

Gelman Sciences, Inc. d/b/a Pall Life Sciences 642 South Wagner Road Ann Arbor, MI 48103 734.436.4025 phone 734.436.4040 fax

### **CASE NARRATIVE**

Monthly Data Pall Life Sciences Project: 1,4-Dioxane Remediation Date: January 2020

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.

Some samples were analyzed at Ann Arbor Technical Services (ATS) for 1,4-dioxane due to delayed service from manufacturer. In the sample analysis report these samples are designate as "O" in the comment section. The balance of the 1,4-dioxane samples and all bromate samples were analyzed at Pall Corporation's Environmental Laboratory. All 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 delay is sample analysis was due to a catastrophic autosampler failure that took considerable time to isolate and fix. The manufacturer's representative made major repairs only to find out that these repairs did not entirely fix the problems. Samples were sent out to ATS for analysis after the service engineer was unable to eliminate all problems during his service call.

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.

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  $4^{\circ}C$  ( $\pm 2^{\circ}C$ ) 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 1.0ppb (part per billion, micrograms per liter,  $\mu g/L$ ). All quality control parameters were within the acceptance limits. All data is reported with two significant figures.

## 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. All data is reported with 2 significant figures.

## Qualifiers

### 1,4-Dioxane Qualifier Codes:

Qualifier Code	Description
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 estimat
В:	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 45 days.
0:	Samples analyzed in outside laboratory.
S:	Samples split with DEQ.

### **Bromate Qualifier Codes:**

Qualifier Code	Description
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 20 Reference Date: 02-020-20

Report Checked by: Laurel Beyer \_ Saml Beyer \_ Date: \_ 2/6/20

## January 2020



## Sample Analysis Report

January, 2020

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

Analyst Initials: \_\_\_\_\_ Date: \_\_\_\_\_

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)
Extraction Wells								
C3								
DOLPH-01-03-20-09:12-1	150	10.0						O, D
TW-10-01-07-20-10:30-1	340	10.0						0, D
TW-10-01-14-20-13:15-1	550	10.0						0, D
TW-14-01-21-20-08:36-1	43	1.0						
TW-20-01-03-20-09:21-1	740	20.0						O, D
D2								
LB-4-01-03-20-08:55-1	560	10.0			6			0, D
TW-21-01-03-20-09:05-1	250	10.0						O, D
TW-5-01-02-20-13:04-1	810	10.0						O, D
TW-5-01-03-20-09:33-1	810	20.0						0, D
TW-9-01-07-20-11:15-1	520	10.0						O, D
TW-9-01-14-20-13:20-1	530	10.0						O, D
E								
TW-11-01-07-20-11:20-1	200	4.0					ъ.	Q
TW-11-01-24-20-15:17-1	180	10.0						D
TW-17-01-03-20-09:26-1	110	10.0						O, D
TW-17-01-24-20-15:13-1	83	10.0						D
TW-18-01-03-20-09:08-1	300	10.0						O, D
TW-18-01-23-20-08:05-1	250	10.0			¥1			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-19-01-03-20-08:52-1	660	10.0						O, D
TW-23-01-03-20-08:50-1	460	10.0						O, D
Marshy								
PW-1-01-03-20-09:12-1	700	10.0			-			O, D
SW								
TW-22-01-15-20-11:50-1	420	10.0						O, D
TW-28-01-03-20-09:41-1	710	10.0						0, D
Monitoring Wells								
C3							-	
MW-32-01-30-20-11:41-1	19	1.0						
D0								(m)
A2 Cleaning Supply-01-06-20-12:40-1	66	1.0			τ.			0
MW-53d-01-06-20-09:34-1	nd	1.0						0
MVV-53i-01-06-20-11:59-1	35	1.0						0
MW-53s-01-06-20-10:48-1	nd	1.0						0
D2								1
2819 Dexter Rd-01-29-20-13:56-1	150	10.0					<u> </u>	D
MW-107-01-21-20-15:06-1	650	10.0						D
MW-113-01-21-20-10:55-1	96	1.0						
MW-120s-01-29-20-12:38-1	nd	1.0						
MW-121s-01-29-20-08:52-1	nd	1.0						
MVV-129i-01-28-20-08:55-1	nd	1.0						
MW-129s-01-28-20-10:06-1	nd	1.0						
MW-34d-01-30-20-09:24-1	nd	1.0						
Е								

PLS Page 4 of 8

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-101-01-21-20-12:23-1	93	1.0						
MW-103d-01-10-20-13:02-1	8	1.0						0
MW-103s-01-17-20-08:59-1	76	1.0						
MW-104-01-17-20-12:46-1	18	1.0						
MW-106s-01-30-20-13:06-1	210	10.0						D
MW-108s-01-30-20-14:29-1	260	10.0						D
MW-110-01-17-20-14:03-1	90	1.0						
MW-112d-01-10-20-10:19-1	1	1.0						0
MW-112i-01-10-20-11:35-1	9	1.0						0
MW-112s-01-10-20-09:07-1	nď	1.0						0
MW-119-01-27-20-12:07-1	33	1.0						
MW-120d-01-29-20-11:24-1	nd	1.0						
MW-121d-01-29-20-10:02-1	2.1	1.0						
MW-129d-01-28-20-11:16-1	1.5	1.0						
MW-76i-01-17-20-10:18-1	88	1.0						
MW-76s-01-17-20-11:29-1	250	10.0						D
MW-79d-01-27-20-09:30-1	nd	1.0						
MW-79s-01-27-20-10:44-1	320	10.0						D
MW-81-01-21-20-13:45-1	190	10.0						D
MW-84s-01-06-20-14:09-1	73	1.0						0
MW-85-01-27-20-14:48-1	560	10.0						D
MW-88-01-27-20-13:27-1	170	10.0						D
MW-90-01-21-20-09:22-1	7.9	1.0						
SW								
MW-57-01-23-20-11:29-1	3.2	1.0						
Surface Water	•							

