FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

May 23, 2018

Erik Wilson
City of Plainwell
211 North Main St.
Plainwell, MI 49080
ewilson@plainwell.org

RE: Production Well Water Sampling Results

Dear Erik:

Attached is the laboratory report from a sample we recently collected from three of your production wells. The samples were analyzed by Pace Laboratories. The samples were un-treated groundwater collected from a copper fitting inside each production wells well house. All three samples did not detect 2,3,7,8-TCDD (2,3,7,8-Tetrachlorodibenzo-p-dioxin) The laboratory report is summarized below.

Summary of Laboratory Results	
Sample	2,3,7,8-TCDD
PW #4	ND (Non-Detect)
PW #5	ND (Non-Detect)
PW #7	ND (Non-Detect)

Thank you for using the services of F&V. If you need additional information, please contact me.

Sincerely,
FLEIS & VANDENBRINK

Brian L. Rice, P.E.
Manager, Environmental Services Group

att: Laboratory Report and Chain of Custody
cc: Mark Worrall, MDEQ
Karen Vorce, MDEQ

2960 Lucerne Drive SE, Suite 100
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com

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

www.pacelabs.com

Report Prepared for:

Will Cole
Pace Analytical Grand Rapids
5560 Corporate Exchange Court
Grand Rapids MI 49512

REPORT OF LABORATORY ANALYSIS FOR 2,3,7,8-TCDD

Report Summary:

Report Prepared Date:
May 18, 2018

Report Information:

Pace Project #: 10430526
Sample Receipt Date: 05/09/2018
Client Project #: 4611871 Fleis & Vanden
Client Sub PO #: N/A
State Cert #: N/A

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 Drinking Water 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 Kirsten Hogberg, your Pace Project Manager.

This report has been reviewed by:

May 18, 2018

Kirsten Hogberg, Project Manager
(612) 607-6407
(612) 607-6444 (fax)
kirsten.hogberg@pacelabs.com

Report of Laboratory Analysis

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

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

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	CERT0092
Alaska	MN00064	Nebraska	NE-OS-18-06
Alaska	UST-078	Nevada	MN00064
Arizona	AZ0014	New Jersey (NE	MN002
Arkansas	88-0680	New York (NEL	11647
CNMI Saipan	MP0003	New hampshire	2081
California	MN00064	North Carolina	27700
Colorado	MN00064	North Carolina	530
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-L	Ohio	41244
Florida (NELAP	E87605	Ohio VAP	CL101
Georgia (EDP)	959	Oklahoma	9507
Guam EPA	959	Oregon (ELAP)	MN200001
Hawaii	MN00064	Oregon (OREL	MN300001
Idaho	MN00064	Pennsylvania	68-00563
Illinois	200011	Puerto Rico	MN00064
Indiana	C-MN-01	South Carolina	74003001
Iowa	368	Tennessee	TN02818
Kansas	E-10167	Texas	T104704192
Kentucky	90062	Utah (NELAP)	MN00064
Louisiana	03086	Virginia	460163
Louisiana	MN00064	Washington	C486
Maine	MN00064	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-L

REPORT OF LABORATORY ANALYSIS

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

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

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 = Interferencepresent

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDEInterference

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

* = SeeDiscussion

REPORT OF LABORATORY ANALYSIS

Report No....10430526_1613DW_DFR

WO# : 10430526

10430526

Chain of Custody

☐ Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: MI

Workorder: 4611871 **Workorder Name:** City of Plainwell - Dioxin **Owner Received Date:** 5/7/2018 **Results Requested By:** 5/21/2018

Report To	Subcontract To
Will Cole Pace Analytical Services 5560 Corporate Exchange Ct. SE Grand Rapids, MI 49512 USA Phone (616)975-4500	Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-1700

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	Requested Analysis: 2,3,7,8 TCDD by 1613	LAB USE ONLY
1	PW-5	PS	5/7/2018 13:48	4611871001	Drinking	1	X	001
2	PW-4	PS	5/7/2018 13:20	4611871002	Drinking	1	X	002
3	PW-7	PS	5/7/2018 13:35	4611871003	Drinking	1	X	003
4								
5								

Comments

Transfers	Released By,	Date/Time	Received By	Date/Time
1		5/8/18 1700	Brandi Pace	5.9.18 930
2				
3				

Cooler Temperature on Receipt 4.2 °C **Custody Seal** Y or (N) **Received on Ice** (Y) or N **Samples Intact** (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*

This chain of custody is considered complete as is since this information is available in the owner laboratory.

