

Sample Analysis Report September, 2014

**CASE NARRATIVE**

**Monthly Data Pall Corporation**  
**Project: 1,4-Dioxane Remediation**  
**Date: September 2014**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Pall Corporation attests to the validity of the laboratory data generated by Pall Corporation's Ann Arbor, Michigan Environmental Laboratory facilities reported herein. All analyses performed by Pall Corporation's Environmental Laboratory facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Pall's Environmental group has reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

One drinking water sample was analyzed by Brighton Analytical, L.L.C., a NELAP, TNI, and MDEQ Drinking Water Accredited Laboratory. The sample analyzed by Brighton Analytical, L.L.C. was 505 Lakeview Avenue and this fact is noted in comment section of the data table.

The balance of the samples were analyzed by Pall Corporation's Environmental Laboratory. The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results. The odd even rule is used for rounding.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

**RECEIPT/ STORAGE**

The samples were received on the days noted in the report for the Month; the samples arrived in good condition, properly preserved and on ice.

Samples that require 1,4-dioxane analysis are collected in hydrochloric (HCl) acid-preserved vials to a pH of  $\leq 2$ , with the exception of the Pall ozone treatment samples. These samples have chemicals that, when mixed with the HCl acid, cause interferences and trap damage. Every attempt is made to analyze these samples within 24 hours of receipt.

Samples that require Bromate analysis are collected and preserved in the laboratory with ethylene di-amine and refrigerated.

Samples that are delivered to the laboratory the same day as they are collected are likely not to have reached a fully chilled temperature. This is acceptable as long as there is evidence that chilling has begun. All samples are iced or refrigerated at 4°C ( $\pm 2^\circ\text{C}$ ) from the time of collection until sample preparation or analysis.

### 1,4-Dioxane (GC-MS)

All ground water and treated water samples were analyzed for 1,4-Dioxane (GC-MS) in accordance with EPA 1624C, which has been modified to enhance detection limits. Matrix effects requiring additional dilutions were seen in the following samples: MW-25s, MW-22, MW-11d, MW-108d, MW-108s, and MW-5d. Reporting limits were adjusted for the dilutions and Qualifier Codes were used to indicate the dilution and matrix effects.

No other difficulties were encountered during the 1,4-dioxane analyses. Reporting limit for undiluted samples is 1ppb (part per billion, micrograms per liter, µg/L). All quality control parameters were within the acceptance limits.

### Bromate (Ion Chromatography)

All surface water and treated samples were analyzed for Bromate (Ion Chromatography) in accordance with EPA 300.1. Surrogates are added to all samples and standards and analyzed by Ion Chromatography utilizing background ion suppression and a conductivity detector. No difficulties were encountered during the Bromate analyses. All quality control parameters were within the acceptance limits.

The reporting limit for treated samples is 5.0ppb and for surface samples is 2.0ppb.

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## Qualifiers

### 1,4-Dioxane Qualifier Codes:

<u>Qualifier Code</u>	<u>Description</u>
nd:	The compound was analyzed for, but was not detected at or above the detection limit indicated.
D:	Analyte value quantified from a dilution, reporting limit is raised to reflect dilution
E:	The compound result is greater than the upper quantitation limit in the associated calibration curve.
H:	The sample vials contained air bubbles larger than 5mm, which may affect compound results.
J:	The compound was positively identified; the associated numerical value is the approximate concentration.
M:	Matrix effects, sample required dilution.
R:	The reported value is unusable and rejected due to variance from quality control criteria.
V:	The reported value is considered estimated due to variance from quality control criteria.
H:	Sample was analyzed past 14 day hold time, but within 28 days.

### Bromate Qualifier Codes:

<u>Qualifier Code</u>	<u>Description</u>
nd:	The compound was analyzed for, but was not detected at or above the detection limit indicated.
D:	Analyte value quantified from a dilution, reporting limit is raised to reflect dilution
E:	The compound result is greater than the upper quantitation limit in the associated calibration curve.
J:	The compound was positively identified; the associated numerical value is the approximate concentration.
M:	Matrix effects, sample required dilution.
R:	The reported value is unusable and rejected due to variance from quality control criteria.
V:	The reported value is considered estimated due to variance from quality control criteria.
H:	Sample was analyzed past 28 day hold time

