

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:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11258

EVENT NAME: Water/CdV (TA16 260) Q3 MY2017

SAMPLE ID: CAWA-17-134190

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	06-02-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	13:33		MEDIA:	UA	
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	1 LITER POLY	1	HNO3	Y	NA
	WSP-8082-PCB	1 LITER AMBER GLASS	3	ICE		NA
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		10-day Quick turn
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		NA
	WSP-8290-D/F	1 LITER AMBER GLASS	2	ICE		NA
	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE		10-day Quick turn
	WSP-CN(T)	250 ML POLY	1	NAOH		NA
	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:

Sampled \approx 40' ft. from running diesel generator.

LOCATION COMMENTS:

None

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11258

EVENT NAME: Water/CdV (TA16 260) Q3 MY2017

SAMPLE ID: CAWA-17-134190

WORK ORDER:

FIELD PARAMETERS:

Sample Time	<u>1343</u>	HH:MM	Dissolved Oxygen	<u>6.21</u>	Flow (in gpm)	<u>5.76</u>
Oxidation-Reduction Potential	<u>161.5</u>		pH	<u>7.93</u>	Specific Conductance	<u>125.5</u>
Temperature	<u>14.1</u>		Turbidity	<u>125.7</u>		

COLLECTED BY (PRINT): D. Jaramillo, A. Vigil

RELINQUISHED BY (Printed Name) <u>ANDREW VIGIL</u> (Signature) <u>Andrew Vigil</u>	Date/Time <u>06/2/2017</u> <u>1500</u>	RECEIVED BY (Printed Name) <u>K. G. Green</u> (Signature) <u>[Signature]</u>	Date/Time <u>6/2/17</u> <u>15100</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 05/30/2017

DATA VALIDATION REPORT

Chain Of Custody No. 2017-1652

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
10875	EPA:170.0	1				
10875	SW-846:8290A	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
10875	EPA:170.0	NA	NA	1																	
10875	SW-846:8290A	34764	34760	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-17-134190	10875001	REG	1	0	0	0
SW-846:8290A	DIOXINS FURANS	CAWA-17-134190	10875001	REG	25	9	0	0
SW-846:8290A	DIOXINS FURANS	LCS	12018746	LCS	0	9	17	0
SW-846:8290A	DIOXINS FURANS	LCSD	12018747	LCSD	0	9	17	0
SW-846:8290A	DIOXINS FURANS	MB	12018745	MB	25	9	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

DATA VALIDATION REPORT

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?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

None.

Reason Code

Description

DATA VALIDATION REPORT

Reason Code

Description

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
CAWA-17-134190	R-68	REG	EPA:170.0	0	1
CAWA-17-134190	R-68	REG	SW-846:8290A	0	25

June 15, 2017

Mr. Keith Greene
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: 10875
SDG: 2017-1652

Dear Mr. Greene:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 06, 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: 2017-1652
Enclosures

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Los Alamos National Laboratory
2012 WQH with LOCUS EDD
Workorder #: 10875
SDG # : 2017-1652

Case Narrative

**Receipt Narrative
for
Los Alamos National Laboratory
SDG: 2017-1652
Work Order: 10875**

Laboratory Identification

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

Summary

Sample receipt: The sample arrived at Cape Fear Analytical LLC (CFA), Wilmington, North Carolina on June 06, 2017 for analysis. The sample was delivered with proper chain of custody documentation and signatures. Shipping container temperature was 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 sample:

<u>Laboratory ID</u>	<u>Client ID</u>
10875001	CAWA-17-134190

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 08 June 2017

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

Chain of Custody and Supporting Documentation

[illegible]

8/5/2017

Received by: Shirley A. FA

Print Name: Andrea Scapellato

Date/Time:

Print Name: _____

Date/Time:

Print Name: _____

SAMPLE RECEIPT CHECKLIST
Cape Fear Analytical

Client: <u>LANL</u>	Work Order: <u>10875</u>
Shipping Company: <u>FedEx</u>	Date/Time Received: <u>06 JUN 17 0945</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: NA

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) <u>6.0°C - 2.9°C = 3.1°C, 5.2°C - 2.9°C = 2.3°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 both containers</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: <u>#2 - 1 L amber glass</u>
11 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