Pace Analytical	Document Name: Sample Condition Upon Receipt Form	Document Revised: 02May2018 Page 1 of 2
	Document No.: F-MN-L-213-rev.23	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: PACE MI

Project #: **WO#: 10430526**

PM: SCU Due Date: 05/16/18

CLIENT: PASI-MI

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

Tracking Number: 4372 1887 5977

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: ☐ G87A9170600254 ☑ G87A9155100842

Type of Ice: ☐ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

HF 5.9.18

Cooler Temp Read (°C): 4.2 Cooler Temp Corrected (°C): 4.2

Temp should be above freezing to 6°C Correction Factor: True

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Date and Initials of Person Examining Contents: HF 5.9.18

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

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (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		1.
Chain of Custody Filled Out?	☑ Yes	☐ No		2.
Chain of Custody Relinquished?	☑ Yes	☐ No		3.
Sampler Name and/or Signature on COC?	☐ Yes	☐ No	☑ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No		5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		6.
Rush Turn Around Time Requested?	☐ Yes	☑ No		7.
Sufficient Volume?	☑ Yes	☐ No		8.
Correct Containers Used?	☑ Yes	☐ No		9.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Is sufficient information available to reconcile the samples to the COC? Matrix: WT	☑ Yes	☐ No		12.
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH Positive for Res. Chlorine? Y N
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	Sample #
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐ 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:

Project Manager Review: Kristen Hoffberg Date: 5/10/2018

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).

Report No.....10430526_1613DW_DFR

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: of 2189426

Section A Required Client Information:
Company: Fleis & VanderBrink
Address: 2960 Lucerne Dr. SE
Grand Rapids, MT
Email To: bwalquist@fveng.com
Phone: 231-234-1656 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:
Report To: Brian Rae (brae@fveng.com)
Copy To:
Purchase Order No.:
Project Name: City of Plainwell
Project Number:

Section C Invoice Information:
Attention: Anne Hayden
Company Name: Fleis & VanderBrink
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY: NPDES, GROUND WATER (X), DRINKING WATER, UST, RCRA, OTHER
Site Location STATE: MI

Section D Required Client Information

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

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

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE	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: 2, 3, 7, 8 TCDD	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	PW-5	DW	G			5/7/18	13:48		2	X								X	(45-139)	
2	PW-4	DW	G			5/7/18	13:20		2	X								X		
3	PW-7	DW	G			5/7/18	13:35		2	X								X		
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				

WO#: 4611871
4611871

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	[signature] / FVE	5/7/18	14:36	[signature]	5/7/18	1436	

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Barrett Walquist
SIGNATURE of SAMPLER: [signature]
DATE Signed (MM/DD/YY): 5/7/18

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

*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

SAMPLE RECEIVING / LOG-IN CHECKLIST

Pace Analytical®

Client: FV - City of Plainwell
Work Order #: 4011871
Receipt Record Page/Line #: (45-13)

Recorded by (initials/date): AW 05/07/18

☑ Cooler ☐ Box ☐ Other
Qty Received: 1

Thermometer Used: ☑ IR Gun (#202) ☐ Digital Thermometer (#54) ☐ IR Gun (#402)

	Cooler 1	Cooler 2	Cooler 3	Cooler 4
Cooler #	Pace 468			
Time	1608			
Custody Seals	☑ None ☐ Present / Intact ☐ Present / Not Intact	☐ None ☐ Present / Intact ☐ Present / Not Intact	☐ None ☐ Present / Intact ☐ Present / Not Intact	☐ None ☐ Present / Intact ☐ Present / Not Intact
Coolant Type	☐ Loose Ice ☑ Bagged Ice ☐ Blue Ice ☐ None	☐ Loose Ice ☐ Bagged Ice ☐ Blue Ice ☐ None	☐ Loose Ice ☐ Bagged Ice ☐ Blue Ice ☐ None	☐ Loose Ice ☐ Bagged Ice ☐ Blue Ice ☐ None
Coolant Location	Dispersed / Top / Middle (checked) / Bottom	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom
Temp Blank Present	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If Present, Temperature Blank Location is	☐ Representative ☐ Not Representative	☐ Representative ☐ Not Representative	☐ Representative ☐ Not Representative	☐ Representative ☐ Not Representative

Cooler 1	Observed °C	Correction Factor °C	Actual °C
Temp Blank:	Ø	Ø	Ø
Sample 1:	12.9	0	12.9
Sample 2:	13.9	0	13.9
Sample 3:	14.2	0	14.2