Analyst: Susan E.O. Peters Signature: Susan E.O. Peters Date: 10-09-14

Report Reviewed By: Cristian Duma Signature: [Signature] Date: 10-9-14



Pall Corporation

# Sample Analysis Report

600 Wagner Road  
Ann Arbor, MI 48103-9019 US  
Phone: 734.665.0651  
Web: www.pall.com

September, 2014

Analyst Initials: SEOP  
Date: 10-7-14

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
<b>Residential Wells</b>								
<b>Not Determined</b>								
505 Lakeview Ave-09-30-14-09:07-1	nd	1.0					Brighton Analytical	O
<b>Extraction Wells</b>								
<b>C3</b>								
DOLPH-09-02-14-08:16-1	85	1.0						
TW-20-09-02-14-08:41-1	870	10.0						D
<b>D2</b>								
LB-4-09-02-14-08:25-1	470	10.0						D
TW-21-09-02-14-08:34-1	120	1.0						
<b>E</b>								
TW-18-09-02-14-08:14-1	280	10.0						D
TW-19-09-02-14-08:26-1	670	10.0						D
<b>Marshy</b>								
PW-1-09-02-14-08:12-1	520	20.0						D
<b>SW</b>								
TW-22-09-02-14-08:54-1	520	10.0						D
TW-8-09-02-14-08:53-1	650	10.0						D
<b>Monitoring Wells</b>								

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
<b>C2</b>								
MW-25s-09-08-14-13:08-1	140	10.0						D, M
<b>C3</b>								
MW-16-09-12-14-10:36-1	3	1.0						
MW-18d-09-04-14-14:01-1	170	5.0						D
MW-22-09-08-14-13:28-1	500	50.0						D, M
MW-36-09-04-14-13:31-1	nd	1.0						
<b>D0</b>								
A2 Cleaning Supply-09-02-14-11:42-1	56	1.0						
MW-53d-09-02-14-13:39-1	nd	1.0						
MW-53i-09-02-14-14:37-1	120	1.0						
MW-53s-09-02-14-13:53-1	nd	1.0						
<b>D2</b>								
MW-11d-09-04-14-11:31-1	73	10.0						D, M
MW-54d-09-16-14-11:34-1	85	1.0						
<b>E</b>								
MW-103s-09-03-14-11:27-1	62	1.0						
MW-108d-09-08-14-11:15-1	1800	100.0						D, M
MW-108s-09-08-14-10:24-1	530	50.0						D, M
MW-112i-09-03-14-10:40-1	10	1.0						
MW-112s-09-03-14-10:57-1	nd	1.0						
MW-76i-09-03-14-13:47-1	87	1.0						
MW-76s-09-03-14-14:06-1	290	5.0						D
MW-81-09-04-14-09:29-1	360	5.0						D
MW-82d-09-12-14-14:34-1	2	1.0						
MW-84s-09-04-14-10:21-1	300	5.0						D

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
<b>SH</b>								
MW-5d-09-08-14-14:16-1	21000	400.0						D, M
<b>SW</b>								
MW-10d-09-05-14-11:21-1	1500	25.0						D
MW-52d-09-05-14-10:24-1	nd	1.0						
MW-52i-09-05-14-10:51-1	15	1.0						
MW-52i-09-15-14-11:08-1	23	1.0						
MW-57-09-08-14-11:53-1	5	1.0						
<b>Surface Water</b>								
<b>Not Applicable</b>								
HC/HR-09-02-14-07:40-1			nd	2.0				
HC/HR-09-03-14-07:41-1			nd	2.0				
HC/HR-09-04-14-07:50-1			nd	2.0				
HC/HR-09-05-14-08:05-1			nd	2.0				
HC/HR-09-08-14-07:53-1			nd	2.0				
HC/HR-09-09-14-07:53-1			nd	2.0				
HC/HR-09-10-14-07:40-1			nd	2.0				
HC/HR-09-11-14-08:05-1			nd	2.0				
HC/HR-09-12-14-08:08-1			nd	2.0				
HC/HR-09-15-14-08:05-1			nd	2.0				
HC/HR-09-16-14-08:12-1			nd	2.0				
HC/HR-09-17-14-07:27-1			nd	2.0				
HC/HR-09-18-14-08:23-1			nd	2.0				
HC/HR-09-19-14-08:10-1			nd	2.0				
HC/HR-09-22-14-08:45-1			nd	2.0				
HC/HR-09-23-14-08:15-1			nd	2.0				

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
HC/HR-09-24-14-09:08-1			nd	2.0				
HC/HR-09-25-14-09:00-1			nd	2.0				
HC/HR-09-26-14-08:45-1			nd	2.0				
HC/HR-09-29-14-08:05-1			nd	2.0				
HC/HR-09-30-14-07:55-1			nd	2.0				
<b>Treatment System</b>								
OUTFALL-09-01-14-1	6	1.0						
OUTFALL-09-01-14-2			5	5.0				
OUTFALL-09-02-14-1	6	1.0						
OUTFALL-09-02-14-2			8	5.0				
OUTFALL-09-03-14-1	6	1.0						
OUTFALL-09-03-14-2			6	5.0				
OUTFALL-09-04-14-1	7	1.0						
OUTFALL-09-04-14-2			6	5.0				
OUTFALL-09-07-14-1	6	1.0						
OUTFALL-09-07-14-2			5	5.0				
OUTFALL-09-08-14-1	6	1.0						
OUTFALL-09-08-14-2			6	5.0				
OUTFALL-09-09-14-1	6	1.0						
OUTFALL-09-09-14-2			nd	5.0				
OUTFALL-09-10-14-1	6	1.0						
OUTFALL-09-10-14-2			6	5.0				
OUTFALL-09-11-14-1	6	1.0						
OUTFALL-09-11-14-2			6	5.0				
OUTFALL-09-14-14-1	5	1.0						
OUTFALL-09-14-14-2			7	5.0				
OUTFALL-09-15-14-1	5	1.0						