2 coolers
custody seals intact

Checklist performed by: Initials: AS

Date: 06 JUN 17

CF-UD-F-7

High Resolution Dioxins and Furans Analysis

Case Narrative

**HDOX LANL Case Narrative
Los Alamos National Laboratory (LANL)
SDG 2017-1652
Work Order 10875**

Method/Analysis Information

Product: Dioxins/Furans by SW846 Method 8290A in Liquids
Analytical Method: SW846 8290A
Extraction Method: SW846 3520C
Analytical Batch Number: 34764
Clean Up Batch Number: 34761
Extraction Batch Number: 34760

Sample Analysis

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

Sample ID	Client ID
10875001	CAWA-17-134190
12018745	Method Blank (MB)
12018746	Laboratory Control Sample (LCS)
12018747	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 2009 TNI Standard.

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:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
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: 2017-1652 CFA Work Order: 10875

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: 15 JUN 2017

Title: Group Leader

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

Page 1 of 1

SDG Number: 2017-1652
Lab Sample ID: 10875001
Client Sample: 8290 Water
Client ID: CAWA-17-134190
Batch ID: 34764
Run Date: 06/09/2017 20:29
Data File: A09JUN17B-9
Prep Batch: 34760
Prep Date: 07-JUN-17

Client: LANL001
Date Collected: 06/02/2017 13:33
Date Received: 06/06/2017 09:45

Method: SW846 8290A
Analyst: CLP

Prep Method: SW846 3520C
Prep Aliquot: 925 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	1.24		pg/L	1.24	10.8
40321-76-4	1,2,3,7,8-PeCDD	U	5.41		pg/L	5.41	54.1
39227-28-6	1,2,3,4,7,8-HxCDD	U	5.41		pg/L	5.41	54.1
57653-85-7	1,2,3,6,7,8-HxCDD	U	5.41		pg/L	5.41	54.1
19408-74-3	1,2,3,7,8,9-HxCDD	U	5.41		pg/L	5.41	54.1
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	5.41		pg/L	5.41	54.1
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	10.8		pg/L	10.8	108
51207-31-9	2,3,7,8-TCDF	U	1.08		pg/L	1.08	10.8
57117-41-6	1,2,3,7,8-PeCDF	U	5.41		pg/L	5.41	54.1
57117-31-4	2,3,4,7,8-PeCDF	U	5.41		pg/L	5.41	54.1
70648-26-9	1,2,3,4,7,8-HxCDF	U	5.41		pg/L	5.41	54.1
57117-44-9	1,2,3,6,7,8-HxCDF	U	5.41		pg/L	5.41	54.1
60851-34-5	2,3,4,6,7,8-HxCDF	U	5.41		pg/L	5.41	54.1
72918-21-9	1,2,3,7,8,9-HxCDF	U	5.41		pg/L	5.41	54.1
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	5.41		pg/L	5.41	54.1
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	5.41		pg/L	5.41	54.1
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	10.8		pg/L	10.8	108
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		6.24	6.24	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1710	2160	pg/L	79.3	(40%-135%)
13C-1,2,3,7,8-PeCDD		2130	2160	pg/L	98.3	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1700	2160	pg/L	78.7	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1790	2160	pg/L	82.7	(40%-135%)
13C-OCDD		3420	4320	pg/L	79.1	(40%-135%)
13C-2,3,7,8-TCDF		1640	2160	pg/L	76.0	(40%-135%)
13C-1,2,3,7,8-PeCDF		1910	2160	pg/L	88.1	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1490	2160	pg/L	68.8	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1650	2160	pg/L	76.4	(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: 2017-1652