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)
Not Applicable								
HC/HR-01-02-20-07:40-1			nd	2.0				
HC/HR-01-03-20-07:38-1			nd	2.0				
HC/HR-01-06-20-07:57-1			nd	2.0				
HC/HR-01-07-20-07:28-1			nd	2.0				
HC/HR-01-08-20-07:45-1			nd	2.0				
HC/HR-01-09-20-08:00-1			nd	2.0				
HC/HR-01-10-20-07:40-1			nd	2.0				
HC/HR-01-13-20-07:38-1			nd	2.0				
HC/HR-01-14-20-08:20-1			nd	2.0				
HC/HR-01-15-20-08:30-1			nd	2.0				
HC/HR-01-16-20-07:55-1			nd	2.0				
HC/HR-01-17-20-07:40-1			nd	2.0				
HC/HR-01-20-20-07:45-1			nd	2.0				
HC/HR-01-21-20-07:43-1			nd	2.0				
HC/HR-01-22-20-07:35-1			nd	2.0				
HC/HR-01-23-20-07:43-1			nd	2.0				
HC/HR-01-24-20-07:58-1			nd	2.0				
HC/HR-01-27-20-07:53-1			nd	2.0				
HC/HR-01-28-20-07:32-1			nd	2.0				
HC/HR-01-29-20-07:55-1			nd	2.0				
HC/HR-01-30-20-07:50-1			nd	2.0				
HC/HR-01-31-20-07:54-1			nd	2.0				
Treatment System								
OUTFALL-01-01-20-2			7.4	5.0				
OUTFALL-01-01-20-1	5	1.0						0
OUTFALL-01-02-20-2	T		6.4	5.0				1
		<u>i</u>		1	1		E	

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-01-02-20-1	7	1.0						0
OUTFALL-01-05-20-2			5.7	5.0				
OUTFALL-01-05-20-1	7	1.0						0
OUTFALL-01-06-20-2			6.7	5.0				
OUTFALL-01-06-20-1	6	1.0						0
OUTFALL-01-07-20-1	6	1.0						0
OUTFALL-01-07-20-2			5.6	5.0				
OUTFALL-01-08-20-1	5	1.0						0
OUTFALL-01-08-20-2			6.7	5.0				
OUTFALL-01-09-20-1	6	1.0						0
OUTFALL-01-09-20-2			6.0	5.0				
OUTFALL-01-12-20-2			5.8	5.0				
OUTFALL-01-12-20-1	5	1.0						0
OUTFALL-01-13-20-2			5.4	5.0				
OUTFALL-01-13-20-1	8	1.0						0
OUTFALL-01-14-20-2			6.8	5.0				
OUTFALL-01-14-20-1	7	1.0						0
OUTFALL-01-15-20-1	6.8	1.0						
OUTFALL-01-15-20-2			9.2	5.0				
OUTFALL-01-16-20-01	6.7	1.0						
OUTFALL-01-16-20-02			7.4	5.0				
OUTFALL-01-19-20-1	6.7	1.0						
OUTFALL-01-19-20-2			8.7	5.0				
OUTFALL-01-20-20-1	7.0	1.0						
OUTFALL-01-20-20-2			7.7	5.0				
OUTFALL-01-21-20-1	6.9	1.0						
OUTFALL-01-21-20-2			7.4	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-01-22-20-1	6.2	1.0						
OUTFALL-01-22-20-2			7.4	5.0				
OUTFALL-01-23-20-1	5.1	1.0						
OUTFALL-01-23-20-2			8.8	5.0				
OUTFALL-01-26-20-1	3.9	1.0						
OUTFALL-01-26-20-2			7.5	5.0				
OUTFALL-01-27-20-1	4.0	1.0						
OUTFALL-01-27-20-2			8.7	5.0				
OUTFALL-01-28-20-1	4.0	1.0						
OUTFALL-01-28-20-2			7.2	5.0				1
OUTFALL-01-29-20-1	4.0	1.0						
OUTFALL-01-29-20-2			8.9	5.0				
OUTFALL-01-30-20-1	3.9	1.0						
OUTFALL-01-30-20-2			7.6	5.0				
Red Pond-01-06-20-08:17-1	370	10.0						0, D
Red Pond-01-13-20-09:48-1	390	10.0						O, D
Red Pond-01-20-20-08:10-1	300	10.0						D
Red Pond-01-27-20-08:15-1	400	10.0						D

## PLS Qualifier Codes:

nd:

D: H:

The compound was analyzed for, but was not detected at or above the detection limit indicated. Analyte value quantified from a dilution, reporting limit is raised to reflect dilution. Sample was analyzed past 45 day hold time, but within 45 days used by ATS for same method with EPA approval. Samples analyzed in outside laboratory, Ann Arbor Technical Services (ATS).

O:



#### Data Transmittal Cover Page

Project Name:	Pall Corporation
ATS Project Number:	G001-002
ATS Report Number(s):	Org_SRF_0107201

Project Description: This data report contains the results of 20 water samples, received by ATS on 1/7/20, to be analyzed for 1,4-Dioxane.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided The energy and the dwarfs analyses of the sport and sport net deem to colocited on accounter with guidances provided in the referenced standard lest 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, SOPa, and OAVCI Information are available for inspection and audit at the laboratory upon request. Unless specificatly noted on the data report, all applicable sample preservation and holding time requirements have been met.

Reciplent:	Ms. Sue Peters		Email: FAX Number:	Sue Peters@Pall.com
No. of Pag	es (including cover pg.):	27		
From:	Sarah Stubblefield Sen'or Chemist / Lab Manager	Email: FAX Number:	Sarah. Stubblefie 734-995-3731	Id@AnnArborTechnicalServices.com
Additional	Message:			
			SA.	Sto

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Sample Receipt and Chain of Custody Records

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are presented in the "Chain of Custody and Sample Receipt Documentation" section of this report.

#### Data Review and Approval

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by US EPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

#### Data Deliverables

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

#### Sample Analysis

1.4-Dioxane Analysis (GC/MS): Samples were analyzed in accordance with US EPA method 1624 (Volntile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits.

