

CAS No.	ANALYTE	CONCENTRATION	TEF (1)	ADJUSTED CONC
1746-01-6	2,3,7,8-TCDD	105	1	105
40321-76-4	1,2,3,7,8-PeCDD	256	0.5	128
39227-28-6	1,2,3,4,7,8-HxCDD	284	0.1	28.4
57653-85-7	1,2,3,6,7,8-HxCDD	268	0.1	26.8
19408-74-3	1,2,3,7,8,9-HxCDD	260	0.1	26.0
35822-46-9	1,2,3,4,6,7,8-HpCDD	243	0.01	2.43
3268-87-9	OCDD	499	0.001	0.499
51207-31-9	2,3,7,8-TCDF	102	0.1	10.2
57117-41-6	1,2,3,7,8-PeCDF	258	0.05	12.9
57117-31-4	2,3,4,7,8-PeCDF	270	0.5	135
70648-26-9	1,2,3,4,7,8-HxCDF	240	0.1	24.0
57117-44-9	1,2,3,6,7,8-HxCDF	259	0.1	25.9
72918-21-9	1,2,3,7,8,9-HxCDF	234	0.1	23.4
60851-34-5	2,3,4,6,7,8-HxCDF	277	0.1	27.7
67562-39-4	1,2,3,4,6,7,8-HpCDF	255	0.01	2.55
55673-89-7	1,2,3,4,7,8,9-HpCDF	281	0.01	2.81
39001-02-0	OCDF	487	0.001	0.487
			Total	582

(1) - Taken from "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds", (EPA/100/R 10/005, December 2010).

010049

SOUTHWEST RESEARCH INSTITUTE
CLIENT: CH2M Hill Plateau Remediation Company
SwRI PROJECT#: 20859.01.00X
SwRI TASK ORDER: 171212-5, 171214-9
SwRI SRR: 60874, 60889
SDG: 624991
SAF: W18-012
VTSR: 12.12.2017, 12.14.2017

EPA METHOD 8290A
Injection Logs

194 TITLE ICAL

PROJECT NO. 20859.01.001 0050
BOOK NO.

Work continued from Page

SWRI

12/26/17

INSTRUMENT ID: AutoSpec P | BOOK NO: 16-0402-024 | METHOD: 1613B/8290A/23

COLUMN: ZB-5 (60m,0.32mm id,0.25um film) | COLUMN FLOW: 1.3 mL/min

TEMP-1: 120 deg C	TIME-2: 15 min	RATE-3 : 15deg/min	SOURCE TEMP : 275 deg C
TIME-1: 3.0 min	RATE-2: 3.0 deg/min	TEMP-4 : 320 deg C	INTERFACE TEMP : 270 deg C
RATE-1: 10deg/min	TEMP-3: 255 deg C	TIME-4 : 5 min	ELECTRON ENERGY: 40eV
TEMP-2: 215 deg C	TIME-3: 0 min	INJ TEMP: 275 deg C	SPLIT VALVE ON : 0.75 min

P12207C1 : INITIAL 10K RESOLVING POWER CHECK AT 5% BASELINE DEFINITION

FILENAME	Date	Time	SAMPLE TEXT
P12207P1_W1	20-Dec-17	11:31	WIN DEF/COL PERF SOLN (53544)
P12207P1_S1	20-Dec-17	12:27	ICAL: 8290A CS5 200PG (410-02-01-15)
P12207P1_S2	20-Dec-17	13:21	ICAL: 8290A CS4 50PG (410-03-01-15)
P12207P1_S3	20-Dec-17	14:15	ICAL: 8290A CS3 10PG (487-01-01-16, no CU)
P12207P1_S4	20-Dec-17	15:10	ICAL: 8290A CS2 2.5PG (410-04-01-15)
P12207P1_S5	20-Dec-17	16:04	ICAL: 8290A CS1 1.0PG (53422, no CU)
P12207P1_S6	20-Dec-17	16:59	ICAL: 8290A CS0.5 0.50PG (59124, no CU)

SAVED AS P12207P1_8290A_ICAL IN C:\MASS/MX\DIOXIN 2017.PRO

WRKST # 2

12/26/17
T.F.

