

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:

[illegible]

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148918

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	12/11/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	KT 12/11/17 10:31		MEDIA:	NA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-68		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
↓	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	↓	↓
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE	↓	↓
	WSP-8290-D/F	1 LITER AMBER GLASS	2	ICE	↓	↓
	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE	↓	↓
	WSP-CN(T)	250 ML POLY	1	NAOH	↓	↓
	WSP-GrossA/B	1 LITER POLY	1	HNO3	↓	↓
	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	↓
	WSP-RAD	1 GAL POLY	1	HNO3	↓	↓
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY****EVENT ID:** 11605**EVENT NAME:** Water/CdV (TA16 260) Q1 MY2018**SAMPLE ID:** CAWA-18-148918**WORK ORDER:****SAMPLE COMMENTS:** *Sampled 40 ft from running diesel generator***LOCATION COMMENTS:** *None***FIELD PARAMETERS:**

Sample Time	<u>1031</u>	HH:MM	Discharge Rate	<u>5.66</u>	Dissolved Oxygen	<u>5.68</u>
Groundwater Elevation	<u>6182.70</u>		Oxidation-Reduction Potential	<u>36.5</u>	Period Purge Volume	<u>NA</u>
pH	<u>7.45</u>		Purge Volume	<u>283.0</u>	Specific Conductance	<u>112.8</u>
Temperature	<u>13.9</u>		Total Volume Pumped	<u>339.60</u>	Turbidity	<u>7.02</u>

**COLLECTED BY (PRINT):** *T. Vander Vis*

RELINQUISHED BY (Printed Name) (Signature)	<i>Katrina Tow</i> <i>[Signature]</i>	Date/Time <i>12/11/17</i> <i>1156</i>	RECEIVED BY (Printed Name) (Signature)	<i>Sherwood</i> <i>[Signature]</i>	Date/Time <i>12/11/17</i> <i>1156</i>
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148943

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	12/11/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1031		MEDIA:	NA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-68		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FD	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
↓	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	↓	↓
↓	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE	↓	↓
↓	WSP-8290-D/F	1 LITER AMBER GLASS	2	ICE	↓	↓
↓	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE	↓	↓
↓	WSP-CN(T)	250 ML POLY	1	NAOH	↓	↓
↓	WSP-GrossA/B	1 LITER POLY	1	HNO3	↓	↓
↓	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	↓
↓	WSP-RAD	1 GAL POLY	1	HNO3	↓	↓
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

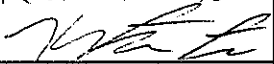

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY****EVENT ID:** 11605**EVENT NAME:** Water/CdV (TA16 260) Q1 MY2018**SAMPLE ID:** CAWA-18-148943**WORK ORDER:****SAMPLE COMMENTS:**~~12/11/17~~ <sup>KT 12/11/17</sup> None**LOCATION COMMENTS:**~~12/11/17~~ <sup>KT 12/11/17</sup> None**FIELD PARAMETERS:**

~~KT 12/11/17~~

Sample Time	HH:MM	Discharge Rate	_____	Dissolved Oxygen	_____
Groundwater Elevation	_____	Oxidation-Reduction Potential	_____	Period Purge Volume	_____
pH	_____	Purge Volume	_____	Specific Conductance	_____
Temperature	_____	Total Volume Pumped	_____	Turbidity	_____

**COLLECTED BY (PRINT):**

T. Vander Vis

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow 	Date/Time 12/11/17 1156	RECEIVED BY (Printed Name) (Signature)	MATT ENGELBERT 	Date/Time 12-11-17 1156
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

TEST - Explosives		YES	NO
Samples collected from a WFO area? (TAs -08, 09, 11, 14, 15, 16, 22, 36, 37, 39, 40, and 49)			✓
Field Test for Explosives Results		YES	NO
HE SPOT test result positive. If YES - Do not transport.			✓

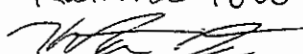
TEST - Chemical Preservation		YES	NO
Samples are chemically preserved?		✓	
Field Team Member Statement		YES	NO
Chemical preservation exceeds limits given 40 CFR 136, Table II - Required Containers, Preservation Techniques and Holding Times (footnote 3). If YES - Do not ship.			✓

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				✓
Sample Activity (dpm/100cm <sup>2</sup> )	Shipment Activity (dpm*g/100cm <sup>2</sup> )	Sampled Location	YES	NO
Alpha detectable	AND Alpha ≥ 160,000	AT TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		✓
Alpha ≥ 125	AND Alpha ≥ 1,250,000	AT other locations		✓
Beta ≥ 1,500	AND Beta ≥ 15,000,000	AT any location		✓
The sample Alpha ≥ 16,000,000 dpm*g/100cm <sup>2</sup> or Beta ≥ 160,000,000 dpm*g/100cm <sup>2</sup> . If YES - Do not ship.				✓
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm <sup>2</sup> , beta activity ≥ 240 dpm/cm <sup>2</sup> , or surface activity ≥ 0.5 mR/hr. If YES - Do not ship.				✓
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on field screening measurements of alpha and beta activity.				✓

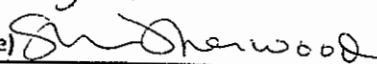
TEST - Location			YES	NO
Prior analytical measurements of radioactive isotopes are available?			✓	
Sample Activity (pCi/g)	Shipment Activity (pCi)		YES	NO
• Am-241 ≥ 27 pCi/g	AND	Am-241 ≥ 270,000 pCi Total		
• Cs-137 ≥ 270 pCi/g	AND	Cs-137 ≥ 270,000 pCi Total		
• Pu-238 ≥ 27 pCi/g	AND	Pu-238 ≥ 270,000 pCi Total		
• Pu-239/240 ≥ 27 pCi/g	AND	Pu-239/240 ≥ 270,000 pCi Total		✓
• Th-228 ≥ 27 pCi/g	AND	Th-228 ≥ 270,000 pCi Total		
• U-234 ≥ 270 pCi/g	AND	U-234 ≥ 1,600,000,000 pCi Total		
• U-238 ≥ 270 pCi/g	AND	U-238 ≥ unlimited		
• H-3 ≥ 27,000,000 pCi/g	AND	H-3 ≥ 27,000,000,000 pCi Total		
Am-241, Pu-238, Pu-239/240, or Th-228 ≥ 27,000,000 pCi; or Cs-137 ≥ 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.				✓
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.				✓