Anomalies Noted: None

Analytical OA/OC Summary

**Calibration Verification** 

Method calibration was verified through the running of a mid-level initial calibration verification (CV) standard at a frequency of every 24 hours. All verification standards met the acceptance criteria with the following exceptions:

None

#### Instrument Blanks

Instrument blanks were analyzed at a frequency of every 24 hours. All blanks met the acceptance criteria with the following exceptions: • None





LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002 Report Date: 1/13/20 SRF / SDG Numbers: 0107201

Case Narrative Summary

This case narrative applies to the following 20 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 1/7/20, and associated matrix-specific QA/QC:

Client Sample Identification	Sample Date	Sample Time	Turn Around Time	Analysis	Matrix
TW-23	1/3/20	8.50	Standard	1,4-Dioxane	Water
TW-19	1/3/20	8.52	Standard	1,4-Dioxane	Water
LB-4	1/3/20	8:55	Standard	1,4-Dioxane	Water
TW-21	1/3/20	9:05	Standard	1,4-Dioxane	Water
TW-18	1/3/20	9.08	Standard	1,4-Dioxane	Water
PW-1	1/3/20	9.12	Standard	1,4-Dioxane	Water
DOLPH	1/3/20	9:12	Standard	1,4-Dioxane	Water
TW-20	1/3/20	9.21	Standard	1,4-Dioxane	Water
TW-17	1/3/20	9.26	Standard	1,4-Dioxane	Water
TW-5	1/3/20	9:33	Standard	1,4-Diaxane	Water
TW-28	1/3/20	9:41	Standard	1,4-Dioxane	Water
Outfall	1/5/20	na	Rush	1,4-Dioxane	Water
Outfail	1/6/20	na	Rush	1,4-Dioxane	Water
Red Pond	1/6/20	8:17	Standard	1,4-Dioxane	Water
MW-53d	1/6/20	9.34	Standard	1,4-Dioxane	Water
MW-53s	1/6/20	10:48	Standard	1,4-Dioxane	Water
MS-531	1/6/20	11:59	Standard	1,4-Dioxane	Water
A2 Cleaning Supply	1/6/20	12:40	Standard	1,4-Dioxane	Water
ATW-84s	1/8/20	14:09	Standard	1,4-Dioxane	Water
TW-10	1/7/20	10:30	Standard	1,4-Dioxane	Water

Upon receipt, samples were scheduled for the following analyses:

Number of Samples

20 + 1 Matrix Spike / 1 Matrix Spike Duplicate

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1,4-Dioxane by US EPA 1624

Analysis

Consultants in Chemistry & Environmental Science 290 South Wagner Road, Ann Arbor, Michigan 48103 Tel 734/995-0995 Fax 734/995-3731

#### **QA/QC** Batch Summary

Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

Laboratory Fortified Blanks and Matrix Spikes

A laboratory fortified blank (LFB) / laboratory control sample (LCS) was analyzed with each QA/QC batch. The LCS/LFB's met the acceptance criteria with the following exceptions: None

#### Matrix Duplicates

A replicate analysis was analyzed with each QA/QC batch. All replicates met the acceptance criteria with the following exceptions: None

#### Sample Dilutions

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• TW-23	• PW-1	• TW-28
• TW-19	<ul> <li>DOLPH</li> </ul>	<ul> <li>Red Pond</li> </ul>
• LB-4	<ul> <li>TW-20</li> </ul>	• TW-10
<ul> <li>TW-21</li> </ul>	• TW-17	
<ul> <li>TW-18</li> </ul>	• TW-5	



Markalitong

### / January 13, 2020

/ January 13, 2020

Mark T. DeLong (Quality Assurance Coordinator)

0 3 + hey

Philip B. Simon (Laboratory Director)



Organic Analysis Data Summary Sheet

For: Ms. Sue Peters		ATS Project:	Pall Corporation	#G001-002			
Pall Corporation	Pall Corporation		1/13/20				
642 South Wagner Road		ATS SRF:	0107201				
Ann Arbor, MI 48103							
Sample Identification:	TW-23						
Sample Date:	1/3/20						
Sample Time:	8:50 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						

Paramoter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.46	0.01	1/8/20	17:52	JEB

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A Sille

20 Bould Wager Road And Charles Control Contro					Organic Analy Data Summary She				
For: Ms. Sue Peters Pall Corporation 642 South Wagner Road			ATS Project:	Pall Corporation	ation				
			Report Date:	1/13/20					
			ATS SRF:	0107201					
Ann Arbor, MI 48103									
Sample Identification:	TW-19								
Sample Date:	1/3/20								
Sample Time:	8:52 AM								
Sampled By:	Client								
Laboratory Receipt Date:	1/7/20								
Sample Matrix:	Water								
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By		
Organic Analysis									
1.4-Dioxane	EPA 1624	ma/L	0.66	0.01	1/8/20	18:35	JEB		

A Sille Ann Arb Tel. 734 15 F.A.

Comments All methods reference USEPA methods unless otherwise noted.

Organic Analysis Data Summary Sheet #G001-002

rev. 1/13/20

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

X1G001-002.20/0RG\_SRF\_0107201

ATS Project:	Pall Corporation
Report Date:	1/13/20
ATS SRF:	0107201

Sample Identification:	LB-4						
Sample Date:	1/3/20						
Sample Time:	8:55 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1.4-Dioxane	EPA 1624	mg/L	0.56	0.01	1/8/20	19:19	JEB

Comments All methods reference USEPA methods unless otherwise noted.

Comments All methods reference USEPA methods unless otherwise noted.

X VG001-002 2010RG\_SRF\_0107201

Michigan Laborat	pan 48103 Fax, 734/995-3731					Organic / Summa			
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002		
Pall Corporation			Report Date:	1/13/20					
642 South Wagner Road			ATS SRF:	0107201					
Ann Arbor, MI 48103									
Sample Identification:	TW-21								
Sample Date:	1/3/20								
Sample Time:	9:05 AM								
Sampled By:	Client								
Laboratory Receipt Date:	1/7/20								
Sample Matrix:	Water								
Parameter	Method	Units	Result	Reporting Limit	Analysis	Analysis Time	Analyzed By		
Organic Analysis		-							
1,4-Dioxane	EPA 1624	mg/L	0.25	0.01	1/8/20	20.03	JEB		

A Defection of a Defection of the Control of the Co						Organic Analysis Data Summary Sheet			
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-00		
Pall Corporation			Report Date:	1/13/20					
642 South Wagner Road			ATS SRF:	0107201					
Ann Arbor, MI 48103									
Sample Identification:	TW-18								
Sample Date:	1/3/20								
Sample Time:	9:08 AM								
Sampled By:	Client								
Laboratory Receipt Date:	1/7/20								
Sample Matrix:	Water								
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By		
Organic Analysis									
1.4-Dioxane	EPA 1624	mg/L	0.30	0.01	1/8/20	20:47	JEB		

Com	ments				
All me	thods reference	USEPA methods	unless	otherwise not	te

290 South Wa

X1G001-002.20/DRG\_SRF\_0107201

rev. 1/13/20

Ann Arbor, Michi Tel, 734/996-0958 Michigan Labor Wisconsin Labor	Fax, 734/295-3731					Organic / Summa	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	PW-1						
Sample Date:	1/3/20						
Sample Time:	9:12 AM						
Sampled By: •	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Irganic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.70	0.01	1/8/20	21:30	JEB

Comments All methods reference USEPA methods unless otherwise noted.

