

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]



2018-547		TEST - Explosives		YES	NO
Samples collected from a WFO area?					X
Field Test for Explosives Results				YES	NO
Spot test shows presence of explosives residues. If YES - Do not ship.				X	

TEST - Chemical Preservation		YES	NO
Samples are chemically preserved?			X
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.			X

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				X
Sample Activity (dpm/100cm <sup>2</sup> )	Shipment Activity (dpm*g/100cm <sup>2</sup> )	Sampled Location	YES	NO
Alpha detectable	Alpha >160,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		X
Alpha > 125	Alpha >1,250,000	other locations		
Beta > 1,500	Beta >15,000,000	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?		X	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO
<ul style="list-style-type: none"> <li>Am-241 &gt; 27</li> <li>Cs-137 &gt; 270</li> <li>Pu-238 &gt; 27</li> <li>Pu-239/240 &gt; 27</li> <li>Th-228 &gt; 27</li> <li>U-234 &gt; 270</li> <li>U-238 &gt; 270</li> <li>H-3 &gt; 27,000,000</li> </ul>	<ul style="list-style-type: none"> <li>Am-241 &gt; 270,000</li> <li>Cs-137 &gt; 270,000</li> <li>Pu-238 &gt; 270,000</li> <li>Pu-239/240 &gt; 270,000</li> <li>Th-228 &gt; 270,000</li> <li>U-234 &gt; 1,600,000,000</li> <li>U-238 &gt; unlimited</li> <li>H-3 &gt; 27,000,000,000</li> </ul>		X
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.			X
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.			X

TEST - AK		YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.				X
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.				X

HOLD SAMPLES FOR ANALYSIS	
The samples are held per ER-SOP-10094, Rev. 1, 5.2.2 [7]	

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) Melissa Mader	10/23/17
(Signature)	300

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	10-23-17
(Signature) M. Engler	1500



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147598

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	10/20/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1036	OK	MEDIA:		
PRS ID:	WA		SAMPLE TECH CODE:	CSL	
LOCATION ID:	R-57 S1		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-8082-PCB	1 LITER AMBER GLASS	3	ICE		
	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-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 COMMENTS: None

LOCATION COMMENTS: Sampled 50ft from running diesel generator

FIELD PARAMETERS:

Sample Time

NA

HH:MM

Dissolved Oxygen

5.67

Flow (in gpm)

3.7

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147598

WORK ORDER:

Oxidation-Reduction Potential	<u>176.3</u>	pH	<u>7.83</u>	Specific Conductance	<u>138.3</u>
Temperature	<u>21.4</u>	Turbidity	<u>0.1</u>		

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) <u>Daniel Scrunk</u> (Signature) <u>[Signature]</u>	Date/Time <u>10/20/17</u> <u>1305</u>	RECEIVED BY <u>MATT ENGLERT</u> (Printed Name) <u>[Signature]</u> (Signature) <u>[Signature]</u>	Date/Time <u>10-20-17</u> <u>1305</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147599

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/20/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1212	OK	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-57 S2		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-8082-PCB	1 LITER AMBER GLASS	3	ICE		
	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-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 COMMENTS: none

LOCATION COMMENTS: Sampled 50 ft Con running diesel generator

FIELD PARAMETERS:

Sample Time

NA

HH:MM

Dissolved Oxygen

5.89

Flow (in gpm)

3.65

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147599

WORK ORDER:

Oxidation-Reduction Potential	<u>210.2</u>	pH	<u>7.88</u>	Specific Conductance	<u>134.4</u>
Temperature	<u>22.3</u>	Turbidity	<u>0.5</u>		

COLLECTED BY (PRINT): A.V. Gil

RELINQUISHED BY (Printed Name) <u>Daniel J. Gil</u> (Signature) <u>[Signature]</u>	Date/Time <u>10/20/17</u> <u>1305</u>	RECEIVED BY (Printed Name) <u>S. Overwood</u> (Signature) <u>[Signature]</u>	Date/Time <u>10/20/17</u> <u>1305</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

## DATA VALIDATION REPORT

Chain Of Custody No. 2018-547

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
11573	EPA:170.0	2				
11573	SW-846:8290A	2				