TEST - AK		YES	NO
The shippers documented knowledge of the sample positively identifies appropriate labeling.			✓
Documented Field Team Member Statement		YES	NO
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, and the sample is submitted to ARS or RP for hazard classification analysis.			✓

These samples do not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200. The sample(s) contained in this shipment have been assigned a tentative proper DOT shipping name, hazard class, identification number, and packing group, based on the shipper's knowledge of the sample:

Hazard Assessment Completed By:		Date/Time
(Printed Name)	Katrina Tow	12/11/17
(Signature)		1156

R-68

Hazard Assessment Reviewed By:		Date/Time
(Printed Name)	Shenwood	12/11/17
(Signature)		1156

ER-SOP-10094, R1, Attachmen

## DATA VALIDATION REPORT

Chain Of Custody No. 2018-1242

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
11767	EPA:170.0	1	1			
11767	SW-846:8290A	1	1			

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
11767	EPA:170.0	NA	NA	1	1																
11767	SW-846:8290A	36563	36560	1					1					1	1						
11767	SW-846:8290A	36643	36641		1				1					1	1						

### 2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:170.0	VOC	CAWA-18-148918	11767001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-148943	11767002	FD	1	0	0	0
SW-846:8290A	DIOXINS FURANS	CAWA-18-148918	11767001	REG	25	9	0	0
SW-846:8290A	DIOXINS FURANS	CAWA-18-148943	11767002	FD	25	9	0	0
SW-846:8290A	DIOXINS FURANS	LCS	12020350	LCS	0	9	17	0
SW-846:8290A	DIOXINS FURANS	LCS	12020423	LCS	0	9	17	0
SW-846:8290A	DIOXINS FURANS	LCSD	12020351	LCSD	0	9	17	0
SW-846:8290A	DIOXINS FURANS	LCSD	12020424	LCSD	0	9	17	0
SW-846:8290A	DIOXINS FURANS	MB	12020349	MB	25	9	0	0
SW-846:8290A	DIOXINS FURANS	MB	12020422	MB	25	9	0	0

### 3. Are any analytes missing?

No.

### 4. Were any holding times exceeded?

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.



## DATA VALIDATION REPORT

No.

5. Any contaminants in blanks?

No.

6. Any surrogate recoveries outside the control limits?

Field Sample ID	Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Spike Recovery	Upper Limit	Lower Limit	Rejection Limit
CAWA-18-148918	11767001	SW-846:8290A	13C-TCDD[2,3,7,8]	36563	12-30-2017	34	135	40	
CAWA-18-148918	11767001	SW-846:8290A	13C-TCDF[2,3,7,8]	36563	12-30-2017	12	135	40	
LCS	12020350	SW-846:8290A	13C-TCDD[2,3,7,8]	36563	12-29-2017	33	135	40	
LCS	12020350	SW-846:8290A	13C-TCDF[2,3,7,8]	36563	12-29-2017	13	135	40	
LCSD	12020351	SW-846:8290A	13C-TCDD[2,3,7,8]	36563	12-29-2017	30	135	40	
LCSD	12020351	SW-846:8290A	13C-TCDF[2,3,7,8]	36563	12-29-2017	14	135	40	
MB	12020349	SW-846:8290A	13C-TCDD[2,3,7,8]	36563	12-29-2017	38	135	40	
MB	12020349	SW-846:8290A	13C-TCDF[2,3,7,8]	36563	12-29-2017	16	135	40	

7. Any MS/MSD recoveries or RPDs outside the control limits?

No.

8. Any LCS/LCSD or BS/BSD recoveries or RPDs outside the control limits?

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
12020350	12020351	SW-846:8290A	Hexachlorodibenzofuran	36560	12-29-2017	W	135	127	130	70			5.71	20

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.

## DATA VALIDATION REPORT

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

### 13. Display Flagged Data.

None.

<u>Reason Code</u>	<u>Description</u>
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualifier. The analyte is detected in the sample.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-18-148918	R-68	REG	EPA:170.0	0	1
CAWA-18-148918	R-68	REG	SW-846:8290A	0	25
CAWA-18-148943	R-68	FD	EPA:170.0	0	1
CAWA-18-148943	R-68	FD	SW-846:8290A	0	25

January 12, 2018

Ms. Nita Patel  
Los Alamos National Laboratory  
PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

Re: 2012 WQH with LOCUS EDD  
Work Order: 11767  
SDG: 2018-1242

Dear Ms. Patel:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 13, 2017. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,



Cynde Larkins  
Project Manager

Chain of Custody: 2018-1242  
Enclosures

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**Los Alamos National Laboratory**  
**2012 WQH with LOCUS EDD**  
**Workorder #: 11767**  
**SDG # : 2018-1242**

# Case Narrative

**Receipt Narrative  
for  
Los Alamos National Laboratory  
SDG: 2018-1242  
Work Order: 11767**

**Laboratory Identification**

Cape Fear Analytical, LLC  
3306 Kitty Hawk Road, Suite 120  
Wilmington, North Carolina 28405  
(910) 795-0421

**Summary**

**Sample receipt:** The samples arrived at Cape Fear Analytical LLC (CFA), Wilmington, North Carolina on December 13, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. Shipping container temperatures were checked, documented, and within specifications. All sample containers arrived without any visible signs of tampering or breakage. Appropriate sample containers were received. Sample containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Sufficient sample was received for analysis. There are no additional comments concerning sample receipt.

**Sample Identification:** The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
11767001	CAWA-18-148918
11767002	CAWA-18-148943

**Case Narrative**

Sample analyses were conducted using methodology as outlined in Cape Fear Analytical's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

**Data Package**

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist and data from the following fractions: High Resolution Dioxins and Furans.

