

CASE NARRATIVE

Monthly Data Pall Life Sciences
Project: 1,4-Dioxane Remediation
Date: December 2019

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 vacation time and mass spectrometer failure. 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 in 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 ≤ 2 , with the exception of the Pall ozone treatment samples. These samples have chemicals that, when mixed with the HCl acid, cause interferences and trap damage. Every attempt is made to analyze these samples within 24 hours of receipt.

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

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

1,4-Dioxane (GC-MS)

All ground water and treated water samples were analyzed for 1,4-Dioxane (GC-MS) in accordance with EPA 1624C, which has been modified to enhance detection limits. 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, µg/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:

<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 45 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: 01-08-20

Report Checked by: Laurel Beyer Laurel Beyer Date: 1-8-20

Sample Analysis Report

December, 2019

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

Analyst Initials: SEOP
Date: 01-08-20

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-12-04-19-09:28-1	130	5.0						D
TW-20-12-04-19-09:30-1	880	25.0						D
D2								
LB-4-12-04-19-09:09-1	480	10.0						D
TW-21-12-04-19-09:16-1	260	10.0						D
E								
TW-17-12-11-19-12:00-1	200	10.0						O, D
TW-18-12-04-19-09:19-1	240	5.0						D
TW-19-12-04-19-08:34-1	550	10.0						D
TW-23-12-04-19-08:35-1	440	10.0						D
Marshy								
PW-1-12-04-19-09:26-1	830	10.0						D
SW								
TW-22-12-04-19-09:38-1	440	10.0						D
TW-28-12-04-19-09:35-1	710	10.0						D
Monitoring Wells								
C3								
MW-1 Replacement-12-20-19-14:10-1	2700	40.0						O, 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)
MW-28-12-19-19-14:15-1	nd	1.0						O
MW-39s-12-12-19-13:43-1	2	1.0						O
D0								
A2 Cleaning Supply-12-05-19-14:40-1	59	10.0						D
MW-136i-12-02-19-12:30-1	nd	1.0						
MW-136s-12-02-19-13:49-1	nd	1.0						
MW-137s-12-13-19-13:16-1	nd	1.0						O
MW-138i-12-04-19-13:49-1	7.0	1.0						
MW-138s-12-04-19-12:38-1	nd	1.0						
MW-139i-12-11-19-11:40-1	nd	1.0						O
MW-139s-12-11-19-10:14-1	nd	1.0						O
MW-140s-12-11-19-12:30-1	nd	1.0						O
MW-41d-12-04-19-10:15-1	20	1.0						
MW-41s-12-04-19-09:45-1	16	1.0						
MW-51-12-12-19-09:40-1	nd	1.0						O
MW-53d-12-10-19-10:00-1	nd	1.0						O
MW-53i-12-10-19-12:28-1	32	1.0						O
MW-53s-12-10-19-11:14-1	nd	1.0						O
MW-61d-12-13-19-10:32-1	6	1.0						O
MW-61s-12-13-19-09:22-1	5	1.0						O
D2								
175 Jackson Plaza-12-11-19-14:38-1	880	10.0						O, D
465 Dupont-12-16-19-09:38-1	1000	20.0						O, D
MW-131s-12-12-19-12:21-1	nd	1.0						O
MW-39d-12-12-19-14:57-1	40	1.0						O
MW-56s-12-20-19-13:13-1	60	1.0						O
MW-62i-12-19-19-12:03-1	nd	1.0						O