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12018746	LCS for batch 34760	13C-2,3,7,8-TCDD		79.9	(40%-135%)
		13C-1,2,3,7,8-PeCDD		96.2	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		77.1	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		85.0	(40%-135%)
		13C-OCDD		84.3	(40%-135%)
		13C-2,3,7,8-TCDF		78.0	(40%-135%)
		13C-1,2,3,7,8-PeCDF		88.1	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		68.4	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		79.0	(40%-135%)
12018747	LCSD for batch 34760	13C-2,3,7,8-TCDD		79.3	(40%-135%)
		13C-1,2,3,7,8-PeCDD		92.5	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		77.2	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		83.1	(40%-135%)
		13C-OCDD		80.3	(40%-135%)
		13C-2,3,7,8-TCDF		77.6	(40%-135%)
		13C-1,2,3,7,8-PeCDF		84.7	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		67.5	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		78.0	(40%-135%)
12018745	MB for batch 34760	13C-2,3,7,8-TCDD		78.2	(40%-135%)
		13C-1,2,3,7,8-PeCDD		92.2	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		74.5	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		79.6	(40%-135%)
		13C-OCDD		76.5	(40%-135%)
		13C-2,3,7,8-TCDF		75.7	(40%-135%)
		13C-1,2,3,7,8-PeCDF		85.4	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		65.6	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		73.1	(40%-135%)
10875001	CAWA-17-134190	13C-2,3,7,8-TCDD		79.3	(40%-135%)
		13C-1,2,3,7,8-PeCDD		98.3	(40%-135%)
		13C-1,2,3,6,7,8-HxCDD		78.7	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDD		82.7	(40%-135%)
		13C-OCDD		79.1	(40%-135%)
		13C-2,3,7,8-TCDF		76.0	(40%-135%)
		13C-1,2,3,7,8-PeCDF		88.1	(40%-135%)
		13C-1,2,3,6,7,8-HxCDF		68.8	(40%-135%)
		13C-1,2,3,4,6,7,8-HpCDF		76.4	(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: 2017-1652

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 34760

Matrix: WATER

Lab Sample ID: 12018746

Instrument: HRP750

Analysis Date: 06/09/2017 14:54

Dilution: 1

Analyst: CLP

Prep Batch ID: 34760

Batch ID: 34764

CAS No.	Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	200	212	106	70-130
40321-76-4	LCS 1,2,3,7,8-PeCDD	1000	1000	100	70-130
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	1000	1160	116	70-130
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	1000	1030	103	70-130
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	1000	1120	112	70-130
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	1000	1070	107	70-130
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	2000	2050	102	70-130
51207-31-9	LCS 2,3,7,8-TCDF	200	198	99.1	70-130
57117-41-6	LCS 1,2,3,7,8-PeCDF	1000	1020	102	70-130
57117-31-4	LCS 2,3,4,7,8-PeCDF	1000	1030	103	70-130
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	1000	1130	113	70-130
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	1000	1050	105	70-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	1000	1120	112	70-130
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	1000	1260	126	70-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	1000	976	97.6	70-130
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	1000	1030	103	70-130
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	2000	1960	97.9	70-130

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

Page 2 of 2

SDG Number: 2017-1652

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 34760

Matrix: WATER

Lab Sample ID: 12018747

Instrument: HRP750

Analysis Date: 06/09/2017 15:42

Dilution: 1

Analyst: CLP

Prep Batch ID: 34760

Batch ID: 34764

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	204	102	70-130	3.96	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	1000	992	99.2	70-130	0.841	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	1000	1070	107	70-130	7.80	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	1000	1070	107	70-130	3.83	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	1000	1120	112	70-130	0.832	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	1000	1040	104	70-130	3.02	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	2000	2020	101	70-130	1.42	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	200	197	98.6	70-130	0.557	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	1000	996	99.6	70-130	2.76	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	1000	1010	101	70-130	1.32	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	1000	1110	111	70-130	1.73	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	1000	1060	106	70-130	0.148	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	1000	1110	111	70-130	0.410	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	1000	1200	120	70-130	4.80	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	1000	946	94.6	70-130	3.15	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	1000	1010	101	70-130	2.19	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	2000	1910	95.6	70-130	2.42	0-20

Method Blank Summary

Page 1 of 1

SDG Number: 2017-1652
Client ID: MB for batch 34760
Lab Sample ID: 12018745
Column:

Client: LANL001
Instrument ID: HRP750
Prep Date: 07-JUN-17

Matrix: WATER
Data File: A09JUN17B-4
Analyzed: 06/09/17 16:30

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 34760	12018746	A09JUN17B-2	06/09/17	1454
02 LCSD for batch 34760	12018747	A09JUN17B-3	06/09/17	1542
03 CAWA-17-134190	10875001	A09JUN17B-9	06/09/17	2029

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

Page 1 of 1

SDG Number: 2017-1652
Lab Sample ID: 12018745
Client Sample: QC for batch 34760
Client ID: MB for batch 34760
Batch ID: 34764
Run Date: 06/09/2017 16:30
Data File: A09JUN17B-4
Prep Batch: 34760
Prep Date: 07-JUN-17