Sincerely,



Cynde Larkins  
Project Manager

**List of current CFA Certifications as of 18 December 2017**

<b>State</b>	<b>Certification</b>
California (NELAC)	09270CA
New Jersey (NELAC)	NC013
North Carolina	NC01894
South Carolina	99063001
Utah (Primary NELAC)	CFAL



# **Chain of Custody and Supporting Documentation**

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**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <u>LANL</u>	Work Order: <u>11767</u>
Shipping Company: <u>FedEx</u>	Date/Time Received: <u>13 Dec 17 1037</u>

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?	<input checked="" type="checkbox"/>		
Samples < 2x background?	<input checked="" type="checkbox"/>		

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			<input checked="" type="checkbox"/>

Air Witness: \_\_\_\_\_

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken   damaged container   leaking container   other(describe)
2 Chain of Custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within 0-6°C?	<input checked="" type="checkbox"/>			Preservation Method: ice bags <u>blue ice</u> dry ice none other (describe) <u>5.0° - 1.9 = 3.1°C</u>
4 Aqueous samples found to have visible solids?			<input checked="" type="checkbox"/>	Sample IDs, containers affected:
5 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample IDs, containers affected and pH observed: <u>pH = 7 on all</u> If preservative added, Lot#:
6 Samples requiring preservation have no residual chlorine?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:  If preservative added, Lot#:
7 Samples received within holding time?	<input checked="" type="checkbox"/>			Sample IDs, tests affected:
8 Sample IDs on COC match IDs on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
9 Date & time of COC match date & time on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
10 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			List type and number of containers / Sample IDs, containers affected:
11 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

1 of 2 container broken in transit. for sample CAWA-18-148918.

Checklist performed by: Initials: CJ Date: 13 Dec 17

CF-UD-F-7

ORIGIN ID:SAFA (505) 665-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03  
LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 12DEC17  
ACTWGT: 33.0 LB MAN  
CAD: 0014176/CAFE2916

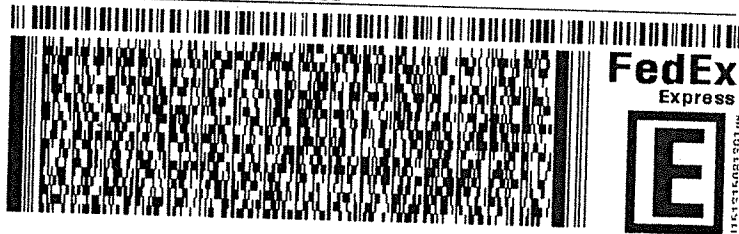
BILL SENDER

TO **CHRIS CORNWELL**  
**CAPE FEAR ANALYTICAL**  
**3306 KITTY HAWK ROAD, SUITE 120**

**WILMINGTON NC 28405**

(910) 795-0421

REF: 21PD0ASRGW04BAGWS0



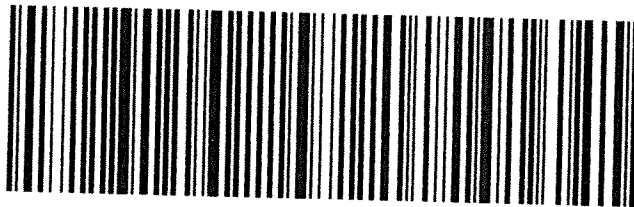
TRK# 5908 1783 3264  
0201

WED - 13 DEC 10:30A  
PRIORITY OVERNIGHT

**XH ILMA**

28405  
NC-US GSO

Part #: 156148V-434 FIT2 06/15 233



*Temp. = 5.0 - 1.9 = 3.1°C*

# **High Resolution Dioxins and Furans Analysis**

# Case Narrative

**HDOX LANL-FBWP Case Narrative  
Los Alamos National Laboratory (LANL)  
SDG 2018-1242  
Work Order 11767**

**Method/Analysis Information**

**Product:** Dioxins/Furans by SW846 Method 8290A in Liquids  
**Analytical Method:** SW846 8290A  
**Extraction Method:** SW846 3520C  
**Analytical Batch Number:** 36563, 36643  
**Clean Up Batch Number:** 36561, 36642  
**Extraction Batch Number:** 36560, 36641

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 8290A:

<b>Sample ID</b>	<b>Client ID</b>
11767001	CAWA-18-148918
11767002	CAWA-18-148943
12020349	Method Blank (MB)
12020350	Laboratory Control Sample (LCS)
12020351	Laboratory Control Sample Duplicate (LCSD)
12020422	Method Blank (MB)
12020423	Laboratory Control Sample (LCS)
12020424	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 14.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

**Quality Control (QC) Information****Certification Statement**

The test results presented in this document are certified to meet all requirements of the analytical method, the 2009 TNI Standard and the DoD/DOE QSM. (A2LA scope No. 3014-01.

**Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

Samples 11767001 (CAWA-18-148918), 12020349 (MB), 12020350 (LCS) and 12020351 (LCSD)- Batch 36563 did not meet acceptance criteria for surrogate recovery. There was no more sample left for re-extraction; therefore, the data is reported.

**Laboratory Control Sample (LCS) Recovery**

One analyte recovered above the upper acceptance limit. This may indicate a high bias for this analyte, however the analyte was not detected above the PQL in the associated samples. 12020350 (LCS)- Batch 36563.

**Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

**LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

**QC Sample Designation**

A matrix spike and matrix spike duplicate analysis was not required for this SDG.

**Technical Information****Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.



**Sample Re-extraction/Re-analysis**

Sample 11767002 (CAWA-18-148943)- Batch 36643 was re-extracted in order to confirm surrogate failures.

**Miscellaneous Information****Nonconformance (NCR) Documentation**

The following NCR was generated for this SDG: 646747 11767001 (CAWA-18-148918), 12020349 (MB), 12020350 (LCS) and 12020351 (LCSD)- Batch 36563.

**Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

**System Configuration**

This analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
HRP763_1	Primary Dioxin Analysis	Dioxin Analysis	DB-5MS	60m x 0.25mm, 0.25um

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# **Sample Data Summary**

## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - [www.capefearanalytical.com](http://www.capefearanalytical.com)

### Qualifier Definition Report for

LANL001 Los Alamos National Laboratory

Client SDG: 2018-1242 CFA Work Order: 11767

#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for , but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 12 JAN 2018

Title: Group Leader

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

**SDG Number:** 2018-1242  
**Lab Sample ID:** 11767001  
**Client Sample:** 8290 Water  
**Client ID:** CAWA-18-148918  
**Batch ID:** 36563  
**Run Date:** 12/30/2017 11:56  
**Data File:** b30dec17a-3  
**Prep Batch:** 36560  
**Prep Date:** 27-DEC-17

**Client:** LANL001  
**Date Collected:** 12/11/2017 10:31  
**Date Received:** 12/13/2017 10:37  
  
**Method:** SW846 8290A  
**Analyst:** MJC  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 966.7 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.4		pg/L	1.40	10.3
40321-76-4	1,2,3,7,8-PeCDD	U	5.17		pg/L	5.17	51.7
39227-28-6	1,2,3,4,7,8-HxCDD	U	5.17		pg/L	5.17	51.7
57653-85-7	1,2,3,6,7,8-HxCDD	U	5.17		pg/L	5.17	51.7
19408-74-3	1,2,3,7,8,9-HxCDD	U	5.17		pg/L	5.17	51.7
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	5.17		pg/L	5.17	51.7
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	10.3		pg/L	10.3	103
51207-31-9	2,3,7,8-TCDF	U	5.38		pg/L	5.38	10.3
57117-41-6	1,2,3,7,8-PeCDF	U	5.17		pg/L	5.17	51.7
57117-31-4	2,3,4,7,8-PeCDF	U	5.17		pg/L	5.17	51.7
70648-26-9	1,2,3,4,7,8-HxCDF	U	5.17		pg/L	5.17	51.7
57117-44-9	1,2,3,6,7,8-HxCDF	U	5.17		pg/L	5.17	51.7
60851-34-5	2,3,4,6,7,8-HxCDF	U	5.17		pg/L	5.17	51.7
72918-21-9	1,2,3,7,8,9-HxCDF	U	5.17		pg/L	5.17	51.7
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	5.17		pg/L	5.17	51.7
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	5.17		pg/L	5.17	51.7
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	10.3		pg/L	10.3	103
41903-57-5	Total TCDDs	U	0		pg/L		
36088-22-9	Total PeCDDs	U	0		pg/L		
34465-46-8	Total HxCDDs	U	0		pg/L		
37871-00-4	Total HpCDDs	U	0		pg/L		
55722-27-5	Total TCDFs	U	0		pg/L		
30402-15-4	Total PeCDFs	U	0		pg/L		
55684-94-1	Total HxCDFs	U	0		pg/L		
38998-75-3	Total HpCDFs	U	0		pg/L		
3333-30-0	TEQ WHO2005 ND=0		0.00	0.00	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		6.30	6.30	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		706	2070	pg/L	34.1 *	(40%-135%)
13C-1,2,3,7,8-PeCDD		1480	2070	pg/L	71.6	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1640	2070	pg/L	79.0	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1920	2070	pg/L	92.6	(40%-135%)
13C-OCDD		3460	4140	pg/L	83.7	(40%-135%)
13C-2,3,7,8-TCDF		254	2070	pg/L	12.3 *	(40%-135%)
13C-1,2,3,7,8-PeCDF		1400	2070	pg/L	67.6	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1570	2070	pg/L	76.1	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1760	2070	pg/L	84.9	(40%-135%)

**Comments:**

U Analyte was analyzed for , but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

**SDG Number:** 2018-1242  
**Lab Sample ID:** 11767002  
**Client Sample:** 8290 Water  
**Client ID:** CAWA-18-148943  
**Batch ID:** 36643  
**Run Date:** 01/11/2018 19:35  
**Data File:** b11jan18b-5  
**Prep Batch:** 36641  
**Prep Date:** 10-JAN-18

**Client:** LANL001  
**Date Collected:** 12/11/2017 10:31  
**Date Received:** 12/13/2017 10:37  
  
**Method:** SW846 8290A  
**Analyst:** CLP  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 951.2 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.05		pg/L	1.05	10.5
40321-76-4	1,2,3,7,8-PeCDD	U	5.26		pg/L	5.26	52.6
39227-28-6	1,2,3,4,7,8-HxCDD	U	5.26		pg/L	5.26	52.6
57653-85-7	1,2,3,6,7,8-HxCDD	U	5.26		pg/L	5.26	52.6
19408-74-3	1,2,3,7,8,9-HxCDD	U	5.26		pg/L	5.26	52.6
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	5.26		pg/L	5.26	52.6
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	10.5		pg/L	10.5	105
51207-31-9	2,3,7,8-TCDF	U	1.06		pg/L	1.06	10.5
57117-41-6	1,2,3,7,8-PeCDF	U	5.26		pg/L	5.26	52.6
57117-31-4	2,3,4,7,8-PeCDF	U	5.26		pg/L	5.26	52.6
70648-26-9	1,2,3,4,7,8-HxCDF	U	5.26		pg/L	5.26	52.6
57117-44-9	1,2,3,6,7,8-HxCDF	U	5.26		pg/L	5.26	52.6
60851-34-5	2,3,4,6,7,8-HxCDF	U	5.26		pg/L	5.26	52.6
72918-21-9	1,2,3,7,8,9-HxCDF	U	5.26		pg/L	5.26	52.6
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	5.26		pg/L	5.26	52.6
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	5.26		pg/L	5.26	52.6
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	10.5		pg/L	10.5	105
41903-57-5	Total TCDDs	U	0		pg/L		
36088-22-9	Total PeCDDs	U	0		pg/L		
34465-46-8	Total HxCDDs	U	0		pg/L		
37871-00-4	Total HpCDDs	U	0		pg/L		
55722-27-5	Total TCDFs	U	0		pg/L		
30402-15-4	Total PeCDFs	U	0		pg/L		
55684-94-1	Total HxCDFs	U	0		pg/L		
38998-75-3	Total HpCDFs	U	0		pg/L		
3333-30-0	TEQ WHO2005 ND=0		0.00	0.00	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		6.00	6.00	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1820	2100	pg/L	86.5	(40%-135%)
13C-1,2,3,7,8-PeCDD		1390	2100	pg/L	65.9	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1790	2100	pg/L	84.9	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1950	2100	pg/L	92.7	(40%-135%)
13C-OCDD		3290	4210	pg/L	78.3	(40%-135%)
13C-2,3,7,8-TCDF		1750	2100	pg/L	83.3	(40%-135%)
13C-1,2,3,7,8-PeCDF		1590	2100	pg/L	75.6	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1810	2100	pg/L	86.3	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		2010	2100	pg/L	95.6	(40%-135%)

