

## CASE NARRATIVE

### **Monthly Data Pall Life Sciences**

**Project: 1,4-Dioxane Remediation**

**Date: October 2016**

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 instrumentation. 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 samples were analyzed by Pall Corporation's Environmental Laboratory except on drinking water sample. 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.

A drinking water sample, 697 S. Wagner Road, for 1,4-dioxane (EPA 1624m) and the Outfall Barium (EPA 6010C) sample were sent to Ann Arbor Technical Services, Inc. (ATS). ATS is a Michigan DEQ certified drinking water laboratory.

Calculations at PLS 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 PLS 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 then 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.

## PLS 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.

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

### Barium

An Outfall001 sample was sent to ATS for total barium analysis per PLS NPDES permit. Barium analysis by EPA 6010C yielded a concentration of 230µg/L as total barium. The results were less than the permitted level of 440µg/L. Reporting Limits for this sample were 1µg/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
O:	Samples analyzed in outside laboratory.

Analyst: Susan E.O. Peters Susan E.O. Peters Date: 11-9-16

Report Checked by: Laurel Beyer Laurel Beyer Date: 11-9-16



# Sample Analysis Report

October, 2016

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

Analyst Initials: JEOP  
Date: 11-8-16

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>								
697 South Wagner Rd-10-21-16-11:45-1	nd	1.0					ATS	O
<b>Miscellaneous Wells</b>								
Bethlehem Cemetery-10-20-16-13:24-1	nd	1.0						
<b>Extraction Wells</b>								
<b>C3</b>								
DOLPH-10-03-16-07:14-1	92	10.0						D
TW-1-10-20-16-14:55-1	79	1.0						
TW-10-10-20-16-13:52-1	280	10.0						D
TW-14-10-20-16-14:38-1	18	1.0						
TW-20-10-03-16-07:25-1	800	25.0						D
TW-3-10-20-16-15:05-1	nd	1.0						
<b>D2</b>								
LB-4-10-03-16-09:35-1	430	25.0						D
TW-21-10-03-16-09:07-1	150	5.0						D
TW-9-10-20-16-14:05-1	630	10.0						D
<b>E</b>								
TW-12-10-20-16-13:38-1	20	1.0						
TW-16-10-03-16-08:45-1	730	25.0						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)
TW-17-10-20-16-13:57-1	620	10.0						D
TW-18-10-03-16-07:16-1	270	10.0						D
TW-19-10-03-16-08:47-1	600	10.0						D
<b>Marshy</b>								
PW-1-10-03-16-07:12-1	800	10.0						D
<b>SW</b>								
TW-22-10-03-16-08:17-1	470	10.0						D
TW-8-10-03-16-08:20-1	690	10.0						D
<b>Monitoring Wells</b>								
<b>C3</b>								
MW-127s-10-26-16-10:57-1	nd	1.0						
MW-128s-10-26-16-13:02-1	nd	1.0						
MW-22-10-21-16-13:35-1	280	10.0						D
<b>D0</b>								
A2 Cleaning Supply-10-11-16-15:50-1	70	1.0						
MW-138i-10-24-16-11:38-1	7.8	1.0						
MW-138s-10-24-16-11:00-1	nd	1.0						
MW-141s-10-24-16-14:23-1	3.2	1.0						
MW-41d-10-31-16-15:03-1	26	1.0						
MW-41s-10-31-16-15:15-1	16	1.0						
MW-53d-10-11-16-14:42-1	nd	1.0						
MW-53i-10-11-16-15:22-1	56	1.0						
MW-53s-10-11-16-13:37-1	nd	1.0						
<b>D2</b>								
HZ-S-10-20-16-14:22-1	950	10.0						D
MW-121s-10-12-16-10:13-1	nd	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-129i-10-12-16-14:08-1	nd	1.0						
MW-129s-10-12-16-14:40-1	nd	1.0						
<b>E</b>								
MW-103s-10-18-16-16:00-1	69	1.0						
MW-112i-10-18-16-15:28-1	9.8	1.0						
MW-112s-10-18-16-14:27-1	nd	1.0						
MW-121d-10-12-16-11:27-1	1.5	1.0						
MW-127d-10-26-16-10:28-1	nd	1.0						
MW-128d-10-26-16-12:29-1	nd	1.0						
MW-129d-10-12-16-16:00-1	1.3	1.0						
MW-138d-10-24-16-10:38-1	nd	1.0						
MW-141d-10-24-16-14:10-1	4.0	1.0						
MW-76i-10-18-16-17:21-1	108	5.0						D
MW-76s-10-18-16-17:57-1	290	5.0						D
MW-84s-10-19-16-16:51-1	670	5.0						D
Saginaw Forest Cabin #1-10-26-16-16:30-1	15	1.0						
Saginaw Forest Cabin #2-10-26-16-15:26-1	nd	1.0						
<b>SH</b>								
MW-25s-10-21-16-13:20-1	39	10.0						D
MW-5d-10-21-16-14:19-1	6000	100.0						D
<b>SW</b>								
MW-57-10-21-16-13:57-1	2.6	1.0						
<b>Surface Water</b>								
<b>Not Applicable</b>								
HC/HR-10-03-16-09:00-1				nd	2.0			
HC/HR-10-04-16-08:45-1				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-10-05-16-08:05-1			nd	2.0				
HC/HR-10-06-16-08:00-1			nd	2.0				
HC/HR-10-07-16-08:10-1			nd	2.0				
HC/HR-10-11-16-08:32-1			nd	2.0				
HC/HR-10-12-16-08:15-1			nd	2.0				
HC/HR-10-13-16-08:10-1			nd	2.0				
HC/HR-10-14-16-08:45-1			nd	2.0				
HC/HR-10-17-16-08:53-1			nd	2.0				
HC/HR-10-18-16-09:00-1			nd	2.0				
HC/HR-10-19-16-08:18-1			nd	2.0				
HC/HR-10-20-16-08:38-1			nd	2.0				
HC/HR-10-21-16-08:33-1			nd	2.0				
HC/HR-10-24-16-08:19-1			nd	2.0				
HC/HR-10-25-16-08:18-1			nd	2.0				
HC/HR-10-26-16-08:26-1			nd	2.0				
HC/HR-10-27-16-09:10-1			nd	2.0				
HC/HR-10-28-16-08:48-1			nd	2.0				
HC/HR-10-31-16-08:43-1			nd	2.0				

