Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

Report Prepared for:

Ronald Arneson
Wisconsin Dept of Natural Resources
Integrated Science Services
101 South Webster Street
Madison WI 53703

REPORT OF LABORATORY ANALYSIS FOR PCDD/PCDF

Report Information:

Pace Project #: 10317200
Sample Receipt Date: 08/05/2015
Client Project #: 8290 Clough Island
Client Sub PO #: NME00000901
State Cert #: 999407970

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:

August 26, 2015

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com

Report Prepared Date:
August 26, 2015

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
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DISCUSSION

This report presents the results from the analyses performed on two samples submitted by a representative of Wisconsin DNR. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using a modified version of USEPA Method 8290. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentration (EMPC) values were treated as positives in the toxic equivalence calculations. Method blank and field sample results presented with reporting limits corresponding to the lowest calibration points and a nominal 10-gram sample amount were included in Appendix A.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 59-90%. All of the labeled internal standard recoveries obtained for this project were within the 40-135% target range specified in Method 8290. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

In some cases, interfering substances impacted the determinations of PCDD or PCDF congeners; the affected values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates. The value reported for 2,3,7,8-TCDF in sample CL15-01 was obtained from a second column confirmation analysis and was flagged "C".

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to contain trace levels of selected congeners. These levels were below the calibration range of the method. The 2,3,7,8-TCDF level reported for sample CL15-04 was similar to the corresponding blank level, flagged "B" on the results table, and may be, at least partially, attributed to the background. It should be noted that levels less than ten times the background are not generally considered to be statistically different from the background.

A laboratory spike sample was also prepared with the sample batch using clean sand that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 99-130%. These results were all within the target range for the method. Matrix spikes were prepared with the sample batch using sample material from a separate project; results from these analyses will be provided upon request.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

REPORT OF LABORATORY ANALYSIS

Report No.....10317200

Appendix A

Sample Management

Pace Analytical®
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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10317200

Page: of

1744964

Report No.....10317200_8290

Section A Required Client Information:

Company: WDNR
Address: 1701 N 4th St
Superior WI 54880
Email To: molly.wick@wisconsin.gov
Phone: 715 395 6911 Fax:
Requested Due Date/TAT: 30 days

Section B Required Project Information:

Report To: Molly Wick
Copy To:
Purchase Order No.:
Project Name: Clough Island
Project Number: 8298

Section C Invoice Information:

Attention: Molly Wick
Company Name: WDNR
Address: 1701 N 4th St Superior
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: Clough Island WI

Section D Required Client Information

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Dioxin Furan	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	CLIS-04	SL	G	8/3/15	12:56				1										X		001
2	CLIS-01	SL	G	8/3/15	14:42				1										X		002
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
				Pace	8/5/15	1000	4.6	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Molly Wick
SIGNATURE of SAMPLER: Molly Wick
DATE Signed (MM/DD/YY): 8/4/15

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 23Feb2015 Page 1 of 1
	Document No.: F-MN-L-213-rev.13	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: CODNR

Project #: WO# : 10317200

10317200

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 7742 0767 5863

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ B88A9130516413 ☑ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.6 **Cooler Temp Corrected (°C):** 4.6 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** TRUE **Date and Initials of Person Examining Contents:** JM 8/5/15

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☐ Yes	☑ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: SL	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☐ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution: method 8290, per quote.

Project Manager Review: Date: 8/07/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

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Method 8290 Blank Analysis Results

Lab Sample ID	BLANK-46414	Matrix	Solid
Filename	F150820A_07	Dilution	NA
Total Amount Extracted	13.0 g	Extracted	08/14/2015 19:15
ICAL ID	F150814	Analyzed	08/20/2015 13:59
CCal Filename(s)	F150820A_02 & F150820A_21	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.0	2,3,7,8-TCDF-13C	2.00	71
Total TCDF	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	82
				1,2,3,7,8-PeCDF-13C	2.00	84
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	81
Total TCDD	ND	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	91
				1,2,3,4,7,8-HxCDF-13C	2.00	67
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	65
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	ND	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	73
				1,2,3,4,7,8-HxCDD-13C	2.00	70
1,2,3,7,8-PeCDD	ND	-----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	58
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	60
				1,2,3,4,7,8,9-HpCDF-13C	2.00	65
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	69
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	57
2,3,4,6,7,8-HxCDF	ND	-----	5.0			
1,2,3,7,8,9-HxCDF	ND	-----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	5.0	2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	ND	-----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 0.00 ng/Kg		
Total HpCDF	ND	-----	5.0	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	ND	-----	5.0			
Total HpCDD	ND	-----	5.0			
OCDF	ND	-----	10.0			
OCDD	ND	-----	10.0			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