X1G001-002.20/DRG\_SRF\_0107201

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# Organic Analysis Data Summary Sheet

rev. 1/13/20

For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	DOLPH						
Sample Date:	1/3/20						
Sample Time:	9:12 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.15	0.01	1/8/20	22:14	JEB

X1G001-002.20/DRG\_SRF\_0107201

X1G001-002.20/ORG\_SRF\_0107201

rev. 1/13/20

An Abor, Michael	Fax. 734/995-3731					)rganic A Summar	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	TW-20						
Sample Date:	1/3/20						
Sample Time:	9:21 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis				12322			JEB
1,4-Dioxane	EPA 1624	mg/L	0.74	0.02	1/8/20	22.58	JEB

Arsille	290 South Wagner Road Ann Arbor, Michigan 48103 Tel, 734:995-0995 Faz, 734:995-3731 Michigan Laboratory ID: 9004 Wisconsin Laboratory ID: 998321720
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## Organic Analysis Data Summary Sheet

For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	TW-17						
Sample Date:	1/3/20						
Sample Time:	9:26 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.11	0.01	1/8/20	23:41	JEB

Comments All methods reference USEPA methods unless otherwise noted.

X1G001-002.20/ORG\_SRF\_0107201

rev. 1/13/20

Michigan Laborat	Fax. 734/995-3731					rganic A Summar	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	TW-5						
Sample Date:	1/3/20						
Sample Time:	9:33 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							150
1,4-Dioxane	EPA 1624	mg/L	0.81	0.02	1/9/20	0:25	JEB

Comments All methods reference USEPA methods unless otherwise noted.

Ann Arbor, Tel, 73499 -3731

X1G001-002.20/ORG\_SRF\_0107201

## Organic Analysis Data Summary Sheet

rev. 1/13/20

#G001-002

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For: Ms. Sue Peters Pall Corporation 642 South Wagner Road Ann Arbor, MI 48103 ATS Project: Pall Corporation Report Date: 1/13/20 ATS SRF: 0107201 Sample Identification: TW-28 Sample Date: Sample Time: Sampled By: Laboratory Receipt Date: Sample Matric: 1/3/20 9:41 AM Client 1/7/20 Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.71	0.01	1/9/20	1:09	JEB

Comments All methods reference USEPA methods unless otherwise noted.

X1G001-002.20/DRG\_SRF\_0107201

X1G001-002.20/ORG\_SRF\_0107201

Comments All methods reference USEPA methods unless otherwise noted.

An Arbor, Michig Tel, 734995 0985 Michigan Laborat Wisconsin Laborat	an 48103 Fax, 734/995-3731					organic A Summar	
For: Ms. Sue Peters Pall Corporation 642 South Wagner Road Ann Arbor, MI 48103			ATS Project: Report Date: ATS SRF:	Pall Corporation 1/13/20 0107201			#G001-002
Sample Identification:	Outfall						
Sample Date:	1/5/20		2				
Sample Time:	na						
Sampled By:	Client						
	1/7/20						
Laboratory Receipt Date:	111120						
	Water						
Laboratory Receipt Date:		Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Laboratory Receipt Date: Sample Matrix:	Water	Units mg/L		Reporting Limit			

41 Sullie	290 South Wagner Road Ann Arbor, Michigan 48103 Tel, 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 996321729 Wisconain Laboratory ID: 996321729
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## Organic Analysis Data Summary Sheet

For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	Outfall						
Sample Date:	1/6/20						
Sample Time:	na						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Paramotor	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							100
1,4-Dioxane	EPA 1624	mg/L	0.006	0.001	1/8/20	12:04	JEB

Comments	
All methods reference USEPA methods unless otherwise not	ed.
Sample analyzed at native pH.	

X.VG001-002.20/ORG\_SRF\_0107201

rev. 1/13/20

Michigan Laborate	Tel. 734/995-0955 Faz, 734/995-3731 Michigan Laboratory ID: 9604						anic Analysis mmary Sheet			
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002			
Pall Corporation			Report Date:	1/13/20						
642 South Wagner Road			ATS SRF:	0107201						
Ann Arbor, MI 48103										
Sample Identification:	Red Pond									
Sample Date:	1/6/20									
Sample Time:	8:17 AM									
Sampled By:	Client									
Laboratory Receipt Date:	1/7/20									
Sample Matrix:	Water									
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By			
Organic Analysis										
1,4-Dioxane	EPA 1624	mg/L	0.37	0.01	1/9/20	1:52	JEB			

X.VG001-002.20/ORG\_SRF\_0107201

Comments All methods reference USEPA methods unless otherwise noted. Sample analyzed at native pH.

210 South Wagner Ro. Ann Arbor, Michigan Tel, 73956-0005 Far. 6-3731

# Organic Analysis Data Summary Sheet

rev. 1/13/20

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

Sue Peters		ATS Project:	Pall Corporation	#G001-002
Corporation		Report Date:	1/13/20	
South Wagner Road		ATS SRF:	0107201	
Arbor, MI 48103				
Sample Identification:	MW-53d			
ple Date:	1/6/20			
ple Time:	9:34 AM			
oled By:	Client			
ratory Receipt Date:	. 1/7/20			
ole Matrix	Water			

Sample Date:	1/6/20							
Sample Time:	9:34 AM							
Sampled By:	Client							
Laboratory Receipt Date:	. 1/7/20							
Sample Matrix:	Water							
Parameter	Meth	od	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							15:19	JEB
1,4-Dioxane	- EPA 1	624	mg/L	<0.001	0.001	1/8/20	15:19	JEB

Comments All methods reference USEPA methods unless otherwise noted.

Comments All methods reference USEPA methods unless otherwise noted.