### Treatment System

OUTFALL-10-02-16-1	4.3	1.0						
OUTFALL-10-02-16-2			6.5	5.0				
OUTFALL-10-03-16-1	4.1	1.0						
OUTFALL-10-03-16-2			6.9	5.0				
OUTFALL-10-04-16-2			7.1	5.0				
OUTFALL-10-04-16-1	4.1	1.0						
OUTFALL-10-05-16-1	4.6	1.0						
OUTFALL-10-05-16-2			5.8	5.0				

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-10-06-16-1	4.7	1.0						
OUTFALL-10-06-16-2			7.4	5.0				
OUTFALL-10-09-16-1	3.8	1.0						
OUTFALL-10-09-16-2			7.9	5.0				
OUTFALL-10-10-16-1	4.2	1.0						
OUTFALL-10-10-16-2			7.7	5.0				
OUTFALL-10-11-16-2			7.5	5.0				
OUTFALL-10-11-16-1	3.9	1.0						
OUTFALL-10-12-16-1	4.1	1.0						
OUTFALL-10-12-16-2			6.5	5.0				
OUTFALL-10-13-16-1	4.0	1.0						
OUTFALL-10-13-16-2			8.0	5.0				
OUTFALL-10-16-16-1	4.4	1.0						
OUTFALL-10-16-16-2			5.7	5.0				
OUTFALL-10-17-16-1	5.2	1.0						
OUTFALL-10-17-16-2			nd	5.0				
OUTFALL-10-18-16-1	5.0	1.0						
OUTFALL-10-18-16-2			6.2	5.0				
OUTFALL-10-19-16-1	4.7	1.0						
OUTFALL-10-19-16-2			5.5	5.0				
OUTFALL-10-20-16-1	4.5	1.0						
OUTFALL-10-20-16-2			5.5	5.0				
OUTFALL-10-23-16-1	4.7	1.0						
OUTFALL-10-23-16-2			6.9	5.0				
OUTFALL-10-24-16-1	4.4	1.0						
OUTFALL-10-24-16-2			7.7	5.0				
OUTFALL-10-25-16-1	4.8	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)
OUTFALL-10-25-16-2			5.2	5.0				
OUTFALL-10-26-16-1	4.8	1.0						
OUTFALL-10-26-16-2			6.2	5.0				
OUTFALL-10-27-16-1	4.6	1.0						
OUTFALL-10-27-16-2			6.6	5.0				
OUTFALL-10-30-16-2			6.6	5.0				
OUTFALL-10-30-16-1	4.4	1.0						
OUTFALL-10-31-16-1	4.6	1.0						
OUTFALL-10-31-16-2			nd	5.0				
Red Pond-10-03-16-06:50-1	440	10.0						D
Red Pond-10-11-16-06:20-1	440	10.0						D
Red Pond-10-17-16-10:00-1	420	10.0						D
Red Pond-10-24-16-06:23-1	410	10.0						D
Red Pond-10-31-16-06:15-1	430	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