REPORT OF LABORATORY ANALYSIS

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Tel: 612-607-1700
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Method 8290 Sample Analysis Results

Client - Wisconsin Dept of Natural Resources

Client's Sample ID	CL15-04		
Lab Sample ID	10317200001		
Filename	Y150823A_07		
Injected By	BAL		
Total Amount Extracted	20.5 g	Matrix	Solid
% Moisture	42.4	Dilution	NA
Dry Weight Extracted	11.8 g	Collected	08/03/2015 12:56
ICAL ID	Y150522	Received	08/05/2015 10:00
CCal Filename(s)	Y150823A_01 & Y150823A_20	Extracted	08/14/2015 19:15
Method Blank ID	BLANK-46414	Analyzed	08/23/2015 15:37

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.0	2,3,7,8-TCDF-13C	2.00	72
Total TCDF	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	90
				1,2,3,7,8-PeCDF-13C	2.00	67
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	64
Total TCDD	ND	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	74
				1,2,3,4,7,8-HxCDF-13C	2.00	71
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	75
Total PeCDF	ND	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	76
				1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	ND	-----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	73
				1,2,3,4,7,8,9-HpCDF-13C	2.00	81
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	87
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	78
2,3,4,6,7,8-HxCDF	ND	-----	5.0			
1,2,3,7,8,9-HxCDF	ND	-----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	33	-----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	5.0	2,3,7,8-TCDD-37Cl4	0.20	85
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	16	-----	5.0			
1,2,3,4,6,7,8-HpCDF	56	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 1.1 ng/Kg		
Total HpCDF	130	-----	5.0	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	43	-----	5.0			
Total HpCDD	83	-----	5.0			
OCDF	49	-----	10.0			
OCDD	340	-----	10.0			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit.

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

REPORT OF LABORATORY ANALYSIS

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Tel: 612-607-1700
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Method 8290 Sample Analysis Results

Client - Wisconsin Dept of Natural Resources

Client's Sample ID	CL15-01		
Lab Sample ID	10317200002		
Filename	Y150823A_08		
Injected By	BAL		
Total Amount Extracted	22.3 g	Matrix	Solid
% Moisture	70.2	Dilution	NA
Dry Weight Extracted	6.65 g	Collected	08/03/2015 14:42
ICAL ID	Y150522	Received	08/05/2015 10:00
CCal Filename(s)	Y150823A_01 & Y150823A_20	Extracted	08/14/2015 19:15
Method Blank ID	BLANK-46414	Analyzed	08/23/2015 16:17

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	3.9	-----	1.0	C	2,3,7,8-TCDF-13C	2.00	68
Total TCDF	36.0	-----	1.0		2,3,7,8-TCDD-13C	2.00	82
					1,2,3,7,8-PeCDF-13C	2.00	60
2,3,7,8-TCDD	1.6	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	61
Total TCDD	15.0	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	69
					1,2,3,4,7,8-HxCDF-13C	2.00	70
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	68
2,3,4,7,8-PeCDF	ND	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	70
Total PeCDF	60.0	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	59
					1,2,3,4,7,8-HxCDD-13C	2.00	73
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	62
Total PeCDD	31.0	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	67
					1,2,3,4,7,8,9-HpCDF-13C	2.00	72
1,2,3,4,7,8-HxCDF	8.3	-----	5.0		1,2,3,4,6,7,8-HpCDD-13C	2.00	80
1,2,3,6,7,8-HxCDF	21.0	-----	5.0		OCDD-13C	4.00	70
2,3,4,6,7,8-HxCDF	ND	-----	5.0				
1,2,3,7,8,9-HxCDF	ND	-----	5.0		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	290.0	-----	5.0		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	5.0		2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	21.0	-----	5.0				
1,2,3,7,8,9-HxCDD	11.0	-----	5.0				
Total HxCDD	170.0	-----	5.0				
1,2,3,4,6,7,8-HpCDF	410.0	-----	5.0		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0		Equivalence: 15 ng/Kg		
Total HpCDF	760.0	-----	5.0		(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	250.0	-----	5.0				
Total HpCDD	530.0	-----	5.0				
OCDF	200.0	-----	10.0				
OCDD	2400.0	-----	10.0				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit.

