

**CASE NARRATIVE****Monthly Data Pall Life Sciences  
Project: 1,4-Dioxane Remediation  
Date: July 2018**

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.

Gelman Sciences, Inc. d/b/a Pall Life Sciences (PLS) attests to the validity of the laboratory data generated by PLS's Ann Arbor, Michigan Environmental Laboratory facilities reported herein. All analyses performed by PLS's Environmental Laboratory facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. PLS'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.

All of 1,4-dioxane and bromate samples were analyzed by Pall Corporation's Environmental Laboratory. The test results in this report meet all NELAP requirements for parameters for which accreditation are required or available. Any exceptions to NELAP requirements are noted in this report. All exceptions are noted per laboratory standard operating procedure based on EPA Method 1624c. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

The quarterly barium sample was sent to ATS for analysis. Sample data can be found in the Barium section of this narrative. These composite samples are to satisfy NPDES permit and are reported here.

Calculations are performed before rounding to avoid round-off errors in calculated results. The odd even rule is used for rounding. Holding times were met for all samples analyzed. Proper preservation was observed on all 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 when necessary. 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.

The barium sample was taken as a composite sample, preserved with nitric acid, and refrigerated before and after being sent to ATS for analysis. This sample is preserved with nitric acid and refrigeration.

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. Samples that were diluted to bring them within the calibrated range of the instrument are noted with a "D" under the Qualifier Code section of the data report. Reporting limits were adjusted based on each dilution.

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. All quality control parameters were within the acceptance limits with the balance of sample analyzed.

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

## Barium

A composite Outfall001 sample was sent to ATS for total barium analysis in accordance with EPA200.7. Barium samples are analyzed quarterly in compliance with PLS NPDES permit. This sample is preserved with nitric acid and refrigeration. The results were less than the permitted level of 440µg/L at 260µg/L.

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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, reported as estimate.
B:	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.
O:	Samples analyzed in outside laboratory.
S:	Samples split with DEQ.

### 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.
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.
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 Susan E.O. Peters Date: 08-07-18