P12207C2 : FINAL 10K RESOLVING POWER CHECK AT 5% BASELINE DEFINITION

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Work continued to Page

SIGNATURE | DATE 12/20/17

DISCLOSED TO AND UNDERSTOOD BY Shraddha Quadrere | DATE 12/26/17 | WITNESS | DATE

TITLE CH2M HILL PRC

PROJECT NO. 20859.01.00X

BOOK NO. 010051

TO: 171212-5, 171214-9

Work continued from Page

SWRI

12/26/17

INSTRUMENT ID: AutoSpec P

BOOK NO: 16-0402-024

METHOD: 1613B/8290A/23

COLUMN: ZB-5 (60m,0.32mm id,0.25um film)

COLUMN FLOW: 1.3 mL/min

TEMP-1: 120 deg C	TIME-2: 15 min	RATE-3 : 15deg/min	SOURCE TEMP : 275 deg C
TIME-1: 3.0 min	RATE-2: 3.0 deg/min	TEMP-4 : 320 deg C	INTERFACE TEMP : 270 deg C
RATE-1: 10deg/min	TEMP-3: 255 deg C	TIME-4 : 5 min	ELECTRON ENERGY: 40eV
TEMP-2: 215 deg C	TIME-3: 0 min	INJ TEMP: 275 deg C	SPLIT VALVE ON : 0.75 min

P12207C2 : INITIAL 10K RESOLVING POWER CHECK AT 5% BASELINE DEFINITION

FILENAME	Date	Time	SAMPLE TEXT
P12207P2_W1	20-Dec-17	17:55	WIN DEF/COL PERF SOLN (53544)
P12207P2_S1	20-Dec-17	18:49	ICV/VER: 8290A CS3 10PG (409-03-01-15)
P12207P2_01	20-Dec-17	19:43	SOLVENT
P12207P2_02	20-Dec-17	20:38	CH2M: BLANK_18DEC17 SN:625413
P12207P2_03	20-Dec-17	21:32	CH2M: B3FKF0 SN:624991
P12207P2_04	20-Dec-17	22:27	CH2M: B3FJW7 SN:625170
P12207P2_05	20-Dec-17	23:21	CH2M: B3FKB9 SN:625171
P12207P2_06	21-Dec-17	0:16	CH2M: B3FKD5 SN:625172
P12207P2_07	21-Dec-17	1:10	CH2M: B3FKD5 MS SN:625172MS
P12207P2_08	21-Dec-17	2:04	CH2M: B3FKD5 MSD SN:625172MSD — run not used. See p. 196 for reanalysis 12/26/17 T.F.
P12207P2_09	21-Dec-17	2:59	CH2M: LCS_18DEC17 SN:625414
P12207P2_S2	21-Dec-17	3:53	VER: 8290A CS3 10PG (487-01-01-16, no CU)

SAVED AS P12207P2 - 8290A_SAMPS in C:\MASS/MX\DIOXIN 2017.PRO

WAKST #2

12/26/17
T.F.

P12207C3 : FINAL 10K RESOLVING POWER CHECK AT 5% BASELINE DEFINITION

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Work continued to Page

SIGNATURE

DATE 12/20/17

DISCLOSED TO AND UNDERSTOOD BY Shraddha Chandera

DATE 12/26/17

WITNESS

DATE

196 TITLE CH2M HILL PRC TO: M1212-5

PROJECT NO. 20859.01.00 **BOOK NO.** 010052

Work continued from Page

SWRI

12/26/17

INSTRUMENT ID: AutoSpec P BOOK NO: 16-0402-024 METHOD: 1613B/8290A/23

COLUMN: ZB-5 (60m,0.32mm id,0.25um film) COLUMN FLOW: 1.3 mL/min

TEMP-1: 120 deg C	TIME-2: 15 min	RATE-3 : 15deg/min	SOURCE TEMP : 275 deg C
TIME-1: 3.0 min	RATE-2: 3.0 deg/min	TEMP-4 : 320 deg C	INTERFACE TEMP : 270 deg C
RATE-1: 10deg/min	TEMP-3: 255 deg C	TIME-4 : 5 min	ELECTRON ENERGY: 40eV
TEMP-2: 215 deg C	TIME-3: 0 min	INJ TEMP: 275 deg C	SPLIT VALVE ON : 0.75 min