X.\G001-002.20/ORG\_SRF\_0107201

Michigan Laborat	Fax, 734/995-3731					)rganic A Summar	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	MW-53s						
Sample Date:	1/6/20						
Sample Time:	10:48 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Paramoter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Timo	Analyzed By
Organic Analysis				2022			JEB
1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	1/9/20	2:36	JEB

Michigan Laborati	Tel. 734/995-0995 Fax. 734/995-3731						Organic Analysis Data Summary Shee		
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002		
Pall Corporation			Report Date:	1/13/20					
642 South Wagner Road			ATS SRF:	0107201					
Ann Arbor, MI 48103									
Sample Identification:	MW-53i								
Sample Date:	1/6/20								
Sample Time:	11:59 AM								
Sampled By:	Client								
Laboratory Receipt Date:	1/7/20								
Sample Matrix:	Water								
Parameter	Method	Units	Result	Reporting LImit	Analysis Date	Analysis Time	Analyzed By		
Organic Analysis									
1.4-Dioxane	EPA 1624	mg/L	0.035	0.001	1/9/20	3:19	JEB		

Comments	
All methods reference USEPA methods unless otherwise noted.	

X.1G001-002.201DRG\_SRF\_0107201

rev. 1/13/20

200 South Wager Read Annual South Wager Read Tel 720092-001 South						organic A Summar	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-00
Pall Corporation			Report Date:	1/13/20	-		
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	A2 Cleaning Supply						
Sample Date:	1/6/20						
Sample Time:	12:40 PM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1.4-Dioxane	EPA 1624	mg/L	0.066	0.001	1/9/20	5:30	JEB

Comments All methods reference USEPA methods unless otherwise noted.

X\G001-002.20/ORG\_\$RF\_0107201

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rev. 1/13/20

Organic Analysis Data Summary Sheet

For: Ms. Sue Peters		2	ATS Project:	Pall Corporation			#G001-002
Pall Corporation		1	Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	MW-84s						
Sample Date:	1/6/20						
Sample Time:	2:09 PM						
Sampled By:	Client			29			
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.073	0.001	1/9/20	4:03	JEB

Comments All methods reference USEPA methods unless otherwise noted.

X1G001-002.20/DRG\_SRF\_0107201

Comments All methods reference USEPA methods unless otherwise noted.

Michigan Laborat	Fax, 734/995-3731					Organic / Summai	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0107201			
Ann Arbor, MI 48103							
Sample Identification:	TW-10						
Sample Date:	1/7/20						
Sample Time:	10:30 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/7/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis					-		
1,4-Dioxane	EPA 1624	mg/L	0.34	0.01	1/9/20	4:46	JEB



Parameter: 1,4-Dioxane (EPA 1624)

#### **Quality Assurance / Quality Control** Data Summary

ATS Project: Pall Corporation Report Date: 1/13/20 #G001-002

Results of QA Samples run concurrently with project samples REPLICATE ANALYSIS

Sample	Replicate #1	Replicate #2	Mean	Relative Range (percent)
#G001-002 MW-534 1/6/20 Matrix Spike	0.011 mg/L	0.010 mg/L	0.010 mg/L	8.0
SPIKES and/or QC CHECK SAMPLES Sample/Analyte	Known Concentration	Spike Concentration	Analyzed Concentration	Recovery (percent)
KG001-002 Laboratory Fortified Blank 1/8/20 NW-53d 1/8/20 Matrix Spike NW-53d 1/8/20 Matrix Spike Duplicate	<0.001 mg/L <0.001 mg/L <0.001 mg/L	0.010 mg/L 0.010 mg/L 0.010 mg/L	0.010 mg/L 0.011 mg/L 0.010 mg/L	99.8 107.5 99.2
BLANK ANALYSIS		Analyzed		
G001-002 Laboratory Reagent Blank 1/8/20			Concentration 01 mg/L	QC Decision Acceptable
Comments:		Control Limits:		
Calculations performed prior to rounding.		Recoveries	ale Deserver (DE 11EW)	

Laboratory Control Sample Recover Matrix Spike Recovery (80 - 120%) overy (85 - 115%) Relative Range Replicates ( <20%)

Comments All methods reference USEPA methods unless otherwise noted.

X1G001-002.20 ORG\_SRF\_0107201

rev. 1/13/20

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#### Data Transmittal Cover Page

Project Name: Pall Corporation ATS Project Number: ATS Report Number(s):

G001-002 Org\_SRF\_0109201

Project Description:

This data report contains the results of 5 water samples, received by ATS on 1/9/20, to be analyzed for 1,4-Dioxane.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided Vere centry that are sample analyses to 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 within Standard Operating Procedure specific to the ATS Laboratories, as required by USEPA. Laboratory data sheets, SOPs, and QAQC 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: FAX Number:	Sue_Peters@Pall.com
No. of Pag	es (including cover pg.):	11		
From:	Sarah Stubblefield	Email:	Sarah.Stubblefie	Id@AnnArborTechnicalServices.com
	Senior Chemist / Lab Manager	FAX Number:	734-995-3731	
Additional	Message:			
Additional	Message:		1	

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MANNER MORE POR Pall/Gelman Cun Cun Cun Susan E.O. Peters, Pall Corp., 642 S. Wagner Rd., Ann Arbor, Mi. Suran E.U. Riters 04-67-30 15:45 ERing 1.7-20 EATZ/THE Dutfall samples quick turn around balance of samples standard turn around 10000001100000 10 00 1 1 1 1 to later 1 08:50 08:52 08:55 09:05 09:08 09:12 09:12 TW-23 TW-19 LB-4 TW-21 TW-18 
 TW-18
 1

 PW-1
 1

 DO/LPH OGLINF
 1

 TW-20
 1

 TW-17
 1

 TW-5
 1

 TW-28
 1

 Outfull
 2
 DO/LPH TW-20 TW-17 TW-5 TW-28 Out/all Out/all Red Pond MW-53d 09:21 09:26 09:33 09:41 08:17 09:34 × 10:48 X MW-53s MW-53 A2 Cleaning Supply MW-84s 681220 12:40 681220 14:09 10:30 X

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CHAIN OF CUSTODY RECORD



#### LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002 Report Date: 1/13/20 SRF / SDG Numbers: 0109201

Case Narrative Summary

This case narrative applies to the following 5 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 1/9/20, and associated matrix-specific QA/QC:

Samples					
Client Sample Identification	Sample Date	Sample Time	Turn Around Time	Analysis	Matrix
Outfall	1/7/20	na	Rush	1,4-Dioxane	Water
Outfall	1/8/20	na	Rush	1,4-Dioxane	Water
TW-5	1/2/20	13:04	Standard	1,4-Dioxane	Water
T\V-9	1/7/20	11:15	Standard	1,4-Dioxane	Water
TW-11	1/7/20	11:20	Standard	1,4-Dioxane	Water

#### Upon receipt, samples were scheduled for the following analyses:

Analysis	Number of Samples
<ul> <li>1,4-Dioxane by US EPA 1624</li> </ul>	5 + 1 Matrix Spike / 1 Matrix Spike Duplicate

#### Sample Receipt and Chain of Custody Records

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are presented in the "Chain of Custody and Sample Receipt Documentation" section of this report.