Coolers 2–4	Observed °C	Correction Factor °C	Actual °C
Temp Blank:			
Sample 1:			
Sample 2:			
Sample 3:			

When above 6 °C take a 3 Sample Average °C: 13.6 (Cooler 1); blank for Coolers 2–4

☐ VOC Trip Blank received? (each cooler)

If any shaded areas checked, complete Sample Receiving Non-Conformance

Paperwork Received

Yes	No	
☑	☐	Chain of Custody record(s)? If No, Initiated By ______
☑		Received for Lab Signed/Date/Time?
☐	☑	USDA Soil Documents?
☐	☑	Sampling / Field Forms?
☐	☑	Other ______

COC Information

☑ Pace COC ☐ Other ______

COC ID Numbers: 2189426

Check COC for Accuracy

Yes	No	
☑	☐	Analysis Requested?
☑	☐	Sample ID matches COC?
☑	☐	Sample Date and Time matches COC?
☑	☐	All containers indicated are received?

Sample Condition Summary

N/A	Yes	No	
	☐	☑	Broken containers/lids?
	☐	☑	Missing or incomplete labels?
	☐	☑	Illegible information on labels?
	☐	☑	Low volume received?
	☐	☑	Inappropriate or non-Pace containers received?
☑	☐	☐	VOC vials have headspace? (AW 05/07/18)
	☐	☑	Extra sample locations?
	☐	☑	Containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	☑	☐	Temperature Blank OR average sample temperature, ≥6° C?
☐	☑	☐	If "Yes" was thermal preservation required?
☐	☑	☐	If "Yes" were ALL samples collected the same day as receipt?
☑	☐		Completed Sample Preservation Verification Form?
☑	☐	☐	Samples chemically preserved correctly?
☑	☐		If "No", add wire tag and fill out Non-Conformance Form?
☑	☐		Received unpreserved Terracore kit?
			If "Yes" unpreserved vials must be frozen

Work Order Not Logged In with Short Hold / Rush

☐ Copies of COC To Lab Areas

Notes

Yes	No	
☑	☐	Were all samples logged into Epic?
☑	☐	Were all samples labelled?
☑	☐	Were samples placed on scan locations?

Initial / Date: WL 5/8/18

2018Sample Receiving Log In Forms - Receiving.Log-In_Checklist revision: 4.3

Pace Analytical™

PaceAnalyticalServices,LLC.
1700ElmStreet-Suite200
Minneapolis,MN,55414

Tel612-607-1700
Fax612-607-6444

Drinking Water Analysis Results
2,3,7,8-TCDD -- USEPA Method 1613B

Sample ID.....PW-5
Client..... Pace Analytical Grand Rapids
Lab Sample ID..... 4611871001

Date Collected.....05/07/2018
Date Received.....05/09/2018
Date Extracted.....05/14/2018

	Sample PW-5	Method Blank	Lab Spike	Lab Spike Dup
[2,3,7,8-TCDD]	**ND**	ND	--	--
LOQ	5.0 pg/L	5.0 pg/L	--	--
2,3,7,8-TCDD Recovery	--	--	100%	94%
Spike Recovery Limit	--	--	73-146%	73-146%
RPD			5.3%	
IS Recovery	**68%**	78%	71%	71%
IS Recovery Limits	31-137%	31-137%	25-141%	25-141%
CS Recovery	**71%**	82%	76%	74%
CS Recovery Limits	42-164%	42-164%	37-158%	37-158%
Filename	F180517A_06	F180516B_05	F180516B_03	F180516B_04
Analysis Date	05/17/2018	05/16/2018	05/16/2018	05/16/2018
Analysis Time	07:28	18:38	17:33	18:05
Analyst	SMT	SMT	SMT	SMT
Volume	1.014L	1.007L	1.042L	1.000L
Dilution	NA	NA	NA	NA
ICAL Date	04/26/2018	04/26/2018	04/26/2018	04/26/2018
CCAL Filename	F180517A_02	F180516B_02	F180516B_02	F180516B_02

! = Outside the Control Limits
ND = Not Detected
LOQ = Limit of Quantitation
Limits = Control Limits from Method 1613 (10/94 Revision), Tables 6A and 7A
RPD = Relative Percent Difference of Lab Spike Recoveries
IS = Internal Standard [2,3,7,8-TCDD- $^{13}C_{12}$]
CS = Cleanup Standard [2,3,7,8-TCDD- $^{37}Cl_4$]