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
C = Result obtained from confirmation analysis

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Reporting Flags

A = Reporting Limit based on signal to noise

B = Less than 10x higher than method blank level

C = Result obtained from confirmation analysis

D = Result obtained from analysis of diluted sample

E = Exceeds calibration range

I = Interference present

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDE Interference

R = Recovery outside target range

S = Peak saturated

U = Analyte not detected

V = Result verified by confirmation analysis

X = %D Exceeds limits

Y = Calculated using average of daily RFs

* = See Discussion

Appendix B

Sample Analysis Summary

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 8290 Sample Analysis Results

Client - Wisconsin Dept of Natural Resources

Client's Sample ID	CL15-04		
Lab Sample ID	10317200001		
Filename	Y150823A_07		
Injected By	BAL		
Total Amount Extracted	20.5 g	Matrix	Solid
% Moisture	42.4	Dilution	NA
Dry Weight Extracted	11.8 g	Collected	08/03/2015 12:56
ICAL ID	Y150522	Received	08/05/2015 10:00
CCal Filename(s)	Y150823A_01 & Y150823A_20	Extracted	08/14/2015 19:15
Method Blank ID	BLANK-46414	Analyzed	08/23/2015 15:37

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.82	-----	0.14	BJ	2,3,7,8-TCDF-13C	2.00	72
Total TCDF	4.00	-----	0.14	J	2,3,7,8-TCDD-13C	2.00	90
					1,2,3,7,8-PeCDF-13C	2.00	67
2,3,7,8-TCDD	0.22	-----	0.11	J	2,3,4,7,8-PeCDF-13C	2.00	64
Total TCDD	3.30	-----	0.11	J	1,2,3,7,8-PeCDD-13C	2.00	74
					1,2,3,4,7,8-HxCDF-13C	2.00	71
1,2,3,7,8-PeCDF	-----	0.29	0.24	IJ	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	0.47	-----	0.25	J	2,3,4,6,7,8-HxCDF-13C	2.00	75
Total PeCDF	6.40	-----	0.25	J	1,2,3,7,8,9-HxCDF-13C	2.00	76
					1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	ND	-----	0.40		1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	4.20	-----	0.40	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	73
					1,2,3,4,7,8,9-HpCDF-13C	2.00	81
1,2,3,4,7,8-HxCDF	-----	0.85	0.18	IJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	87
1,2,3,6,7,8-HxCDF	2.10	-----	0.18	J	OCDD-13C	4.00	78
2,3,4,6,7,8-HxCDF	1.10	-----	0.11	J			
1,2,3,7,8,9-HxCDF	ND	-----	0.15		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	41.00	-----	0.15		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.39	-----	0.17	J	2,3,7,8-TCDD-37Cl4	0.20	85
1,2,3,6,7,8-HxCDD	3.10	-----	0.24	J			
1,2,3,7,8,9-HxCDD	-----	0.98	0.14	IJ			
Total HxCDD	19.00	-----	0.18				
1,2,3,4,6,7,8-HpCDF	56.00	-----	0.17		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	0.84	0.15	IJ	Equivalence: 2.4 ng/Kg		
Total HpCDF	130.00	-----	0.16		(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	43.00	-----	0.22				
Total HpCDD	83.00	-----	0.22				
OCDF	49.00	-----	0.23				
OCDD	340.00	-----	0.35				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit.