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
11573	EPA:170.0	NA	NA	2																	
11573	SW-846:8290A	36096	36092	2					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	CAPA-18-147598	11573001	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147599	11573002	REG	1	0	0	0
SW-846:8290A	DIOXINS FURANS	CAPA-18-147598	11573001	REG	25	9	0	0
SW-846:8290A	DIOXINS FURANS	CAPA-18-147599	11573002	REG	25	9	0	0
SW-846:8290A	DIOXINS FURANS	LCS	12019931	LCS	0	9	17	0
SW-846:8290A	DIOXINS FURANS	LCSD	12019932	LCSD	0	9	17	0
SW-846:8290A	DIOXINS FURANS	MB	12019930	MB	25	9	0	0

### 3. Are any analytes missing?

No.

### 4. Were any holding times exceeded?

No.



## DATA VALIDATION REPORT

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	12019930	METHOD BLANK	SW-846:8290A	W	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-	16.4	JK	pg/L	50

No.

6. Any surrogate recoveries outside the control limits?

No.

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?

No.

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?

DATA VALIDATION REPORT

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-57 S2	2018-547	CAPA-18-147599	REG	INIT	DIOXINS FURANS	SW-846:8290A	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	BJK	U	DF4	N	6.00	pg/L	6e-006	ug/L			W	10/20/2017	36096		VAL	Y

Reason Code

Description

DF4	The sample result is =5 times the concentration of the related analyte in the method blank.
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. 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
CAPA-18-147598	R-57 S1	REG	EPA:170.0	0	1
CAPA-18-147598	R-57 S1	REG	SW-846:8290A	0	25
CAPA-18-147599	R-57 S2	REG	EPA:170.0	0	1
CAPA-18-147599	R-57 S2	REG	SW-846:8290A	0	25



November 20, 2017

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: 11573  
SDG: 2018-547

Dear Ms. Patel:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 24, 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: 2018-547  
Enclosures

**Los Alamos National Laboratory  
2012 WQH with LOCUS EDD  
Workorder #: 11573  
SDG # : 2018-547**



# Case Narrative

**Receipt Narrative  
for  
Los Alamos National Laboratory  
SDG: 2018-547  
Work Order: 11573**

**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 October 24, 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. Client was notified of collection time discrepancy. 11573001.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
11573001	CAPA-18-147598
11573002	CAPA-18-147599

**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 27 October 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**

[illegible]

**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <b>LANL</b>	Work Order: <b>11573</b>
Shipping Company: <b>FedEx</b>	Date/Time Received: <b>24OCT17 1020</b>

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 (blue ice)   dry ice   none   other (describe) <b>6.8° - 4.9° = 1.9°</b>
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: <b>pH = 7 on all containers</b> 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: <b>Collection time on labels for CAPA-18-147598 is 10:36, COC has 10:13</b>
10 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			List type and number of containers / Sample IDs, containers affected: <b>2- 1L WMA per sample</b>
11 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

Checklist performed by: Initials: **CF** Date: **24OCT17**

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: 23OCT17  
ACTWGT: 38.0 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#  
0201

RT 357  
FZ 359

1  
10:30

A

DATE - 24 OCT 10:30A  
PRIORITY OVERNIGHT

0287  
10.24

**XH ILMA**

**28405**  
NC-US GSO

Part # 156148V-434 RIT2 09/15 00



Temp. = 6.8 - 4.9 = 1.9°C

# **High Resolution Dioxins and Furans Analysis**

# Case Narrative

**HDOX LANL-FBWP Case Narrative  
Los Alamos National Laboratory (LANL)  
SDG 2018-547  
Work Order 11573**

**Method/Analysis Information**

**Product:** Dioxins/Furans by SW846 Method 8290A in Liquids  
**Analytical Method:** SW846 8290A  
**Extraction Method:** SW846 3520C  
**Analytical Batch Number:** 36096  
**Clean Up Batch Number:** 36093  
**Extraction Batch Number:** 36092

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
11573001	CAPA-18-147598
11573002	CAPA-18-147599
12019930	Method Blank (MB)
12019931	Laboratory Control Sample (LCS)
12019932	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**

All surrogate recoveries were within the established acceptance criteria for this SDG.

### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

### **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**

Re-extractions or re-analyses were not required in this SDG.

## **Miscellaneous Information**

### **Nonconformance (NCR) Documentation**

A NCR was not required for this SDG.

### **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>
HRP750_2	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

### Qualifier Definition Report for

LANL001 Los Alamos National Laboratory

Client SDG: 2018-547 CFA Work Order: 11573

#### 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
- B The target analyte was detected in the associated blank.
- J Value is estimated
- K Estimated Maximum Possible Concentration
- 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: 20 NOV 2017

Title: Group Leader



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

Page 1 of 1

**SDG Number:** 2018-547  
**Lab Sample ID:** 11573001  
**Client Sample:** 8290 Water  
**Client ID:** CAPA-18-147598  
**Batch ID:** 36096  
**Run Date:** 11/07/2017 13:10  
**Data File:** A06NOV17B\_3-11  
**Prep Batch:** 36092  
**Prep Date:** 03-NOV-17

**Client:** LANL001  
**Date Collected:** 10/20/2017 10:13  
**Date Received:** 10/24/2017 10:20  
  
**Method:** SW846 8290A  
**Analyst:** MJC  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 941.9 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP750  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	2.91		pg/L	2.91	10.6
40321-76-4	1,2,3,7,8-PeCDD	U	5.31		pg/L	5.31	53.1
39227-28-6	1,2,3,4,7,8-HxCDD	U	5.31		pg/L	5.31	53.1
57653-85-7	1,2,3,6,7,8-HxCDD	U	5.31		pg/L	5.31	53.1
19408-74-3	1,2,3,7,8,9-HxCDD	U	5.31		pg/L	5.31	53.1
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	5.31		pg/L	5.31	53.1
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	10.6		pg/L	10.6	106
51207-31-9	2,3,7,8-TCDF	U	1.89		pg/L	1.89	10.6
57117-41-6	1,2,3,7,8-PeCDF	U	5.31		pg/L	5.31	53.1
57117-31-4	2,3,4,7,8-PeCDF	U	5.31		pg/L	5.31	53.1
70648-26-9	1,2,3,4,7,8-HxCDF	U	5.31		pg/L	5.31	53.1
57117-44-9	1,2,3,6,7,8-HxCDF	U	5.31		pg/L	5.31	53.1
60851-34-5	2,3,4,6,7,8-HxCDF	U	5.31		pg/L	5.31	53.1
72918-21-9	1,2,3,7,8,9-HxCDF	U	5.31		pg/L	5.31	53.1
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	5.31		pg/L	5.31	53.1
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	5.31		pg/L	5.31	53.1
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	10.6		pg/L	10.6	106
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		7.02	7.02	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1680	2120	pg/L	79.1	(40%-135%)
13C-1,2,3,7,8-PeCDD		1900	2120	pg/L	89.5	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1640	2120	pg/L	77.3	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1830	2120	pg/L	86.3	(40%-135%)
13C-OCDD		3480	4250	pg/L	82.0	(40%-135%)
13C-2,3,7,8-TCDF		1650	2120	pg/L	77.7	(40%-135%)
13C-1,2,3,7,8-PeCDF		1840	2120	pg/L	86.8	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1500	2120	pg/L	70.8	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1690	2120	pg/L	79.8	(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:** 2018-547  
**Lab Sample ID:** 11573002  
**Client Sample:** 8290 Water  
**Client ID:** CAPA-18-147599  
**Batch ID:** 36096  
**Run Date:** 11/07/2017 13:57  
**Data File:** A06NOV17B\_3-12  
**Prep Batch:** 36092  
**Prep Date:** 03-NOV-17