#### Data Review and Approval

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by US EPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

#### G001-002.20/CN\_0109201.doc

Matrix Duplicates

Sample Dilutions

• TW-5

ving exceptions None

Consultants in Chemistry & Environmental Science 290 South Wagner Road, Ann Arbor, Michigan 48103 Tel 734/955-0995 Fax 734/995-3731

A replicate analysis was analyzed with each QA/QC batch. All replicates met the acceptance criteria with the following exception:

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• TW-11

#### A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

#### Data Deliverables

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

#### Sample Analysis

<u>1.4-Dioxane Analysis (GCMS)</u>: Samples were analyzed in accordance with US EPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits.

#### Anomalies Noted: • None

Analytical QA/QC Summary

#### Calibration Verification

Method calibration was verified through the running of a mid-level initial calibration verification (CV) standard at a frequency of every 24 hours. All verification standards met the acceptance criteria with the following exceptions:

None

#### Instrument Blanks

Instrument blanks were analyzed at a frequency of every 24 hours. All blanks met the acceptance criteria with the following exceptions:
 None

#### QA/QC Batch Summary

Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

• Note

#### Laboratory Fortified Blanks and Matrix Spikes

A laboratory fortified blank (LFB) / laboratory control sample (LCS) was analyzed with each QA/QC batch. The LCS/LFB's met the acceptance criteria with the following exceptions: • None

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD met the acceptance criteria with the following exceptions:

• None
• None

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#### Organic Analysis Data Summary Sheet

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

Sample I

Sample Date: Sample Time: Sampled By: Laboratory Rec Sample Matrix:

		ATS Project:	Pall Corporation	#G001-002
		Report Date:	1/13/20	
Road	ATS SRF:	0109201		
103				
Identification:	Outfall			
	1/7/20			
	na			
	Client			
t Date:	1/9/20			
	Water			

Analysis Analysis Analyzed **Reporting Limit** Parameter Method Units Result Date Time By inic Analysis 1,4-Dioxane EPA 1624 mo/L 0.006 0.001 1/9/20 16:36 JE8

Markalitong

/ January 13, 2020

• TW-9

Mark T. DeLong (Quality Assurance Coordinator)

D / January 13, 2020

Philip B. Simon (Laboratory Director)

Comments All methods reference USEPA methods unless otherwise noted Sample analyzed at native pH.



Michigan Laborat	Fax, 734/995-3731					Organic / Summa	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0109201			
Ann Arbor, MI 48103							
Sample Identification:	Outfall						
Sample Date:	1/8/20						
Sample Time:	na						
Sampled By:	Client						
Laboratory Receipt Date:	1/9/20						
Sample Matrix:	Water						
Paramotor	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.005	0.001	1/9/20	14:18	JEB

Michigan Laborat	Fax, 734/995-3731					Organic / Summai	
For: Ms. Sue Peters Pall Corporation			ATS Project: Report Date:	Pall Corporation 1/13/20			#G001-002
642 South Wagner Road			ATS SRF:	0109201			
Ann Arbor, MI 48103				1			
Sample Identification:	TW-5						
Sample Date:	1/2/20						
Sample Time:	1:04 PM						
Sampled By:	Client						
Laboratory Receipt Date:	1/9/20						
Sample Matrix	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1.4-Dioxane	EPA 1624	mg/L	0.81	0.01	1/9/20	17:20	JEB

Comments All methods reference USEPA methods unless otherwise noted. Sample analyzed at native pH.

XNG001-002.20/DRG\_SRF\_0109201

rev. 1/13/20

Ann Arborn, Michigan Laborn Wisconsin Laborn	Fax. 734/995-3731					Organic / Summai	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0109201			
Ann Arbor, MI 48103							
Sample Identification:	TW-9						
Sample Date:	1/7/20						
Sample Time:	11:15 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/9/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1.4-Dioxane	EPA 1624	mg/L	0.52	0.01	1/9/20	18:04	JEB

Comments All methods reference USEPA methods unless otherwise noted.

X1G001-002.20/ORG\_SRF\_0109201

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## Organic Analysis Data Summary Sheet

rev. 1/13/20

#G001-002

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

Sample Identification:	TW-11						
Sample Date:	1/7/20						
Sample Time:	11:20 AM						
Sampled By:	Client						
Laboratory Receipt Date:	1/9/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.20	0.004	1/9/20	18:48	JEB

ATS Project: Pall Corporation Report Date: 1/13/20 ATS SRF: 0109201

Comments All methods reference USEPA methods unless otherwise noted.

X1G001-002.20 OR0\_SRF\_0109201

Comments All methods reference USEPA methods unless otherwise noted.



### **Quality Assurance / Quality Control Data Summary**

#G001-002

atch Number: QCORG0109201 Parameter: 1,4-Dioxane (EPA 1624)

ATS Project: Pall Corporation Report Date: 1/13/20

Results of QA Samples run concurrently with p olact camples

-3731

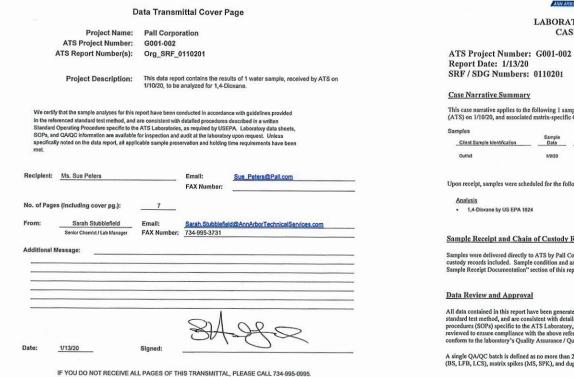
Sample	Replicate #1	Replicate #2	Mean	Relative Range (percent)
#G001-002 Outfall 1/8/20 Matrix Spike	0.015 mg/L	0.014 mg/L	0.014 mg/L	2.4
SPIKES and/or QC CHECK SAMPLES Sample/Analyte	Known Concentration	Spike Concentration	Analyzed Concentration	Recovery (percent)
VG001-002 Laboratory Fortifed Blank 1/0/20 Outfall 1/0/20 Matrix Sp%e Outfall 1/0/20 Matrix Sp%e Duplicate	<0.001 mg/L 0.005 mg/L 0.005 mg/L	0.010 mg/L 0.010 mg/L 0.010 mg/L	0.009 mg/L 0.015 mg/L 0.014 mg/L	87.6 96.3 92.9
BLANK ANALYSIS Sample		Analyzed (	Concentration	QC Decision
G001-002 Laboratory Reagent Blank 1/9/20		<0.0	01 mg/L	Acceptable