**Comments:**

U Analyte was analyzed for , but not detected above the specified detection limit.

# **Quality Control Summary**

# **Hi-Res Dioxins/Furans** **Surrogate Recovery Report**

SDG Number: 2018-1242

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12020350	LCS for batch 36560	13C-2,3,7,8-TCDD		32.6 *	(40%-135%)
		13C-1,2,3,7,8-PeCDD		66.9	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		74.7	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		82.0	(40%-135%)
		13C-OCDD		66.8	(40%-135%)
		13C-2,3,7,8-TCDF		13.4 *	(40%-135%)
		13C-1,2,3,7,8-PeCDF		66.2	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		77.0	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		81.2	(40%-135%)
12020351	LCSD for batch 36560	13C-2,3,7,8-TCDD		30.2 *	(40%-135%)
		13C-1,2,3,7,8-PeCDD		60.7	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		75.2	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		80.8	(40%-135%)
		13C-OCDD		66.5	(40%-135%)
		13C-2,3,7,8-TCDF		13.5 *	(40%-135%)
		13C-1,2,3,7,8-PeCDF		59.7	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		75.9	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		79.5	(40%-135%)
12020349	MB for batch 36560	13C-2,3,7,8-TCDD		37.6 *	(40%-135%)
		13C-1,2,3,7,8-PeCDD		64.0	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		70.7	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		79.6	(40%-135%)
		13C-OCDD		65.7	(40%-135%)
		13C-2,3,7,8-TCDF		16.4 *	(40%-135%)
		13C-1,2,3,7,8-PeCDF		65.8	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		71.2	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		77.1	(40%-135%)
11767001	CAWA-18-148918	13C-2,3,7,8-TCDD		34.1 *	(40%-135%)
		13C-1,2,3,7,8-PeCDD		71.6	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		79.0	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		92.6	(40%-135%)
		13C-OCDD		83.7	(40%-135%)
		13C-2,3,7,8-TCDF		12.3 *	(40%-135%)
		13C-1,2,3,7,8-PeCDF		67.6	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		76.1	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		84.9	(40%-135%)
12020423	LCS for batch 36641	13C-2,3,7,8-TCDD		93.1	(40%-135%)
		13C-1,2,3,7,8-PeCDD		76.8	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		87.0	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		94.2	(40%-135%)
		13C-OCDD		79.8	(40%-135%)
		13C-2,3,7,8-TCDF		86.6	(40%-135%)
		13C-1,2,3,7,8-PeCDF		86.8	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		88.5	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		93.2	(40%-135%)
12020424	LCSD for batch 36641	13C-2,3,7,8-TCDD		85.4	(40%-135%)
		13C-1,2,3,7,8-PeCDD		67.3	(40%-135%)

# **Hi-Res Dioxins/Furans** **Surrogate Recovery Report**

SDG Number: 2018-1242

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12020424	LCSD for batch 36641	13C-1,2,3,6,7,8-HxCDD		79.2	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		88.9	(40%-135%)
		13C-OCDD		77.0	(40%-135%)
		13C-2,3,7,8-TCDF		79.8	(40%-135%)
		13C-1,2,3,7,8-PeCDF		77.9	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		81.4	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		88.9	(40%-135%)
12020422	MB for batch 36641	13C-2,3,7,8-TCDD		91.2	(40%-135%)
		13C-1,2,3,7,8-PeCDD		67.5	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		83.6	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		89.4	(40%-135%)
		13C-OCDD		79.8	(40%-135%)
		13C-2,3,7,8-TCDF		83.1	(40%-135%)
		13C-1,2,3,7,8-PeCDF		77.4	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		86.1	(40%-135%)
11767002	CAWA-18-148943	13C-1,2,3,4,6,7,8-HpCDF		93.7	(40%-135%)
		13C-2,3,7,8-TCDD		86.5	(40%-135%)
		13C-1,2,3,7,8-PeCDD		65.9	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		84.9	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		92.7	(40%-135%)
		13C-OCDD		78.3	(40%-135%)
		13C-2,3,7,8-TCDF		83.3	(40%-135%)
		13C-1,2,3,7,8-PeCDF		75.6	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		86.3	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		95.6	(40%-135%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted



**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 1 of 2

SDG Number: 2018-1242

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 36560

Matrix: WATER

Lab Sample ID: 12020350

Instrument: HRP763

Analysis Date: 12/29/2017 11:43

Dilution: 1

Analyst: MJC

Prep Batch ID: 36560

Batch ID: 36563

CAS No.	Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	200	200	100	70-130
40321-76-4	LCS 1,2,3,7,8-PeCDD	1000	1150	115	70-130
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	1000	1140	114	70-130
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	1000	1200	120	70-130
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	1000	1300	130	70-130
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	1000	969	96.9	70-130
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	2000	2150	108	70-130
51207-31-9	LCS 2,3,7,8-TCDF	200	188	93.9	70-130
57117-41-6	LCS 1,2,3,7,8-PeCDF	1000	961	96.1	70-130
57117-31-4	LCS 2,3,4,7,8-PeCDF	1000	897	89.7	70-130
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	1000	1120	112	70-130
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	1000	1130	113	70-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	1000	1140	114	70-130
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	1000	1350	135 *	70-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	1000	1040	104	70-130
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	1000	967	96.7	70-130
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	2000	2090	104	70-130