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Estimated value
B = Less than 10x higher than method blank level
I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

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Method 8290 Sample Analysis Results

Client - Wisconsin Dept of Natural Resources

Client's Sample ID	CL15-01		
Lab Sample ID	10317200002		
Filename	Y150823A_08		
Injected By	BAL		
Total Amount Extracted	22.3 g	Matrix	Solid
% Moisture	70.2	Dilution	NA
Dry Weight Extracted	6.65 g	Collected	08/03/2015 14:42
ICAL ID	Y150522	Received	08/05/2015 10:00
CCal Filename(s)	Y150823A_01 & Y150823A_20	Extracted	08/14/2015 19:15
Method Blank ID	BLANK-46414	Analyzed	08/23/2015 16:17

Native Isomers	**Conc** ng/Kg	**EMPC** ng/Kg	**RL** ng/Kg		**Internal Standards**	**ng's Added**	**Percent Recovery**
2,3,7,8-TCDF	3.9	-----	0.40	C	2,3,7,8-TCDF-13C	2.00	68
Total TCDF	38.0	-----	0.34		2,3,7,8-TCDD-13C	2.00	82
					1,2,3,7,8-PeCDF-13C	2.00	60
2,3,7,8-TCDD	1.6	-----	0.29		2,3,4,7,8-PeCDF-13C	2.00	61
Total TCDD	15.0	-----	0.29		1,2,3,7,8-PeCDD-13C	2.00	69
					1,2,3,4,7,8-HxCDF-13C	2.00	70
1,2,3,7,8-PeCDF	2.2	-----	0.67	J	1,2,3,6,7,8-HxCDF-13C	2.00	68
2,3,4,7,8-PeCDF	3.7	-----	0.46	J	2,3,4,6,7,8-HxCDF-13C	2.00	70
Total PeCDF	69.0	-----	0.57		1,2,3,7,8,9-HxCDF-13C	2.00	59
					1,2,3,4,7,8-HxCDD-13C	2.00	73
1,2,3,7,8-PeCDD	4.3	-----	0.81	J	1,2,3,6,7,8-HxCDD-13C	2.00	62
Total PeCDD	39.0	-----	0.81		1,2,3,4,6,7,8-HpCDF-13C	2.00	67
					1,2,3,4,7,8,9-HpCDF-13C	2.00	72
1,2,3,4,7,8-HxCDF	8.3	-----	0.32		1,2,3,4,6,7,8-HpCDD-13C	2.00	80
1,2,3,6,7,8-HxCDF	21.0	-----	0.28		OCDD-13C	4.00	70
2,3,4,6,7,8-HxCDF	2.5	-----	0.46	J			
1,2,3,7,8,9-HxCDF	2.3	-----	0.34	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	310.0	-----	0.35		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	4.0	-----	0.29	J	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	21.0	-----	0.46				
1,2,3,7,8,9-HxCDD	11.0	-----	0.47				
Total HxCDD	180.0	-----	0.40				
1,2,3,4,6,7,8-HpCDF	410.0	-----	0.43		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	4.4	-----	0.56	J	Equivalence: 22 ng/Kg		
Total HpCDF	760.0	-----	0.50		(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	250.0	-----	0.49				
Total HpCDD	530.0	-----	0.49				
OCDF	200.0	-----	0.60				
OCDD	2400.0	-----	0.65				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit.

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Estimated value
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Method 8290 Blank Analysis Results