Comments: Calculations performed prior to rounding. **Control Limits:** coveries Laboratory Control Sample Recovery (85 - 115%) Matrix Spike Recovery (80 - 120%) Relative Range Replicates ( <20%)

G001-002.20\ORG\_SRF\_0109201

250 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/985-0995 Fax, 734/995-3731

rev 1/13/20



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### The Article With States

CHAIN OF CUSTODY RECORD

Page 1

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LABORATORY OPERATIONS CASE NARRATIVE

SRF / SDG Numbers: 0110201

This case narrative applies to the following 1 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 1/10/20, and associated matrix-specific QA/QC:

	Sample	Sample	Turn Around		
Client Sample Identification	Date	Time	Time	Analysis	Matrix
Outfall	1/9/20	na	Rush	1,4-Dioxane	Water

Upon receipt, samples were scheduled for the following analyses:

Nu	mber of Samples
	1 + 1 Matrix Spike / 1 Matrix Spike Duplicate

#### Sample Receipt and Chain of Custody Records

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are presented in the "Chain of Custody and Sample Receipt Documentation" section of this report.

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOP3) specific to the ATS Laboratory, as required by US EPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

G001-002.20/CN\_0110201.doc

#### Data Deliverables

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

#### Sample Analysis

<u>1.4-Dioxane Analysis (GC/MS)</u>: Samples were analyzed in accordance with US EPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits.

Anomalies Noted • None

Analytical QA/QC Summary

Calibration Verification

Method calibration was verified through the running of a mid-level initial calibration verification (CV) standard at a frequency of every 24 hours. All verification standards met the acceptance criteria with the following exceptions:

• None
• None

Instrument Blanks

Instrument blanks were analyzed at a frequency of every 24 hours. All blanks met the acceptance criteria with the following exceptions: • None

**QA/QC Batch Summary** 

#### Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions; • None

#### Laboratory Fortified Blanks and Matrix Spikes

A laboratory fortified blank (LFB) / laboratory control sample (LCS) was analyzed with each QA/QC batch. The LCS/LFB's met the acceptance criteria with the following exceptions:
 None

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD met the acceptance criteria with the following exceptions: • None

G001-002 20/CN 0110201.doc



#### Matrix Duplicates

A replicate analysis was analyzed with each QA/QC batch. All replicates met the acceptance criteria with the following exceptions:

None

None

#### Sample Dilutions

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:
 None

/ January 13, 2020

Markalitong

/ January 13, 2020

Mark T. DeLong (Quality Assurance Coordinator)

y Philip B. Simon (Laboratory Director)

G001-002.20/CN\_0110201.doc



200 South Wagner Road Ann Arbor, Michigan 48103 Tel, 7340905 Fax, 734096-3731 Tel, 7340901 P 6804

**Organic Analysis Data Summary Sheet** 

For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/13/20			
642 South Wagner Road			ATS SRF:	0110201			
Ann Arbor, MI 48103							
Sample Identification:	Outfall						
Sample Date:	1/9/20						
Sample Time:	na						
Sampled By:	Client						
Laboratory Receipt Date:	1/10/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.006	0.001	1/10/20	11:53	JEB

290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 1 salle

QC Batch Number: QCORG0110201 Parameter: 1,4-Dioxane (EPA 1624)

**Quality Assurance / Quality Control Data Summary** 

> ATS Project: Pall Corporation Report Date: 1/13/20 #G001-002

Results of QA Samples run concurrently with project samples DEDI ICATE ANALVEIC

Sample	Replicate #1	Replicate #2	Mean	Relative Range (percent)
#G001-002 Ovtfall 1/8/20 Matrix Spike	0.014 mg/L	0.015 mg/L	0.014 mg/L	7.7
SPIKES and/or QC CHECK SAMPLES Sample/Analyte	Known Concentration	Spike Concentration	Analyzed Concentration	Recovery (percent)
#G001-002 Laboratory Fortfiled Blank 1/10/20 Outfall 1/9/20 Matrix Spike Outfall 1/9/20 Matrix Spike Dupficate	<0.001 mg/L 0.008 mg/L 0.006 mg/L	0.010 mg/L 0.010 mg/L 0.010 mg/L	0.010 mg/L 0.014 mg/L 0.015 mg/L	105.3 83.5 94.7
BLANK ANALYSIS Sample		Analyzed	Concentration	QC Decision
/G001-002 Laboratory Reagent Blank 1/10/20			01 mg/L	Acceptable
Comments: Calculations performed prior to rounding.		Control Limits: Recoveries Laboratory Control Sar Matrix Spike Recovery Relative Brance	nple Recovery (85 - 115% (80 - 120%)	)

Relative Range Replicates ( <20%)

Comments All methods reference USEPA methods unless otherwise noted. Sample analyzed at native pH.

rev. 1/13/20



#### **Data Transmittal Cover Page**

Email:

FAX Number:

734-995-3731

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Project Name:	Pall
ATS Project Number:	G00
TS Report Number(s):	Org

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Corporation 1-002 SRF\_0103201

This data report contains the results of 3 water samples, received by ATS on 1/3/20, to be analyzed for 1,4-Dioxane. Project Description:

Sue Peters@Pall.com

Sarah.Stubblefield@AnnArborTechnicalServices.com

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 OA/CC 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 and other the same statement of the same stat

No. of Page	es (Including cover pg.):	9
From:	Sarah Stubblefield	Email:
	Senior Chemist / Lab Manager	FAX Number
Additional	Message:	

Date: 1/8/20 Slaned:

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#### LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002 Report Date: 1/8/20 SRF / SDG Numbers: 0103201

#### Case Narrative Summary

This case narrative applies to the following 3 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 1/3/20, and associated matrix-specific QA/QC: Sa

Gamples					
Client Sample Identification	Sample Date	Sample	Turn Around Time	Analysis	Matrix
Outfall	12/31/19	na	Standard	1,4-Dioxane	Treated Water
Outfail	1/1/20	ra	Standard	1,4-Dioxane	Treated Water
Outfall	1/2/20	r.a	Standard	1,4-Dioxane	Treated Water

Upon receipt, samples were scheduled for the following analyses:

Analysis Number of Samples 1,4-Dioxane by US EPA 1624 3 + 1 Matrix Spike / 1 Matrix Spike Duplicate

#### Sample Receipt and Chain of Custody Records

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are presented in the "Chain of Custody and Sample Receipt Documentation" section of this report.