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





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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):** ORG\_SRF\_1102161 (Rush)

**Project Description:** This data report contains the results of 2 water samples, received by ATS on 11/2/16, to be analyzed for 1,4-Dioxane and 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  
**FAX Number:** \_\_\_\_\_

**No. of Pages (including cover pg.):** 4

**From:** Sarah Stubblefield **Email:** Sarah.Stubblefield@AnnArborTechnicalServices.com  
 Senior Chemist / Lab Manager **FAX Number:** 734-995-3731

**Additional Message:** Email Copy: Ms. Laurel Beyer (Laurel\_Beyer@Pall.com)

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**Date:** 11/4/16 **Signed:** \_\_\_\_\_

IF YOU DO NOT RECEIVE ALL PAGES OF THIS TRANSMITTAL, PLEASE CALL 734-995-0995.

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290 South Wagner Road  
 Ann Arbor, Michigan 48103  
 Tel. 734/995-0995 Fax. 734/995-3731  
 Michigan Laboratory ID: 9604  
 Wisconsin Laboratory ID: 998321720

# Organic 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: 11/4/16  
 ATS SRF: 1102161 (Rush)

**Sample Identification:** 697 South Wagner Road

Sample Date: 10/21/16  
 Sample Time: 11:45 AM  
 Sampled By: Client  
 Laboratory Receipt Date: 11/2/16  
 Sample Matrix: Drinking Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	11/4/16	13:59	JEB

**Comments**

All methods reference USEPA methods unless otherwise noted.



290 South Wagner Road  
 Ann Arbor, Michigan 48103  
 Tel. 734/995-0995 Fax. 734/995-3731  
 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: 11/4/16  
 ATS SRF: 1102161 (Rush)

**Sample Identification:** Barium - Outfall

Sample Date: 10/8/16  
 Sample Time: na  
 Sampled By: Client  
 Laboratory Receipt Date: 11/2/16  
 Sample Matrix: Treated Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
<b>Metals Analysis</b>							
Total Barium	EPA 6010C	mg/L	0.23	0.001	11/3/16	14:04	SLS

Comments

All methods reference USEPA methods unless otherwise noted.  
 na - Indicates not available.



290 South Wagner Road  
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# CHAIN OF CUSTODY RECORD

PROJECT NO.		PROJECT NAME					NO. OF CONTAINERS	SAMPLE TYPE											
G002-001		Pall Corp						14-Dioxane	Barium										
SAMPLERS (SIGNATURE) Keith Patterson / Robert Ursting																			
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION														
	10-21-16	11:45		✓	6978 Wagner Rd	2	DD	Tested											
	10-8-16	NA		✓	Barium-Outfall	1													
RELINQUISHED BY: (SIGNATURE) Susan E. Petrus		DATE/TIME 11-2-16 15:50		RECEIVED BY: (SIGNATURE) 		RELINQUISHED BY: (SIGNATURE)			DATE/T										
RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)		RELINQUISHED BY: (SIGNATURE)			DATE/T										
RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED FOR DISPOSAL BY: (SIGNATURE)		DATE/TIME		REMARKS											