Report Checked by: Laurel Beyer Laurel Beyer Date: 8/7/18

# Sample Analysis Report

July, 2018

642 South Wagner Road  
Ann Arbor, MI 48103-9019 US  
734.436.4025 phone

Analyst Initials: SEOP  
Date: 08-07-18

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>Extraction Wells</b>								
<b>C3</b>								
DOLPH-07-10-18-10:50-1	110	1.0						
TW-20-07-10-18-10:25-1	880	25.0						D
<b>D2</b>								
LB-4-07-10-18-09:45-1	440	10.0						D
TW-21-07-10-18-10:20-1	200	5.0						D
<b>E</b>								
TW-18-07-10-18-10:45-1	250	5.0						D
TW-19-07-10-18-10:00-1	450	10.0						D
TW-23-07-10-18-09:42-1	470	10.0						D
<b>Marshy</b>								
PW-1-07-10-18-10:40-1	530	25.0						D
<b>SW</b>								
TW-22-07-10-18-11:05-1	360	10.0						D
TW-8-07-10-18-11:00-1	910	25.0						D
<b>Monitoring Wells</b>								
<b>C3</b>								
MW-2d-07-25-18-14:50-1	53	1.0						
MW-39s-07-25-18-12:13-1	1.8	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)
<b>D0</b>								
A2 Cleaning Supply-07-03-18-14:37-1	75	1.0						
MW-53d-07-03-18-10:47-1	nd	1.0						
MW-53i-07-03-18-13:19-1	46	1.0						
MW-53s-07-03-18-12:05-1	nd	1.0						
<b>D2</b>								
MW-120s-07-12-18-10:43-1	nd	1.0						
MW-121s-07-16-18-12:03-1	nd	1.0						
MW-124s-07-19-18-11:53-1	nd	1.0						
MW-126s-07-16-18-16:01-1	nd	1.0						
MW-129i-07-17-18-12:51-1	nd	1.0						
MW-129s-07-17-18-14:04-1	nd	1.0						
MW-130i-07-17-18-15:25-1	4.5	1.0						
MW-130s-07-19-18-13:31-1	nd	1.0						
MW-131s-07-19-18-16:12-1	nd	1.0						
MW-133i-07-23-18-12:20-1	1.9	1.0						
MW-133s-07-23-18-13:31-1	1.3	1.0						
MW-134i-07-24-18-13:56-1	8.5	1.0						
MW-134s-07-24-18-15:09-1	9.4	1.0						
MW-39d-07-25-18-13:30-1	34	1.0						
MW-4d-07-25-18-16:06-1	430	10.0						D
MW-54d-07-20-18-11:06-1	19	1.0						
MW-54s-07-20-18-12:22-1	nd	1.0						
<b>E</b>								
MW-103s-07-11-18-14:12-1	65	1.0						
MW-112i-07-11-18-12:51-1	9.3	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)
MW-112s-07-11-18-11:37-1	nd	1.0						
MW-120d-07-12-18-12:19-1	nd	1.0						
MW-121d-07-16-18-13:18-1	1.8	1.0						
MW-124d-07-19-18-10:29-1	nd	1.0						
MW-126d-07-16-18-14:48-1	nd	1.0						
MW-129d-07-17-18-11:25-1	nd	1.0						
MW-131d-07-19-18-14:57-1	nd	1.0						
MW-133d-07-23-18-11:06-1	1.3	1.0						
MW-134d-07-24-18-12:43-1	5.8	1.0						
MW-135-07-26-18-11:16-1	nd	1.0						
MW-72d-07-23-18-14:54-1	780	25.0						D
MW-76i-07-12-18-13:46-1	91	1.0						
MW-76s-07-12-18-15:02-1	250	5.0						D
MW-84s-07-11-18-15:31-1	1.6	1.0						
<b>SH</b>								
MW-2s-07-25-18-14:30-1	1.8	1.0						
<b>SW</b>								
MW-57-07-25-18-10:51-1	2.4	1.0						
<b>Surface Water</b>								
<b>Not Applicable</b>								
HC/HR-07-02-18-08:15-1				nd	2.0			
HC/HR-07-03-18-08:15-1				nd	2.0			
HC/HR-07-05-18-08:55-1				nd	2.0			
HC/HR-07-06-18-09:12-1				nd	2.0			
HC/HR-07-09-18-08:08-1				nd	2.0			
HC/HR-07-10-18-09:30-1				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-07-11-18-08:27-1			nd	2.0				
HC/HR-07-12-18-08:15-1			nd	2.0				
HC/HR-07-13-18-08:15-1			nd	2.0				
HC/HR-07-16-18-09:36-1			nd	2.0				
HC/HR-07-17-18-07:58-1			nd	2.0				
HC/HR-07-18-18-08:15-1			nd	2.0				
HC/HR-07-19-18-08:07-1			nd	2.0				
HC/HR-07-20-18-08:45-1			nd	2.0				
HC/HR-07-23-18-08:30-1			nd	2.0				
HC/HR-07-24-18-10:20-1			nd	2.0				
HC/HR-07-25-18-08:08-1			nd	2.0				
HC/HR-07-26-18-08:57-1			nd	2.0				
HC/HR-07-27-18-08:03-1			nd	2.0				
HC/HR-07-30-18-08:25-1			nd	2.0				
HC/HR-07-31-18-08:07-1			nd	2.0				
<b>Treatment System</b>								
OUTFALL-07-01-18-2			6.8	5.0				
OUTFALL-07-01-18-1	5.2	1.0						
OUTFALL-07-02-18-2			6.3	5.0				
OUTFALL-07-02-18-1	4.2	1.0						
OUTFALL-07-03-18-1	5.0	1.0						
OUTFALL-07-03-18-2			7.6	5.0				
OUTFALL-07-04-18-1	5.1	1.0						
OUTFALL-07-04-18-2			7.9	5.0				
OUTFALL-07-05-18-1	5.6	1.0						
OUTFALL-07-05-18-2			7.2	5.0				
OUTFALL-07-08-18-1	6.0	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-07-08-18-2			7.3	5.0				
OUTFALL-07-09-18-1	5.6	1.0						
OUTFALL-07-09-18-2			6.1	5.0				
OUTFALL-07-10-18-1	5.9	1.0						
OUTFALL-07-10-18-2			6.8	5.0				
OUTFALL-07-11-18-1	6.2	1.0						
OUTFALL-07-11-18-2			6.8	5.0				
OUTFALL-07-12-18-1	5.6	1.0						
OUTFALL-07-12-18-2			6.5	5.0				
OUTFALL-07-15-18-1	5.2	1.0						
OUTFALL-07-15-18-2			7.3	5.0				
OUTFALL-07-16-18-1	5.3	1.0						
OUTFALL-07-16-18-2			7.0	5.0				
OUTFALL-07-17-18-1	5.1	1.0						
OUTFALL-07-17-18-2			6.9	5.0				
OUTFALL-07-18-18-1	6.2	1.0						
OUTFALL-07-18-18-2			6.7	5.0				
OUTFALL-07-19-18-1	5.6	1.0						
OUTFALL-07-19-18-2			6.6	5.0				
OUTFALL-07-22-18-2			7.1	5.0				
OUTFALL-07-22-18-1	5.0	1.0						
OUTFALL-07-23-18-2			6.8	5.0				
OUTFALL-07-23-18-1	5.3	1.0						
OUTFALL-07-24-18-2			7.3	5.0				
OUTFALL-07-24-18-1	5.4	1.0						
OUTFALL-07-25-18-2			6.8	5.0				
OUTFALL-07-25-18-1	5.3	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-07-26-18-2			5.9	5.0				
OUTFALL-07-26-18-1	5.7	1.0						
OUTFALL-07-29-18-2			nd	5.0				
OUTFALL-07-29-18-1	6.2	1.0						
OUTFALL-07-30-18-2			6.8	5.0				
OUTFALL-07-30-18-1	6.1	1.0						
OUTFALL-07-31-18-2			6.5	5.0				
OUTFALL-07-31-18-1	5.5	1.0						
Red Pond-07-02-18-07:30-1	380	10.0						D
Red Pond-07-09-18-10:00-1	380	10.0						D
Red Pond-07-16-18-08:25-1	370	10.0						D
Red Pond-07-23-18-07:55-01	420	10.0						D
Red Pond-07-30-18-07:50-1	410	10.0						D

**PLS 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.  
H: Sample was analyzed past 14 day hold time, but within 28 days used by ATS for same method with EPA approval.  
O: Samples analyzed in outside laboratory.