#### Data Review and Approval

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by US EPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR). G001-002.20/CN\_0103201.doc

#### Data Deliverables

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

#### Sample Analysis

<u>1.4-Dioxane Analysis (GC/MS)</u>: Samples were analyzed in accordance with US EPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits.

Anomalies Noted: None

#### Analytical QA/QC Summary

#### Calibration Verification

Method calibration was verified through the running of a mid-level initial calibration verification (CV) standard at a frequency of every 24 hours. All verification standards met the acceptance criteria with the following exceptions:

None

#### Instrument Blanks

Instrument blanks were analyzed at a frequency of every 24 hours. All blanks met the acceptance criteria with the following exceptions: • None

#### **OA/OC** Batch Summary

Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

 None

#### Laboratory Fortified Blanks and Matrix Spikes

A laboratory fortified blank (LFB) / laboratory control sample (LCS) was analyzed with each QA/QC batch. The LCS/LFB's met the acceptance criteria with the following exceptions: None

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD met the acceptance criteria with the following exceptions: • None

G001-002.20/CN\_0103201.doc



#### Matrix Duplicates

#### Sample Dilutions

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane: • None

Mockallong

/ January 8, 2020

Mark T. DeLong (Quality Assurance Coordinator)



Philip B. Simon (Laboratory Director)

G001-002.20/CN\_0103201.doc

290 South Wagner Road

AT Sille

Michigan Laborat	Fax, 734/995-3731					rganic A Summar	
For: Ms. Sue Peters			ATS Project:	Pall Corporation			#G001-002
Pall Corporation			Report Date:	1/8/20			
642 South Wagner Road			ATS SRF:	0103201			
Ann Arbor, MI 48103							
Sample Identification:	Outfall						
Sample Date:	1/1/20						
Sample Time:	na						
Sampled By:	Client						
Laboratory Receipt Date:	1/3/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1.4-Dloxane	EPA 1624	mg/L	0.005	0.001	1/6/20	15:43	JEB



Organic Analysis Data Summary Sheet

#G001-002

ATS Project: Pall Corporation Report Date: 1/8/20 ATS SRF: 0103201 For: Ms. Sue Peters Pall Corporation 642 South Wagner Road Ann Arbor, MI 48103 Sample Identification: Outfall Sample Date: Sample Time: Sampled By: Laboratory Receipt Date: Sample Matrix: 12/31/19 na Client 1/3/20 Water Analysis Analysis Analyzed

Parameter	Method	Units	Result	Reporting Limit	Date	Time	By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.005	0.001	1/6/20	13:16	JEB

Comments All methods reference USEPA methods unless otherwise noted. Sample analyzed at native pH.

X1G001-002.20/ORG\_SRF\_0103201

290 South Ann Arbor Tel. 734/99

995 Fax. 73 95-3731 rev. 1/8/20

**Organic Analysis Data Summary Sheet** 

#G001-002

For: Ms. Sue Peters Pall Corporation 642 South Wagner F Ann Arbor, MI 4810

<u>3</u>

orporation		Report Date:	1/8/20
outh Wagner Road		ATS SRF:	0103201
rbor, MI 48103			
Sample Identification:	Outfall		
e Date:	1/2/20		
e Time:	na		
ed By:	Client		
atory Receipt Date:	1/3/20		

ATS Project: Pall Corporation

· · · · · · · · · · · · · · · · · · ·	-						
Sample Date:	1/2/20						
Sample Time:	na						
Sampled By:	Client						
Laboratory Receipt Date:	1/3/20						
Sample Matrix:	Water						
Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.007	0.001	1/6/20	16:27	JEB

Comments All methods reference USEPA methods unless otherwise noted. Sample analyzed at native pH.

X1G001-002.20/DRG\_SRF\_0103201

All methods reference USEPA methods unless otherwise noted. Sample analyzed at native pH.

Comments

rev, 1/8/20

Michigan Laboratory ID: 958121720		290 South Wagner Road Ann Arbor, Michigan 48103 Tel, 734/995-0995 Fax, 734/995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 99321720
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### Quality Assurance / Quality Control Data Summary

#### ATS Project: Pall Corporation Report Date: 1/8/20 #G001-002 C Batch Number: QCORG0106201 Parameter: 1,4-Dioxane (EPA 1624)

Results of QA Samples run concurrently with project samples

Sample	Replicate #1	Replicate #2	Mean	Relative Range (percent)
G001-002 Outfall 12/31/19 Makix Spike	0.015 mg/L	0.015 mg/L	0.015 mg/L	0.9
PIKES and/or QC CHECK SAMPLES Sample/Analyte	Known Concentration	Spike Concentration	Analyzed Concentration	Recovery (percent)
G001-002 Laboratory Fortified Blank 1/6/20 Outhal 12/31/19 Matrix Spike Outhal 12/31/19 Matrix Spike Duplicate	<0.001 mg/L 0.005 mg/L 0.005 mg/L	0.010 mg/L 0.010 mg/L 0.010 mg/L	0.008 mg/L 0.015 mg/L 0.015 mg/L	82.1* 101.5 102.8
BLANK ANALYSIS Sample		Analyzed	Concentration	QC Decision
G001-002 Laboratory Reagent Blank 1/6/20		<0.0	101 mg/L	Acceptable

Calculations performed prior to rounding. \* Outside standard control limits.

Control Limits: Recoveries Laboratory Control Sample Recovery (85 - 115%) Matrix Spike Recovery (80 - 120%) Relative Range Replicates ( <20%)

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