Lab Sample ID	BLANK-46414	Matrix	Solid
Filename	F150820A_07	Dilution	NA
Total Amount Extracted	13.0 g	Extracted	08/14/2015 19:15
ICAL ID	F150814	Analyzed	08/20/2015 13:59
CCal Filename(s)	F150820A_02 & F150820A_21	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.150	-----	0.056	J	2,3,7,8-TCDF-13C	2.00	71
Total TCDF	0.220	-----	0.056	J	2,3,7,8-TCDD-13C	2.00	82
					1,2,3,7,8-PeCDF-13C	2.00	84
2,3,7,8-TCDD	ND	-----	0.049		2,3,4,7,8-PeCDF-13C	2.00	81
Total TCDD	ND	-----	0.049		1,2,3,7,8-PeCDD-13C	2.00	91
					1,2,3,4,7,8-HxCDF-13C	2.00	67
1,2,3,7,8-PeCDF	0.083	-----	0.068	J	1,2,3,6,7,8-HxCDF-13C	2.00	65
2,3,4,7,8-PeCDF	ND	-----	0.072		2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	0.083	-----	0.070	J	1,2,3,7,8,9-HxCDF-13C	2.00	73
					1,2,3,4,7,8-HxCDD-13C	2.00	70
1,2,3,7,8-PeCDD	ND	-----	0.063		1,2,3,6,7,8-HxCDD-13C	2.00	58
Total PeCDD	ND	-----	0.063		1,2,3,4,6,7,8-HpCDF-13C	2.00	60
					1,2,3,4,7,8,9-HpCDF-13C	2.00	65
1,2,3,4,7,8-HxCDF	ND	-----	0.180		1,2,3,4,6,7,8-HpCDD-13C	2.00	69
1,2,3,6,7,8-HxCDF	ND	-----	0.180		OCDD-13C	4.00	57
2,3,4,6,7,8-HxCDF	ND	-----	0.170				
1,2,3,7,8,9-HxCDF	ND	-----	0.180		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.180		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.059		2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	-----	0.075	0.068	IJ			
1,2,3,7,8,9-HxCDD	ND	-----	0.063				
Total HxCDD	ND	-----	0.063				
1,2,3,4,6,7,8-HpCDF	0.640	-----	0.200	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.250		Equivalence: 0.035 ng/Kg		
Total HpCDF	1.600	-----	0.220	J	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	0.320	-----	0.120	J			
Total HpCDD	0.320	-----	0.120	J			
OCDF	1.100	-----	0.150	J			
OCDD	0.690	-----	0.130	J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.
J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 8290 Laboratory Control Spike Results

Lab Sample ID	LCS-46415		
Filename	F150820A_03	Matrix	Solid
Total Amount Extracted	11.4 g	Dilution	NA
ICAL ID	F150814	Extracted	08/14/2015 19:15
CCal Filename(s)	F150820A_02 & F150820A_21	Analyzed	08/20/2015 11:12
Method Blank ID	BLANK-46414	Injected By	SMT

Native Isomers	**Qs** (ng)	**Qm** (ng)	% Rec.	**Internal Standards**	**ng's Added**	**Percent Recovery**
2,3,7,8-TCDF	0.20	0.24	119	2,3,7,8-TCDF-13C	2.0	70
Total TCDF				2,3,7,8-TCDD-13C	2.0	81
				1,2,3,7,8-PeCDF-13C	2.0	82
2,3,7,8-TCDD	0.20	0.20	99	2,3,4,7,8-PeCDF-13C	2.0	83
Total TCDD				1,2,3,7,8-PeCDD-13C	2.0	89
				1,2,3,4,7,8-HxCDF-13C	2.0	71
1,2,3,7,8-PeCDF	1.0	1.2	121	1,2,3,6,7,8-HxCDF-13C	2.0	69
2,3,4,7,8-PeCDF	1.0	1.2	119	2,3,4,6,7,8-HxCDF-13C	2.0	73
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.0	76
				1,2,3,4,7,8-HxCDD-13C	2.0	69
1,2,3,7,8-PeCDD	1.0	1.1	109	1,2,3,6,7,8-HxCDD-13C	2.0	61
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.0	65
				1,2,3,4,7,8,9-HpCDF-13C	2.0	70
1,2,3,4,7,8-HxCDF	1.0	1.2	116	1,2,3,4,6,7,8-HpCDD-13C	2.0	73
1,2,3,6,7,8-HxCDF	1.0	1.2	116	OCDD-13C	4.0	61
2,3,4,6,7,8-HxCDF	1.0	1.1	105			
1,2,3,7,8,9-HxCDF	1.0	1.1	113	1,2,3,4-TCDD-13C	2.0	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.0	NA
1,2,3,4,7,8-HxCDD	1.0	1.3	126	2,3,7,8-TCDD-37Cl4	0.20	79
1,2,3,6,7,8-HxCDD	1.0	1.3	130			
1,2,3,7,8,9-HxCDD	1.0	1.3	127			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.0	1.2	117			
1,2,3,4,7,8,9-HpCDF	1.0	1.1	109			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.0	1.1	111			
Total HpCDD						
OCDF	2.0	2.2	109			
OCDD	2.0	2.4	122			

Qs = Quantity Spiked
Qm = Quantity Measured
Rec. = Recovery (Expressed as Percent)
R = Recovery outside of target range
Y = RF averaging used in calculations
Nn = Value obtained from additional analysis
NA = Not Applicable
* = See Discussion

REPORT OF LABORATORY ANALYSIS