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 2 of 2

SDG Number: 2018-1242

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 36560

Matrix: WATER

Lab Sample ID: 12020351

Instrument: HRP763

Analysis Date: 12/29/2017 12:31

Dilution: 1

Analyst: MJC

Prep Batch ID: 36560

Batch ID: 36563

CAS No.	Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	200	200	100	70-130	0.140	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	1000	1140	114	70-130	0.985	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	1000	1170	117	70-130	2.27	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	1000	1180	118	70-130	1.54	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	1000	1280	128	70-130	2.11	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	1000	952	95.2	70-130	1.79	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	2000	2140	107	70-130	0.680	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	200	190	95.2	70-130	1.36	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	1000	980	98	70-130	2.02	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	1000	923	92.3	70-130	2.91	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	1000	1100	110	70-130	1.08	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	1000	1120	112	70-130	0.738	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	1000	1140	114	70-130	0.0683	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	1000	1270	127	70-130	5.71	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	1000	1040	104	70-130	0.480	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	1000	955	95.5	70-130	1.22	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	2000	2120	106	70-130	1.49	0-20

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 1 of 2

**SDG Number:** 2018-1242  
**Client ID:** LCS for batch 36641  
**Lab Sample ID:** 12020423  
**Instrument:** HRP763  
**Analyst:** CLP

**Sample Type:** Laboratory Control Sample  
**Matrix:** WATER  
**Analysis Date:** 01/11/2018 17:09  
**Prep Batch ID:** 36641  
**Batch ID:** 36643

**Dilution:** 1

CAS No.	Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	200	201	100	70-130
40321-76-4	LCS 1,2,3,7,8-PeCDD	1000	1200	120	70-130
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	1000	1110	111	70-130
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	1000	1270	127	70-130
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	1000	1250	125	70-130
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	1000	1000	100	70-130
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	2000	2140	107	70-130
51207-31-9	LCS 2,3,7,8-TCDF	200	201	100	70-130
57117-41-6	LCS 1,2,3,7,8-PeCDF	1000	996	99.6	70-130
57117-31-4	LCS 2,3,4,7,8-PeCDF	1000	966	96.6	70-130
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	1000	1140	114	70-130
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	1000	1240	124	70-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	1000	1170	117	70-130
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	1000	1160	116	70-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	1000	1090	109	70-130
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	1000	1040	104	70-130
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	2000	2270	114	70-130

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 2 of 2

SDG Number: 2018-1242

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 36641

Matrix: WATER

Lab Sample ID: 12020424

Instrument: HRP763

Analysis Date: 01/11/2018 17:58

Dilution: 1

Analyst: CLP

Prep Batch ID: 36641

Batch ID: 36643

CAS No.	Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	200	202	101	70-130	0.725	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	1000	1230	123	70-130	2.49	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	1000	1130	113	70-130	1.96	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	1000	1260	126	70-130	0.798	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	1000	1250	125	70-130	0.262	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	1000	986	98.6	70-130	1.41	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	2000	2160	108	70-130	1.04	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	200	199	99.4	70-130	0.891	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	1000	996	99.6	70-130	0.010	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	1000	966	96.6	70-130	0.0331	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	1000	1160	116	70-130	1.76	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	1000	1240	124	70-130	0.313	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	1000	1180	118	70-130	0.722	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	1000	1140	114	70-130	1.38	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	1000	1070	107	70-130	1.90	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	1000	1000	100	70-130	3.16	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	2000	2270	113	70-130	0.251	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: 2018-1242  
Client ID: MB for batch 36560  
Lab Sample ID: 12020349  
Column:

Client: LANL001  
Instrument ID: HRP763  
Prep Date: 27-DEC-17

Matrix: WATER  
Data File: b29dec17b-4  
Analyzed: 12/29/17 13:19

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 36560	12020350	b29dec17b-2	12/29/17	1143
02 LCSD for batch 36560	12020351	b29dec17b-3	12/29/17	1231
03 CAWA-18-148918	11767001	b30dec17a-3	12/30/17	1156

## Method Blank Summary

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SDG Number: 2018-1242  
Client ID: MB for batch 36641  
Lab Sample ID: 12020422  
Column:

Client: LANL001  
Instrument ID: HRP763  
Prep Date: 10-JAN-18

Matrix: WATER  
Data File: b11jan18b-4  
Analyzed: 01/11/18 18:46

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 36641	12020423	b11jan18b-2	01/11/18	1709
02 LCSD for batch 36641	12020424	b11jan18b-3	01/11/18	1758
03 CAWA-18-148943	11767002	b11jan18b-5	01/11/18	1935

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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**SDG Number:** 2018-1242  
**Lab Sample ID:** 12020349  
**Client Sample:** QC for batch 36560  
**Client ID:** MB for batch 36560  
**Batch ID:** 36563  
**Run Date:** 12/29/2017 13:19  
**Data File:** b29dec17b-4  
**Prep Batch:** 36560  
**Prep Date:** 27-DEC-17