**Client:** LANL001  
**Date Collected:** 10/20/2017 12:12  
**Date Received:** 10/24/2017 10:20  
  
**Method:** SW846 8290A  
**Analyst:** MJC  
  
**Prep Method:** SW846 3520C  
**Prep Aliquot:** 907.3 mL

**Project:** LANL00112  
**Matrix:** WATER  
  
**Prep Basis:** As Received  
  
**Instrument:** HRP750  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	3.06		pg/L	3.06	11.0
40321-76-4	1,2,3,7,8-PeCDD	U	5.51		pg/L	5.51	55.1
39227-28-6	1,2,3,4,7,8-HxCDD	U	5.51		pg/L	5.51	55.1
57653-85-7	1,2,3,6,7,8-HxCDD	U	5.51		pg/L	5.51	55.1
19408-74-3	1,2,3,7,8,9-HxCDD	U	5.51		pg/L	5.51	55.1
35822-46-9	1,2,3,4,6,7,8-HpCDD	BJK		6.00	pg/L	5.51	55.1
3268-87-9	1,2,3,4,6,7,8-OCDD	U	11		pg/L	11.0	110
51207-31-9	2,3,7,8-TCDF	U	2.2		pg/L	2.20	11.0
57117-41-6	1,2,3,7,8-PeCDF	U	5.51		pg/L	5.51	55.1
57117-31-4	2,3,4,7,8-PeCDF	U	5.51		pg/L	5.51	55.1
70648-26-9	1,2,3,4,7,8-HxCDF	U	5.51		pg/L	5.51	55.1
57117-44-9	1,2,3,6,7,8-HxCDF	U	5.51		pg/L	5.51	55.1
60851-34-5	2,3,4,6,7,8-HxCDF	U	5.51		pg/L	5.51	55.1
72918-21-9	1,2,3,7,8,9-HxCDF	U	5.51		pg/L	5.51	55.1
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	5.51		pg/L	5.51	55.1
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	5.51		pg/L	5.51	55.1
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	11		pg/L	11.0	110
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	6.00	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	0.060	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		7.32	7.35	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1810	2200	pg/L	82.1	(40%-135%)
13C-1,2,3,7,8-PeCDD		2100	2200	pg/L	95.1	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1780	2200	pg/L	81.0	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		2090	2200	pg/L	94.7	(40%-135%)
13C-OCDD		3910	4410	pg/L	88.7	(40%-135%)
13C-2,3,7,8-TCDF		1790	2200	pg/L	81.1	(40%-135%)
13C-1,2,3,7,8-PeCDF		2050	2200	pg/L	92.8	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1660	2200	pg/L	75.4	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1920	2200	pg/L	86.9	(40%-135%)

**Comments:**

- B** The target analyte was detected in the associated blank.  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for , but not detected above the specified detection limit.

# **Quality Control Summary**

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

Page 1 of 2

SDG Number: 2018-547

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12019931	LCS for batch 36092	13C-2,3,7,8-TCDD		77.3	(40%-135%)
		13C-1,2,3,7,8-PeCDD		84.4	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		77.9	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		84.4	(40%-135%)
		13C-OCDD		76.6	(40%-135%)
		13C-2,3,7,8-TCDF		73.9	(40%-135%)
		13C-1,2,3,7,8-PeCDF		83.3	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		73.6	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		81.7	(40%-135%)
12019932	LCSD for batch 36092	13C-2,3,7,8-TCDD		78.8	(40%-135%)
		13C-1,2,3,7,8-PeCDD		90.4	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		83.2	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		88.0	(40%-135%)
		13C-OCDD		81.2	(40%-135%)
		13C-2,3,7,8-TCDF		78.4	(40%-135%)
		13C-1,2,3,7,8-PeCDF		87.7	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		75.9	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		84.3	(40%-135%)
12019930	MB for batch 36092	13C-2,3,7,8-TCDD		81.8	(40%-135%)
		13C-1,2,3,7,8-PeCDD		92.3	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		81.5	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		89.5	(40%-135%)
		13C-OCDD		81.9	(40%-135%)
		13C-2,3,7,8-TCDF		78.6	(40%-135%)
		13C-1,2,3,7,8-PeCDF		91.4	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		74.1	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		84.8	(40%-135%)
11573001	CAPA-18-147598	13C-2,3,7,8-TCDD		79.1	(40%-135%)
		13C-1,2,3,7,8-PeCDD		89.5	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		77.3	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		86.3	(40%-135%)
		13C-OCDD		82.0	(40%-135%)
		13C-2,3,7,8-TCDF		77.7	(40%-135%)
		13C-1,2,3,7,8-PeCDF		86.8	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		70.8	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		79.8	(40%-135%)
11573002	CAPA-18-147599	13C-2,3,7,8-TCDD		82.1	(40%-135%)
		13C-1,2,3,7,8-PeCDD		95.1	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		81.0	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		94.7	(40%-135%)
		13C-OCDD		88.7	(40%-135%)
		13C-2,3,7,8-TCDF		81.1	(40%-135%)
		13C-1,2,3,7,8-PeCDF		92.8	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		75.4	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		86.9	(40%-135%)