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-62s-12-19-19-13:30-1	nd	1.0						O
MW-BE-1d-12-16-19-11:07-1	740	10.0						O, D
MW-BE-1s-12-16-19-12:21-1	730	20.0						O, D
E								
IW-2-12-17-19-09:09-1	440	10.0						O
IW-2-12-17-19-09:30-1	480	10.0						O, D
IW-2-12-17-19-10:40-1	1900	40.0						O, D
IW-2-12-17-19-13:17-1	2100	40.0						O, D
MW-100-12-16-19-13:50-1	2000	40.0						O, D
MW-103s-12-10-19-14:10-1	77	1.0						O
MW-112i-12-05-19-11:45-1	11	1.0						
MW-112s-12-05-19-10:33-1	nd	1.0						
MW-131d-12-12-19-11:08-1	nd	1.0						O
MW-136d-12-02-19-11:07-1	nd	1.0						
MW-137d-12-13-19-12:05-1	nd	1.0						O
MW-138d-12-03-19-09:57-1	nd	1.0						
MW-139d-12-11-19-10:28-1	nd	1.0						O
MW-140d-12-11-19-13:05-1	nd	1.0						O
MW-56d-12-20-19-11:58-1	nd	1.0						O
MW-62d-12-19-19-10:49-1	nd	1.0						O
MW-76i-12-05-19-13:06-1	92	10.0						D
MW-76s-12-05-19-14:18-1	270	10.0						D
MW-84s-12-10-19-15:49-1	31	1.0						O
Marshy								
NMW-1s-12-19-19-11:34-1	1900	40.0						O, D
NMW-2s-12-19-19-11:41-1	2100	40.0						O, 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)
SH								
MW-5d-12-19-19-12:20-1	11000	200						O, D
SW								
MW-45d-12-19-19-14:11-1	410	20.0						O, D
MW-45s-12-19-19-13:44-1	3	1.0						O
Surface Water								
Not Applicable								
HC/HR-12-02-19-07:45-1				nd	2.0			
HC/HR-12-03-19-07:43-1				nd	2.0			
HC/HR-12-04-19-07:50-1				nd	2.0			
HC/HR-12-05-19-07:54-1				nd	2.0			
HC/HR-12-06-19-08:05-1				nd	2.0			
HC/HR-12-09-19-07:43-1				nd	2.0			
HC/HR-12-10-19-07:35-1				nd	2.0			
HC/HR-12-11-19-07:40-1				nd	2.0			
HC/HR-12-12-19-07:45-1				nd	2.0			
HC/HR-12-13-19-07:43-1				nd	2.0			
HC/HR-12-16-19-08:00-1				nd	2.0			
HC/HR-12-17-19-08:00-1				nd	2.0			
HC/HR-12-18-19-07:45-1				nd	2.0			
HC/HR-12-19-19-08:30-1				nd	2.0			
HC/HR-12-20-19-07:30-1				nd	2.0			
HC/HR-12-23-19-07:40-1				nd	2.0			
HC/HR-12-24-19-07:44-1				nd	2.0			
HC/HR-12-26-19-07:48-1				nd	2.0			
HC/HR-12-27-19-07:45-1				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-12-30-19-07:40-1			nd	2.0				
HC/HR-12-31-19-10:00-1			nd	2.0				
Treatment System								
OUTFALL-12-01-19-1	5.0	1.0						
OUTFALL-12-01-19-2			7.5	5.0				
OUTFALL-12-02-19-2			6.2	5.0				
OUTFALL-12-02-19-1	5.0	1.0						
OUTFALL-12-03-19-2			6.6	5.0				
OUTFALL-12-03-19-1	5.5	1.0						
OUTFALL-12-04-19-2			7.4	5.0				
OUTFALL-12-04-19-1	4.8	1.0						
OUTFALL-12-05-19-1	5.8	1.0						
OUTFALL-12-05-19-2			7.1	5.0				
OUTFALL-12-08-19-1	5.1	1.0						
OUTFALL-12-08-19-2			7.7	5.0				
OUTFALL-12-09-19-1	4.9	1.0						
OUTFALL-12-09-19-2			8.6	5.0				
OUTFALL-12-10-19-1	4	1.0						O
OUTFALL-12-10-19-2			8.6	5.0				
OUTFALL-12-11-19-2			8.4	5.0				
OUTFALL-12-11-19-1	5	1.0						O
OUTFALL-12-12-19-2			8.0	5.0				
OUTFALL-12-12-19-1	5	1.0						O
OUTFALL-12-15-19-2			7.1	5.0				
OUTFALL-12-15-19-1	5	1.0						O
OUTFALL-12-16-19-2			7.6	5.0				
OUTFALL-12-16-19-1	5	1.0						O

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-12-17-19-2			8.2	5.0				
OUTFALL-12-17-19-1	6	1.0						O
OUTFALL-12-18-19-2			6.6	5.0				
OUTFALL-12-18-19-1	5	1.0						O
OUTFALL-12-19-19-2			8.0	5.0				
OUTFALL-12-19-19-1	5	1.0						O
OUTFALL-12-22-19-2			7.5	5.0				
OUTFALL-12-22-19-1	5	1.0						O
OUTFALL-12-23-19-2			7.5	5.0				
OUTFALL-12-23-19-1	6	1.0						O
OUTFALL-12-24-19-2			6.1	5.0				
OUTFALL-12-24-19-1	5	1.0						O
OUTFALL-12-25-19-2			7.6	5.0				
OUTFALL-12-25-19-1	5	1.0						O
OUTFALL-12-26-19-2			7.1	5.0				
OUTFALL-12-26-19-1	5	1.0						O
OUTFALL-12-29-19-2			7.6	5.0				
OUTFALL-12-29-19-1	5	1.0						O
OUTFALL-12-30-19-1	5	1.0						O
OUTFALL-12-30-19-2			8.1	5.0				
OUTFALL-12-31-19-2			7.6	5.0				
OUTFALL-12-31-19-1	5	1.0						O
Red Pond-12-02-19-08:05-1	340	10.0						D
Red Pond-12-09-19-08:04-1	390	10.0						D
Red Pond-12-16-19-08:21-1	380	10.0						O, D
Red Pond-12-23-19-07:59-1	340	10.0						O, D
Red Pond-12-30-19-08:01-1	380	10.0						O, D