Analyst: _____

Project No.....10430526

Pace Analytical™

PaceAnalyticalServices,LLC.
1700ElmStreet-Suite200
Minneapolis,MN,55414

Tel612-607-1700
Fax612-607-6444

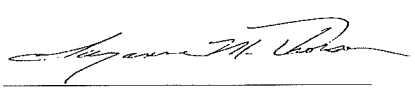
Drinking Water Analysis Results
2,3,7,8-TCDD -- USEPA Method 1613B

Sample ID.....PW-4
Client..... Pace Analytical Grand Rapids
Lab Sample ID..... 4611871002

Date Collected.....05/07/2018
Date Received.....05/09/2018
Date Extracted.....05/14/2018

	Sample PW-4	Method Blank	Lab Spike	Lab Spike Dup
[2,3,7,8-TCDD]	**ND**	ND	--	--
LOQ	5.0 pg/L	5.0 pg/L	--	--
2,3,7,8-TCDD Recovery	--	--	100%	94%
Spike Recovery Limit	--	--	73-146%	73-146%
RPD			5.3%	
IS Recovery	**79%**	78%	71%	71%
IS Recovery Limits	31-137%	31-137%	25-141%	25-141%
CS Recovery	**86%**	82%	76%	74%
CS Recovery Limits	42-164%	42-164%	37-158%	37-158%
Filename	F180517A_07	F180516B_05	F180516B_03	F180516B_04
Analysis Date	05/17/2018	05/16/2018	05/16/2018	05/16/2018
Analysis Time	08:00	18:38	17:33	18:05
Analyst	SMT	SMT	SMT	SMT
Volume	1.117L	1.007L	1.042L	1.000L
Dilution	NA	NA	NA	NA
ICAL Date	04/26/2018	04/26/2018	04/26/2018	04/26/2018
CCAL Filename	F180517A_02	F180516B_02	F180516B_02	F180516B_02

! = Outside the Control Limits
ND = Not Detected
LOQ = Limit of Quantitation
Limits = Control Limits from Method 1613 (10/94 Revision), Tables 6A and 7A
RPD = Relative Percent Difference of Lab Spike Recoveries
IS = Internal Standard [2,3,7,8-TCDD- $^{13}C_{12}$]
CS = Cleanup Standard [2,3,7,8-TCDD- $^{37}Cl_4$]

Analyst: 

Project No.....10430526

Pace Analytical™

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1700ElmStreet-Suite200
Minneapolis,MN,55414

Tel612-607-1700
Fax612-607-6444

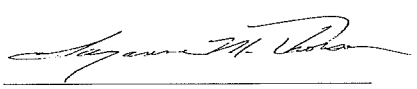
Drinking Water Analysis Results
2,3,7,8-TCDD -- USEPA Method 1613B

Sample ID.....PW-7
Client..... Pace Analytical Grand Rapids
Lab Sample ID..... 4611871003

Date Collected.....05/07/2018
Date Received.....05/09/2018
Date Extracted.....05/14/2018

	Sample PW-7	Method Blank	Lab Spike	Lab Spike Dup
[2,3,7,8-TCDD]	**ND**	ND	--	--
LOQ	5.0 pg/L	5.0 pg/L	--	--
2,3,7,8-TCDD Recovery	--	--	100%	94%
Spike Recovery Limit	--	--	73-146%	73-146%
RPD			5.3%	
IS Recovery	**68%**	78%	71%	71%
IS Recovery Limits	31-137%	31-137%	25-141%	25-141%
CS Recovery	**73%**	82%	76%	74%
CS Recovery Limits	42-164%	42-164%	37-158%	37-158%
Filename	F180517A_08	F180516B_05	F180516B_03	F180516B_04
Analysis Date	05/17/2018	05/16/2018	05/16/2018	05/16/2018
Analysis Time	08:32	18:38	17:33	18:05
Analyst	SMT	SMT	SMT	SMT
Volume	1.006L	1.007L	1.042L	1.000L
Dilution	NA	NA	NA	NA
ICAL Date	04/26/2018	04/26/2018	04/26/2018	04/26/2018
CCAL Filename	F180517A_02	F180516B_02	F180516B_02	F180516B_02

! = Outside the Control Limits
ND = Not Detected
LOQ = Limit of Quantitation
Limits = Control Limits from Method 1613 (10/94 Revision), Tables 6A and 7A
RPD = Relative Percent Difference of Lab Spike Recoveries
IS = Internal Standard [2,3,7,8-TCDD- $^{13}C_{12}$]
CS = Cleanup Standard [2,3,7,8-TCDD- $^{37}Cl_4$]

Analyst: 

Project No.....10430526