\* Recovery outside Acceptance Limits

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

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SDG Number: 2018-547

Matrix Type: LIQUID

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Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
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\* 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: 2018-547

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 36092

Matrix: WATER

Lab Sample ID: 12019931

Instrument: HRP750

Analysis Date: 11/06/2017 18:15

Dilution: 1

Analyst: MJC

Prep Batch ID: 36092

Batch ID: 36096

CAS No.	Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	200	209	104	70-130
40321-76-4	LCS 1,2,3,7,8-PeCDD	1000	1110	111	70-130
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	1000	1120	112	70-130
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	1000	1110	111	70-130
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	1000	1100	110	70-130
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	1000	1100	110	70-130
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	2000	2160	108	70-130
51207-31-9	LCS 2,3,7,8-TCDF	200	198	98.9	70-130
57117-41-6	LCS 1,2,3,7,8-PeCDF	1000	1050	105	70-130
57117-31-4	LCS 2,3,4,7,8-PeCDF	1000	1070	107	70-130
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	1000	1160	116	70-130
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	1000	1170	117	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	1170	117	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	1000	100	70-130
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	2000	2110	106	70-130



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

Page 2 of 2

SDG Number: 2018-547

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 36092

Matrix: WATER

Lab Sample ID: 12019932

Instrument: HRP750

Analysis Date: 11/06/2017 19:02

Dilution: 1

Analyst: MJC

Prep Batch ID: 36092

Batch ID: 36096

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	215	107	70-130	2.93	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	1000	1070	107	70-130	3.66	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	1000	1100	110	70-130	1.61	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	1000	1100	110	70-130	0.886	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	1000	1080	108	70-130	2.13	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	1000	1110	111	70-130	1.01	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	2000	2160	108	70-130	0.0592	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	200	202	101	70-130	1.91	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	1000	1060	106	70-130	0.654	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	1000	1080	108	70-130	0.786	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	1000	1150	115	70-130	0.632	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	1000	1190	119	70-130	2.10	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	1000	1190	119	70-130	1.55	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	1000	1170	117	70-130	0.259	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	1000	1040	104	70-130	0.263	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	1000	1030	103	70-130	2.59	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	2000	2180	109	70-130	3.15	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: 2018-547  
Client ID: MB for batch 36092  
Lab Sample ID: 12019930  
Column:

Client: LANL001  
Instrument ID: HRP750  
Prep Date: 03-NOV-17

Matrix: WATER  
Data File: A06NOV17B\_2-3  
Analyzed: 11/06/17 19:49

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 36092	12019931	A06NOV17B_2-1	11/06/17	1815
02 LCSD for batch 36092	12019932	A06NOV17B_2-2	11/06/17	1902
03 CAPA-18-147598	11573001	A06NOV17B_3-11	11/07/17	1310
04 CAPA-18-147599	11573002	A06NOV17B_3-12	11/07/17	1357

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

Page 1 of 1

**SDG Number:** 2018-547  
**Lab Sample ID:** 12019930  
**Client Sample:** QC for batch 36092  
**Client ID:** MB for batch 36092  
**Batch ID:** 36096  
**Run Date:** 11/06/2017 19:49  
**Data File:** A06NOV17B\_2-3  
**Prep Batch:** 36092  
**Prep Date:** 03-NOV-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:** HRP750  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	3.28		pg/L	3.28	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	JK		16.4	pg/L	7.62	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	18.0		pg/L	10.0	100
51207-31-9	2,3,7,8-TCDF	U	2.18		pg/L	2.18	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	J	7.36		pg/L	5.36	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	6.86		pg/L	6.86	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF	J	16.3		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	24.9	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	J	17.7		pg/L		
3333-30-0	TEQ WHO2005 ND=0		0.0839	0.248	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		7.02	7.11	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1640	2000	pg/L	81.8	(40%-135%)
13C-1,2,3,7,8-PeCDD		1850	2000	pg/L	92.3	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1630	2000	pg/L	81.5	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1790	2000	pg/L	89.5	(40%-135%)
13C-OCDD		3280	4000	pg/L	81.9	(40%-135%)
13C-2,3,7,8-TCDF		1570	2000	pg/L	78.6	(40%-135%)
13C-1,2,3,7,8-PeCDF		1830	2000	pg/L	91.4	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1480	2000	pg/L	74.1	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1700	2000	pg/L	84.8	(40%-135%)