**Client:** LANL001  
  
**Method:** SW846 8290A  
**Analyst:** MJC  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 1000 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1		pg/L	1.00	10.0
40321-76-4	1,2,3,7,8-PeCDD	U	5		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD	U	5		pg/L	5.00	50.0
57653-85-7	1,2,3,6,7,8-HxCDD	U	5		pg/L	5.00	50.0
19408-74-3	1,2,3,7,8,9-HxCDD	U	5		pg/L	5.00	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	5		pg/L	5.00	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	10		pg/L	10.0	100
51207-31-9	2,3,7,8-TCDF	U	1.47		pg/L	1.47	10.0
57117-41-6	1,2,3,7,8-PeCDF	U	5		pg/L	5.00	50.0
57117-31-4	2,3,4,7,8-PeCDF	U	5		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF	U	5		pg/L	5.00	50.0
57117-44-9	1,2,3,6,7,8-HxCDF	U	5		pg/L	5.00	50.0
60851-34-5	2,3,4,6,7,8-HxCDF	U	5		pg/L	5.00	50.0
72918-21-9	1,2,3,7,8,9-HxCDF	U	5		pg/L	5.00	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	5		pg/L	5.00	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	5		pg/L	5.00	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	10		pg/L	10.0	100
41903-57-5	Total TCDDs	U	0		pg/L		
36088-22-9	Total PeCDDs	U	0		pg/L		
34465-46-8	Total HxCDDs	U	0		pg/L		
37871-00-4	Total HpCDDs	U	0		pg/L		
55722-27-5	Total TCDFs	U	0		pg/L		
30402-15-4	Total PeCDFs	U	0		pg/L		
55684-94-1	Total HxCDFs	U	0		pg/L		
38998-75-3	Total HpCDFs	U	0		pg/L		
3333-30-0	TEQ WHO2005 ND=0		0.00	0.00	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		5.73	5.73	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		751	2000	pg/L	37.6 *	(40%-135%)
13C-1,2,3,7,8-PeCDD		1280	2000	pg/L	64.0	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1410	2000	pg/L	70.7	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1590	2000	pg/L	79.6	(40%-135%)
13C-OCDD		2630	4000	pg/L	65.7	(40%-135%)
13C-2,3,7,8-TCDF		328	2000	pg/L	16.4 *	(40%-135%)
13C-1,2,3,7,8-PeCDF		1320	2000	pg/L	65.8	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1420	2000	pg/L	71.2	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1540	2000	pg/L	77.1	(40%-135%)

**Comments:**

**U** Analyte was analyzed for , but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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**SDG Number:** 2018-1242  
**Lab Sample ID:** 12020350  
**Client Sample:** QC for batch 36560  
**Client ID:** LCS for batch 36560  
**Batch ID:** 36563  
**Run Date:** 12/29/2017 11:43  
**Data File:** b29dec17b-2  
**Prep Batch:** 36560  
**Prep Date:** 27-DEC-17

**Client:** LANL001  
  
**Method:** SW846 8290A  
**Analyst:** MJC  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 1000 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		200		pg/L	1.00	10.0
40321-76-4	1,2,3,7,8-PeCDD		1150		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1140		pg/L	5.00	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1200		pg/L	5.00	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1300		pg/L	5.00	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		969		pg/L	5.00	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2150		pg/L	10.0	100
51207-31-9	2,3,7,8-TCDF		188		pg/L	2.36	10.0
57117-41-6	1,2,3,7,8-PeCDF		961		pg/L	5.00	50.0
57117-31-4	2,3,4,7,8-PeCDF		897		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1120		pg/L	5.00	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1130		pg/L	5.00	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1140		pg/L	5.00	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1350		pg/L	5.00	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1040		pg/L	5.00	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		967		pg/L	5.00	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2090		pg/L	10.0	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		652	2000	pg/L	32.6 *	(40%-135%)
13C-1,2,3,7,8-PeCDD		1340	2000	pg/L	66.9	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1490	2000	pg/L	74.7	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1640	2000	pg/L	82.0	(40%-135%)
13C-OCDD		2670	4000	pg/L	66.8	(40%-135%)
13C-2,3,7,8-TCDF		268	2000	pg/L	13.4 *	(40%-135%)
13C-1,2,3,7,8-PeCDF		1320	2000	pg/L	66.2	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1540	2000	pg/L	77.0	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1620	2000	pg/L	81.2	(40%-135%)

**Comments:**

**U** Analyte was analyzed for , but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

**SDG Number:** 2018-1242  
**Lab Sample ID:** 12020351  
**Client Sample:** QC for batch 36560  
**Client ID:** LCSD for batch 36560  
**Batch ID:** 36563  
**Run Date:** 12/29/2017 12:31  
**Data File:** b29dec17b-3  
**Prep Batch:** 36560  
**Prep Date:** 27-DEC-17

**Client:** LANL001  
  
**Method:** SW846 8290A  
**Analyst:** MJC  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 1000 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		200		pg/L	1.00	10.0
40321-76-4	1,2,3,7,8-PeCDD		1140		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1170		pg/L	5.00	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1180		pg/L	5.00	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1280		pg/L	5.00	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		952		pg/L	5.00	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2140		pg/L	10.0	100
51207-31-9	2,3,7,8-TCDF		190		pg/L	2.42	10.0
57117-41-6	1,2,3,7,8-PeCDF		980		pg/L	5.00	50.0
57117-31-4	2,3,4,7,8-PeCDF		923		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1100		pg/L	5.00	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1120		pg/L	5.00	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1140		pg/L	5.00	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1270		pg/L	5.00	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1040		pg/L	5.00	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		955		pg/L	5.00	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2120		pg/L	10.0	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		605	2000	pg/L	30.2 *	(40%-135%)
13C-1,2,3,7,8-PeCDD		1210	2000	pg/L	60.7	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1500	2000	pg/L	75.2	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1620	2000	pg/L	80.8	(40%-135%)
13C-OCDD		2660	4000	pg/L	66.5	(40%-135%)
13C-2,3,7,8-TCDF		270	2000	pg/L	13.5 *	(40%-135%)
13C-1,2,3,7,8-PeCDF		1190	2000	pg/L	59.7	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1520	2000	pg/L	75.9	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1590	2000	pg/L	79.5	(40%-135%)

**Comments:**

**U** Analyte was analyzed for , but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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**SDG Number:** 2018-1242  
**Lab Sample ID:** 12020422  
**Client Sample:** QC for batch 36641  
**Client ID:** MB for batch 36641  
**Batch ID:** 36643  
**Run Date:** 01/11/2018 18:46  
**Data File:** b11jan18b-4  
**Prep Batch:** 36641  
**Prep Date:** 10-JAN-18