Client: LANL001
Method: SW846 8290A
Analyst: CLP
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	1.16		pg/L	1.16	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		pg/L	1.00	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		5.78	5.78	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1560	2000	pg/L	78.2	(40%-135%)
13C-1,2,3,7,8-PeCDD		1840	2000	pg/L	92.2	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1490	2000	pg/L	74.5	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1590	2000	pg/L	79.6	(40%-135%)
13C-OCDD		3060	4000	pg/L	76.5	(40%-135%)
13C-2,3,7,8-TCDF		1510	2000	pg/L	75.7	(40%-135%)
13C-1,2,3,7,8-PeCDF		1710	2000	pg/L	85.4	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1310	2000	pg/L	65.6	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1460	2000	pg/L	73.1	(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**

Page 1 of 1

SDG Number: 2017-1652
Lab Sample ID: 12018746
Client Sample: QC for batch 34760
Client ID: LCS for batch 34760
Batch ID: 34764
Run Date: 06/09/2017 14:54
Data File: A09JUN17B-2
Prep Batch: 34760
Prep Date: 07-JUN-17

Client: LANL001

Method: SW846 8290A
Analyst: CLP

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		212		pg/L	1.65	10.0
40321-76-4	1,2,3,7,8-PeCDD		1000		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1160		pg/L	5.00	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1030		pg/L	5.00	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1120		pg/L	5.00	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1070		pg/L	5.24	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2050		pg/L	11.3	100
51207-31-9	2,3,7,8-TCDF		198		pg/L	1.24	10.0
57117-41-6	1,2,3,7,8-PeCDF		1020		pg/L	5.00	50.0
57117-31-4	2,3,4,7,8-PeCDF		1030		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1130		pg/L	6.54	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1050		pg/L	5.60	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1120		pg/L	6.22	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1260		pg/L	7.48	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		976		pg/L	5.00	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1030		pg/L	6.12	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		1960		pg/L	10.0	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1600	2000	pg/L	79.9	(40%-135%)
13C-1,2,3,7,8-PeCDD		1920	2000	pg/L	96.2	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1540	2000	pg/L	77.1	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1700	2000	pg/L	85.0	(40%-135%)
13C-OCDD		3370	4000	pg/L	84.3	(40%-135%)
13C-2,3,7,8-TCDF		1560	2000	pg/L	78.0	(40%-135%)
13C-1,2,3,7,8-PeCDF		1760	2000	pg/L	88.1	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1370	2000	pg/L	68.4	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1580	2000	pg/L	79.0	(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: 2017-1652
Lab Sample ID: 12018747
Client Sample: QC for batch 34760
Client ID: LCSD for batch 34760
Batch ID: 34764
Run Date: 06/09/2017 15:42
Data File: A09JUN17B-3
Prep Batch: 34760
Prep Date: 07-JUN-17

Client: LANL001

Method: SW846 8290A
Analyst: CLP

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		204		pg/L	1.56	10.0
40321-76-4	1,2,3,7,8-PeCDD		992		pg/L	5.00	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1070		pg/L	5.30	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1070		pg/L	5.00	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1120		pg/L	5.00	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1040		pg/L	5.16	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2020		pg/L	10.0	100
51207-31-9	2,3,7,8-TCDF		197		pg/L	1.62	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		1010		pg/L	5.00	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1110		pg/L	6.20	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1060		pg/L	5.32	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1110		pg/L	5.90	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1200		pg/L	7.10	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		946		pg/L	6.62	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1010		pg/L	8.18	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		1910		pg/L	10.0	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1590	2000	pg/L	79.3	(40%-135%)
13C-1,2,3,7,8-PeCDD		1850	2000	pg/L	92.5	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1540	2000	pg/L	77.2	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1660	2000	pg/L	83.1	(40%-135%)
13C-OCDD		3210	4000	pg/L	80.3	(40%-135%)
13C-2,3,7,8-TCDF		1550	2000	pg/L	77.6	(40%-135%)
13C-1,2,3,7,8-PeCDF		1690	2000	pg/L	84.7	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1350	2000	pg/L	67.5	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1560	2000	pg/L	78.0	(40%-135%)

Comments:

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