**Comments:****J** Value is estimated**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:** 2018-547  
**Lab Sample ID:** 12019931  
**Client Sample:** QC for batch 36092  
**Client ID:** LCS for batch 36092  
**Batch ID:** 36096  
**Run Date:** 11/06/2017 18:15  
**Data File:** A06NOV17B\_2-1  
**Prep Batch:** 36092  
**Prep Date:** 03-NOV-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:** HRP750  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		209		pg/L	4.06	10.0
40321-76-4	1,2,3,7,8-PeCDD		1110		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1120		pg/L	9.86	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1110		pg/L	9.02	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1100		pg/L	9.66	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1100		pg/L	10.8	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2160		pg/L	13.3	100
51207-31-9	2,3,7,8-TCDF		198		pg/L	3.88	10.0
57117-41-6	1,2,3,7,8-PeCDF		1050		pg/L	5.82	50.0
57117-31-4	2,3,4,7,8-PeCDF		1070		pg/L	5.26	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1160		pg/L	9.58	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1170		pg/L	8.82	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1170		pg/L	9.50	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1170		pg/L	11.2	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1040		pg/L	6.64	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1000		pg/L	8.50	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2110		pg/L	17.5	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1550	2000	pg/L	77.3	(40%-135%)
13C-1,2,3,7,8-PeCDD		1690	2000	pg/L	84.4	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1560	2000	pg/L	77.9	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1690	2000	pg/L	84.4	(40%-135%)
13C-OCDD		3060	4000	pg/L	76.6	(40%-135%)
13C-2,3,7,8-TCDF		1480	2000	pg/L	73.9	(40%-135%)
13C-1,2,3,7,8-PeCDF		1670	2000	pg/L	83.3	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1470	2000	pg/L	73.6	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1630	2000	pg/L	81.7	(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:** 2018-547  
**Lab Sample ID:** 12019932  
**Client Sample:** QC for batch 36092  
**Client ID:** LCSD for batch 36092  
**Batch ID:** 36096  
**Run Date:** 11/06/2017 19:02  
**Data File:** A06NOV17B\_2-2  
**Prep Batch:** 36092  
**Prep Date:** 03-NOV-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:** HRP750  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		215		pg/L	4.70	10.0
40321-76-4	1,2,3,7,8-PeCDD		1070		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1100		pg/L	7.54	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1100		pg/L	6.90	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1080		pg/L	7.40	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1110		pg/L	8.90	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2160		pg/L	15.7	100
51207-31-9	2,3,7,8-TCDF		202		pg/L	3.36	10.0
57117-41-6	1,2,3,7,8-PeCDF		1060		pg/L	5.00	50.0
57117-31-4	2,3,4,7,8-PeCDF		1080		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1150		pg/L	10.0	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1190		pg/L	9.22	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1190		pg/L	9.92	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1170		pg/L	11.7	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1040		pg/L	7.04	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1030		pg/L	9.02	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2180		pg/L	11.0	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1580	2000	pg/L	78.8	(40%-135%)
13C-1,2,3,7,8-PeCDD		1810	2000	pg/L	90.4	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1660	2000	pg/L	83.2	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1760	2000	pg/L	88.0	(40%-135%)
13C-OCDD		3250	4000	pg/L	81.2	(40%-135%)
13C-2,3,7,8-TCDF		1570	2000	pg/L	78.4	(40%-135%)
13C-1,2,3,7,8-PeCDF		1750	2000	pg/L	87.7	(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		1690	2000	pg/L	84.3	(40%-135%)

**Comments:**

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