**Client:** LANL001  
  
**Method:** SW846 8290A  
**Analyst:** CLP  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 1000 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1		pg/L	1.00	10.0
40321-76-4	1,2,3,7,8-PeCDD	U	5		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD	U	5		pg/L	5.00	50.0
57653-85-7	1,2,3,6,7,8-HxCDD	U	5		pg/L	5.00	50.0
19408-74-3	1,2,3,7,8,9-HxCDD	U	5		pg/L	5.00	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	5		pg/L	5.00	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	10		pg/L	10.0	100
51207-31-9	2,3,7,8-TCDF	U	1.16		pg/L	1.16	10.0
57117-41-6	1,2,3,7,8-PeCDF	U	5		pg/L	5.00	50.0
57117-31-4	2,3,4,7,8-PeCDF	U	5		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF	U	5		pg/L	5.00	50.0
57117-44-9	1,2,3,6,7,8-HxCDF	U	5		pg/L	5.00	50.0
60851-34-5	2,3,4,6,7,8-HxCDF	U	5		pg/L	5.00	50.0
72918-21-9	1,2,3,7,8,9-HxCDF	U	5		pg/L	5.00	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	5		pg/L	5.00	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	5		pg/L	5.00	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	10		pg/L	10.0	100
41903-57-5	Total TCDDs	U	0		pg/L		
36088-22-9	Total PeCDDs	U	0		pg/L		
34465-46-8	Total HxCDDs	U	0		pg/L		
37871-00-4	Total HpCDDs	U	0		pg/L		
55722-27-5	Total TCDFs	U	0		pg/L		
30402-15-4	Total PeCDFs	U	0		pg/L		
55684-94-1	Total HxCDFs	U	0		pg/L		
38998-75-3	Total HpCDFs	U	0		pg/L		
3333-30-0	TEQ WHO2005 ND=0		0.00	0.00	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		5.71	5.71	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1820	2000	pg/L	91.2	(40%-135%)
13C-1,2,3,7,8-PeCDD		1350	2000	pg/L	67.5	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1670	2000	pg/L	83.6	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1790	2000	pg/L	89.4	(40%-135%)
13C-OCDD		3190	4000	pg/L	79.8	(40%-135%)
13C-2,3,7,8-TCDF		1660	2000	pg/L	83.1	(40%-135%)
13C-1,2,3,7,8-PeCDF		1550	2000	pg/L	77.4	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1720	2000	pg/L	86.1	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1870	2000	pg/L	93.7	(40%-135%)

**Comments:****K** Estimated Maximum Possible Concentration**U** Analyte was analyzed for , but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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**SDG Number:** 2018-1242  
**Lab Sample ID:** 12020423  
**Client Sample:** QC for batch 36641  
**Client ID:** LCS for batch 36641  
**Batch ID:** 36643  
**Run Date:** 01/11/2018 17:09  
**Data File:** b11jan18b-2  
**Prep Batch:** 36641  
**Prep Date:** 10-JAN-18

**Client:** LANL001  
  
**Method:** SW846 8290A  
**Analyst:** CLP  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 1000 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		201		pg/L	1.15	10.0
40321-76-4	1,2,3,7,8-PeCDD		1200		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1110		pg/L	5.00	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1270		pg/L	5.00	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1250		pg/L	5.00	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1000		pg/L	5.00	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2140		pg/L	10.0	100
51207-31-9	2,3,7,8-TCDF		201		pg/L	1.37	10.0
57117-41-6	1,2,3,7,8-PeCDF		996		pg/L	5.00	50.0
57117-31-4	2,3,4,7,8-PeCDF		966		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1140		pg/L	5.00	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1240		pg/L	5.00	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1170		pg/L	5.00	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1160		pg/L	5.12	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1090		pg/L	5.00	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1040		pg/L	5.00	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2270		pg/L	10.0	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1860	2000	pg/L	93.1	(40%-135%)
13C-1,2,3,7,8-PeCDD		1540	2000	pg/L	76.8	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1740	2000	pg/L	87.0	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1880	2000	pg/L	94.2	(40%-135%)
13C-OCDD		3190	4000	pg/L	79.8	(40%-135%)
13C-2,3,7,8-TCDF		1730	2000	pg/L	86.6	(40%-135%)
13C-1,2,3,7,8-PeCDF		1740	2000	pg/L	86.8	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1770	2000	pg/L	88.5	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1860	2000	pg/L	93.2	(40%-135%)

**Comments:**

**U** Analyte was analyzed for , but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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**SDG Number:** 2018-1242  
**Lab Sample ID:** 12020424  
**Client Sample:** QC for batch 36641  
**Client ID:** LCSD for batch 36641  
**Batch ID:** 36643  
**Run Date:** 01/11/2018 17:58  
**Data File:** b11jan18b-3  
**Prep Batch:** 36641  
**Prep Date:** 10-JAN-18

**Client:** LANL001  
  
**Method:** SW846 8290A  
**Analyst:** CLP  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 1000 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		202		pg/L	1.14	10.0
40321-76-4	1,2,3,7,8-PeCDD		1230		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1130		pg/L	5.00	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1260		pg/L	5.00	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1250		pg/L	5.00	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		986		pg/L	5.00	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2160		pg/L	10.0	100
51207-31-9	2,3,7,8-TCDF		199		pg/L	1.52	10.0
57117-41-6	1,2,3,7,8-PeCDF		996		pg/L	5.00	50.0
57117-31-4	2,3,4,7,8-PeCDF		966		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1160		pg/L	5.00	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1240		pg/L	5.00	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1180		pg/L	5.00	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1140		pg/L	5.00	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1070		pg/L	5.00	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1000		pg/L	5.00	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2270		pg/L	10.0	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1710	2000	pg/L	85.4	(40%-135%)
13C-1,2,3,7,8-PeCDD		1350	2000	pg/L	67.3	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1580	2000	pg/L	79.2	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1780	2000	pg/L	88.9	(40%-135%)
13C-OCDD		3080	4000	pg/L	77.0	(40%-135%)
13C-2,3,7,8-TCDF		1600	2000	pg/L	79.8	(40%-135%)
13C-1,2,3,7,8-PeCDF		1560	2000	pg/L	77.9	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1630	2000	pg/L	81.4	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1780	2000	pg/L	88.9	(40%-135%)

**Comments:**

**U** Analyte was analyzed for , but not detected above the specified detection limit.