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
OUTFALL-09-15-14-2			6	5.0				
OUTFALL-09-16-14-1	6	1.0						
OUTFALL-09-16-14-2			6	5.0				
OUTFALL-09-17-14-1	5	1.0						
OUTFALL-09-17-14-2			5	5.0				
OUTFALL-09-18-14-1	5	1.0						
OUTFALL-09-18-14-2			6	5.0				
OUTFALL-09-21-14-1	5	1.0						
OUTFALL-09-21-14-2			6	5.0				
OUTFALL-09-22-14-1	5	1.0						
OUTFALL-09-22-14-2			6	5.0				
OUTFALL-09-23-14-1	5	1.0						
OUTFALL-09-23-14-2			7	5.0				
OUTFALL-09-24-14-1	5	1.0						
OUTFALL-09-24-14-2			7	5.0				
OUTFALL-09-25-14-1	5	1.0						
OUTFALL-09-25-14-2			7	5.0				
OUTFALL-09-28-14-1	5	1.0						
OUTFALL-09-28-14-2			7	5.0				
OUTFALL-09-29-14-1	5	1.0						
OUTFALL-09-29-14-2			7	5.0				
OUTFALL-09-30-14-1	5	1.0						
OUTFALL-09-30-14-2			6	5.0				
Red Pond-09-02-14-08:20-1	420	10.0						D
Red Pond-09-08-14-07:50-1	430	10.0						D
Red Pond-09-15-14-07:30-1	440	10.0						D
Red Pond-09-22-14-09:30-1	410	10.0						D

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
Red Pond-09-29-14-08:10-1	420	10.0						D

**Qualifier Codes:**

**nd:** The compound was analyzed for, but was not detected at or above the detection limit indicated.

**D:** Analyte value quantified from a dilution, reporting limit is raised to reflect dilution

**M:** Matrix effects, sample required dilution.

**O:** Sample analyzed by and outside laboratory specified in the comment section



October 02, 2014

Pall Corp.  
600 S. Wagner  
Bldg. 4  
Ann Arbor, MI 48103

Subject: Grout 1 Water Sample

Dear Ms. Peters :

Thank you for making Brighton Analytical, L.L.C. your laboratory of choice. Attached are the results for the samples submitted on 09/30/2014 for the above mentioned project. NELAP/TNI Accredited Analysis and MDEQ Drinking Water Certified Analysis will be identified in their respective reporting formats. Hard copies can be supplied at your request for a fee of \$20.00 per copy.

The invoice for this project will be emailed separately. If you have any questions concerning the data or invoice, please don't hesitate to contact our office. Please reference Brighton Analytical, L.L.C. Project ID 31660 when calling or emailing. We thank you for this opportunity to partner with you on this project and hope to work with you again in the future.

Sincerely,  
Brighton Analytical, L.L.C.





**Brighton Analytical, L.L.C.**  
**2105 Pless Drive**  
**Brighton, Michigan 48116**  
**Phone: (810) 229-7575 FAX: (810) 229-8650**  
 e-mail: bai-brighton@sbcglobal.net

Sample Date: 9/30/2014  
 Submit Date: 9/30/2014  
 Report Date: 10/2/2014

To: Pall Corp.  
 600 S. Wagner  
 Bldg. 4  
 Ann Arbor, MI 48103

BA Report Number: **31660**  
 BA Sample ID: **CA05138**

Project Name: **Grout 1 Water Sample**  
 Project Number:  
 Sample ID: **505 Lakeview**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
<b>1,4-Dioxane(SIM)</b>						
1,4-Dioxane (SIM)	<b>Not detected</b>	ug/L	I	EPA 1624(SIM)	CW	10/1/2014

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:  
 Date:

*W. J. ...*  
 10/2/14

**GC/MS**  
**VOLATILE METHOD 1624 SIM**

**REPRESENTATIVE BATCH PRECISION AND ACCURACY QUALITY CONTROL SUMMARY**

Analysis Date: October 1, 2014

Spike Std ID: 2303.20

Inst/Delec: Vol 5 GC/MS

Laboratory ID: LCS

Matrix: Water

Analyst: CW

	Matrix Spike - Precision				Matrix spike - Accuracy					
	Spike 1	Spike 2	Relative Percent Difference	Spk Conc ug/L	% Recovery	% Recovery	Range (%)	Sample background	Method Blank	LCS
1,4 Dioxane	9.7	9.1	5.8	10	97	91	70-130	<1	<1	98%

ug/L is equivalent to ppb

Comments: \_\_\_\_\_