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 Michigan Laboratory ID: 9604  
 Wisconsin Laboratory ID: 998321720

### Data Transmittal Cover Page

**Project Name:** Pall Corporation  
**ATS Project Number:** G001-002  
**ATS Report Number(s):** SRF\_0801181

**Project Description:** This data report contains the results of one water sample, received by ATS on 8/1/18, to be analyzed for barium.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written Standard Operating Procedure specific to the ATS Laboratories, as required by USEPA. Laboratory data sheets, SOPs, and QA/QC information are available for inspection and audit at the laboratory upon request. Unless specifically noted on the data report, all applicable sample preservation and holding time requirements have been met.

**Recipient:** Ms. Sue Peters **Email:** [Sue\\_Peters@Pall.com](mailto:Sue_Peters@Pall.com)  
**FAX Number:** \_\_\_\_\_

**No. of Pages (including cover pg.):** 3

**From:** Sarah Stubblefield **Email:** [Sarah\\_Stubblefield@AnnArborTechnicalServices.com](mailto:Sarah_Stubblefield@AnnArborTechnicalServices.com)  
Senior Chemist / Lab Manager **FAX Number:** 734-995-3731

**Additional Message:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Date:** 8/7/18 **Signed:** \_\_\_\_\_

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Michigan Laboratory ID: 9604  
Wisconsin Laboratory ID: 998321720

## Inorganic Analysis Data Summary Sheet

For: Ms. Sue Peters  
Pall Corporation  
642 South Wagner Road  
Ann Arbor, MI 48103

ATS Project: Pall Corporation #G001-002  
Report Date: 8/7/18  
ATS SRF: 0801181

Sample Identification: Outfall

Sample Date: 7/14/18  
Sample Time: na  
Sampled By: Client  
Laboratory Receipt Date: 8/1/18  
Sample Matrix: Treated Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Metals Analysis							
Total Barium	EPA 200.7	mg/L	0.24	0.001	8/6/18	17:05	DMS

### Comments

All methods reference USEPA methods unless otherwise noted.



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Michigan Laboratory ID: 9604  
Wisconsin Laboratory ID: 99321728

CHAIN OF CUSTODY RECORD

PROJECT ID / NUMBER				LABORATORY INFORMATION				SHIPPING INFORMATION: SHIPPER (Check one) / TRACKING NUMBER(S) (If Applicable)												
				Pall/Gelman Corporation				Date	<input type="checkbox"/>	Fed Ex	<input type="checkbox"/>	UPS	<input type="checkbox"/>	DHL	<input type="checkbox"/>	Carrier	<input type="checkbox"/>	Tracking Number		
SAMPLE CUSTODIAN (Print & Signature)								Date	<input type="checkbox"/>	Fed Ex	<input type="checkbox"/>	UPS	<input type="checkbox"/>	DHL	<input type="checkbox"/>	Carrier	<input type="checkbox"/>	Tracking Number		
Susan Peters, 642 S. Wagner Rd. Ann Arbor Michigan								Date	<input type="checkbox"/>	Fed Ex	<input type="checkbox"/>	UPS	<input type="checkbox"/>	DHL	<input type="checkbox"/>	Carrier	<input type="checkbox"/>	Tracking Number		
RELINQUISHED BY (Print & Signature)				DATE / TIME	RECEIVED BY (Print & Signature)				DATE / TIME	RELINQUISHED BY (Print Signature)				DATE / TIME	RECEIVED BY (Print Signature)				DATE / TIME	
Susan Peters				08-01-16	[Signature]															
RELINQUISHED BY (Print & Signature)				DATE / TIME	RECEIVED BY (Print & Signature)				DATE / TIME	RELINQUISHED BY (Print & Signature)				DATE / TIME	RECEIVED BY (Print & Signature)				DATE / TIME	
					[Signature] NR 8.1.18				10:00											
COMMENTS (Preservation, etc.)								ANALYSIS												MATRIX Indicate Soil/Water/Air/ Sediment/Sludge Extract
NO. LINE	BAR CODE	DATE	TIME	COMP. / CORRECT	SAMPLE IDENTIFICATION	NO. OF CONTAINERS	PRIORITY NUMBER													
1.		07/14/2018	na	X	Outfall	1	Barium	X										treated water		
2.																				
3.																				
4.																				
5.																				
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