P12217C3 : INITIAL 10K RESOLVING POWER CHECK AT 5% BASELINE DEFINITION

FILENAME	Date	Time	SAMPLE TEXT
P12217P2_W1	21-Dec-17	17:09	WIN DEF/COL PERF SOLN (53544)
P12217P2_S1	21-Dec-17	18:03	VER: 8290A CS3 10PG (487-01-01-16, no CU)
P12217P2_01	21-Dec-17	18:58	SOLVENT
P12217P2_02	21-Dec-17	19:52	CH2M: B3FKD5 MSD SN:625172MSD – INIT ANALYSES ON P. 195 12/26/17 TF
P12217P2_S2	21-Dec-17	20:47	VER: 8290A CS3 10PG (487-01-01-16, no CU)

SAVED AS P12217P2_8290A_SAMPS INC:\MASS\MX\DIOXIN 2017.PRC

RETST #2

12/26/17
T.F.

P12217C4 : FINAL 10K RESOLVING POWER CHECK AT 5% BASELINE DEFINITION

SIGNATURE DATE 12/21/17

DISCLOSED TO AND UNDERSTOOD BY DATE 12/26/17 WITNESS DATE

010053

SOUTHWEST RESEARCH INSTITUTE
CLIENT: CH2M Hill Plateau Remediation Company
SwRI PROJECT#: 20859.01.00X
SwRI TASK ORDER: 171212-5, 171214-9
SwRI SRR: 60874, 60889
SDG: 624991
SAF: W18-012
VTSR: 12.12.2017, 12.14.2017

EPA METHOD 8290A
Extraction Forms

010054 X38405

(E8290W) Dioxin Water Extraction By Sep-Funnel 3510C (CH2M)

SwRI Labs
Client: CH2M Hill Plateau Remediation Company
Project: 20859.01.00X
Case: CHPRC, W18-012

Sample Receipt: 60874, 60889
TO#'s: 171214-9, 171212-5

DATE EXTRACTED	12/18/17
ANALYSTS INVOLVED	Christina Menn (SP,BD) Marina Lebron(EXT,Conc,QT) Hamed Edrisi (SU,SW,EXT) Ronald Douglas (sp-cu,CU,BD,QT,FV)
SURROGATE SOL. ID	491-01-01-17@50/125/250pg/uL
MTX SPK SOL. ID	439-01-01-15@10/25/50pg/uL
CLEAN UP STD ID	508-01-01-17@4.0pg/uL
EXTRACTS LOCATION	Tracked By LIMS(12/19/17 RD)
CHEMICAL,BRAND,&LOT#	Ozarka water ID:04-0402-003p24L5,6 Sodium Sulfate ID:04-0402-004P29B DCM Fisher Optima Lot#176740 Hexane Fisher Optima Lot#173874 Sulfuric Acid Fisher Lot#171338 Acidified Silica Gel ID:09-0402-004p197B MP N-Super I Alumina Lot#16

NOTES	Hamilton Co. Syringes: 25uL ID#621849(SURR) 25uL ID#621850(MS)
ADDITIONAL NOTES	*FV before clean-up pH paper 83518
EMULSION	C= Centrifuged,W= Wired,T= Tilted
REFRENCE BOOK &PAGE	17-0402-025p14
TAP(S) USED	Extraction: 01-0402-015 Clean-up: 01-0402-125

	System ID	Type	Customer ID	PH	SAMPLE VOL	SURROGATE SOL VOL
1	624991		B3FKF0	6.4	1030 mL	10 uL
2	625170		B3FJW7	6.4	1040 mL	10 uL
3	625171		B3FKB9	6.4	1050 mL	10 uL
4	625172		B3FKD5	6.4	1030 mL	10 uL
5	625172	MS	B3FKD5	6.4	1030 mL	10 uL
6	625172	MSD	B3FKD5	6.4	1020 mL	10 uL
7	625413		WQCBLK_18DEC17	6.4	1000 mL	10 uL
8	625414		LCS_18DEC17	6.4	1000 mL	10 uL

	System ID	Type	Customer ID	MTX SPK SOL VOL	FV HEX	CLEAN UP STD VOL
1	624991		B3FKF0	0 uL	~4mL*	25 uL
2	625170		B3FJW7	0 uL	~4mL*	25 uL
3	625171		B3FKB9	0 uL	~4mL*	25 uL
4	625172		B3FKD5	0 uL	~4mL*	25 uL
5	625172	MS	B3FKD5	10 uL	~4mL*	25 uL
6	625172	MSD	B3FKD5	10 uL	~4mL*	25 uL
7	625413		WQCBLK_18DEC17	0 uL	~4mL*	25 uL
8	625414		LCS_18DEC17	10 uL	~4mL*	25 uL

	System ID	Type	Customer ID	H2SO4 VOL (ML)	AL/SI 4.5"/4.5"	CHARCOAL YES/NO	EMULSION
1	624991		B3FKF0	4	1	no	no
2	625170		B3FJW7	4	1	no	no
3	625171		B3FKB9	4	1	no	no
4	625172		B3FKD5	4	1	no	no
5	625172	MS	B3FKD5	4	1	no	no
6	625172	MSD	B3FKD5	4	1	no	no
7	625413		WQCBLK_18DEC17	4	1	no	no
8	625414		LCS_18DEC17	4	1	no	no

Page created Dec 18 2017 12:05PM by mlebron
Date Printed: 12/26/2017
Book: EXTRACTION LAB, Volume: EXT-2017, Page: 515 (Section 1 of 2)
Approved by CHRISTINA MENN on Dec 26 2017 10:33AM

ver (04/10/2017)

(E8290W) Dioxin Water Extraction By Sep-Funnel 3510C (CH2M)

010055 X38405

SwRI Labs
Client: CH2M Hill Plateau Remediation Company
Project: 20859.01.00X
Case: CHPRC, W18-012

Sample Receipt: 60874, 60889
TO#'s: 171214-9, 171212-5

Extraction Flowchart:

XmL H2O —> ~4mL Hexane —> Dioxin Clean-up (AC/Si/AL)

└> FV Dryness for analysis

Page created Dec 18 2017 12:05PM by mlebron
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Approved by CHRISTINA MENN on Dec 26 2017 10:33AM

Date Printed: 12/26/2017

ver (04/10/2017)

REV.1

010056 X38418

CH2M Hill PRC (8290A) RS spiking

SwRI Labs
Client: CH2M Hill Plateau Remediation Company
Project: 20859.01.00X
Case: CHPRC, W18-012

Sample Receipt: 60874, 60889
TO#'s: 171212-5, 171214-9

SOLVENT (CI#):	Nonane (CI# 67040)
RS SPIKE ID:	515-01-01-17
EXTRACT LOCATION:	Frz 31, Box 42, E2-E9

COMMENTS:

	System ID	Type	Customer ID	VOLUME RS	VOLUME SOLVENT	SPIKE DATE	SPIKE PERSON
1	624991		B3FKF0	10.0 uL	30.0 uL	12/19/17	CG
2	625170		B3FJW7	10.0 uL	30.0 uL	12/19/17	CG
3	625171		B3FKB9	10.0 uL	30.0 uL	12/19/17	CG
4	625172		B3FKD5	10.0 uL	30.0 uL	12/19/17	CG
5	625413		WQCBLK_18DEC17	10.0 uL	30.0 uL	12/19/17	CG
6	625172	MS	B3FKD5	10.0 uL	30.0 uL	12/19/17	CG
7	625172	MSD	B3FKD5	10.0 uL	30.0 uL	12/19/17	CG
8	625414		LCS_18DEC17	10.0 uL	30.0 uL	12/19/17	CG

Page created Dec 19 2017 5:47PM by CGourley
Book: BNA/DIOXIN, Volume: HRMS SPIKE LOG, Page: 548 (Section 1 of 1)
Approved by TOM FARIAS on Dec 26 2017 2:19PM

Date Printed: 12/26/2017

ver (04/10/2017)