Data Transmittal Cover Page

LABORATORY OPERATIONS
CASE NARRATIVE

Project Name: Pall Corporation
ATS Project Number: G001-002
ATS Report Number(s): Org_SRF_0103201

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

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

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:

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.

Client Sample Identification	Sample Date	Sample Time	Turn Around Time	Analysis	Matrix
Out3a	1/29/19	na	Standard	1,4-Dioxane	Treated Water
Out3a	1/1/20	na	Standard	1,4-Dioxane	Treated Water
Out3a	1/2/20	na	Standard	1,4-Dioxane	Treated Water

Recipient: Ms. Sue Peters Email: Sue_Peters@Pall.com
FAX Number: _____

Upon receipt, samples were scheduled for the following analyses:

No. of Pages (including cover pg.): 9

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

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

Additional Message: _____

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.

Date: 1/8/20 Signed: 

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.

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

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, L.R).

This material is intended only for the use of the individual or entity to whom it is addressed, and may contain information that is privileged and confidential. If you are not the intended recipient or the agent responsible for delivering this material to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone. Thank you.

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

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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 (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:

- 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

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:

- None


/ January 8, 2020

Mark T. DeLong (Quality Assurance Coordinator)


/ January 8, 2020

Philip B. Simon (Laboratory Director)

**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: 1/8/20
 ATS SRF: 0103201

Sample Identification: Outfall

Sample Date: 12/31/19
 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	0.005	0.001	1/8/20	13:18	JEB

Comments

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

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rev. 1/8/20

**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: 1/8/20
 ATS SRF: 0103201

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-Dioxane	EPA 1624	mg/L	0.005	0.001	1/8/20	15:43	JEB

Comments

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

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rev. 1/8/20

**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: 1/8/20
 ATS SRF: 0103201

Sample Identification: Outfall

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	1/8/20	16:27	JEB

Comments

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

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rev. 1/8/20

**Quality Assurance / Quality Control
 Data Summary**

QC Batch Number: QCORG0106201
 Parameter: 1,4-Dioxane (EPA 1624)

ATS Project: Pall Corporation #G001-002
 Report Date: 1/8/20

Results of QA Samples run concurrently with project samples

REPLICATE ANALYSIS

Sample	Replicate #1	Replicate #2	Mean	Relative Range (percent)
#G001-002 Outfall 12/31/19 Matrix Spike	0.015 mg/L	0.015 mg/L	0.015 mg/L	0.0

SPIKES and/or QC CHECK SAMPLES

Sample/Analyte	Known Concentration	Spike Concentration	Analyzed Concentration	Recovery (percent)
#G001-002 Laboratory Fortified Blank 1/8/20	<0.001 mg/L	0.010 mg/L	0.008 mg/L	82.1*
Outfall 12/31/19 Matrix Spike	0.005 mg/L	0.010 mg/L	0.015 mg/L	101.5
Outfall 12/31/19 Matrix Spike Duplicate	0.005 mg/L	0.010 mg/L	0.015 mg/L	102.8

BLANK ANALYSIS

Sample	Analyzed Concentration	QC Decision
#G001-002 Laboratory Reagent Blank 1/8/20	<0.001 mg/L	Acceptable

Comments:

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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rev 1/8/20

Sample Analysis

1,4-Dioxane Analysis (GC/MS): 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:
• 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

Matrix Duplicates

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

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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-17 12/11/19
- 175 Jackson Plaza 12/11/19
- Red Pond 12/16/19
- 465 DuPont 12/16/19
- MW-BE-1D 12/16/19
- MW-BE-1S 12/16/19
- MW-100 12/16/19
- IW-2 12/17/19 (9:09AM)
- IW-2 12/17/19 (9:30AM)
- IW-2 12/17/19 (10:40AM)
- IW-2 12/17/19 (1:17 PM)

Mark DeLong

/ January 3, 2020

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon

/ January 3, 2020

Philip B. Simon (Laboratory Director)

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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: 1/3/20
ATS SRF: 1220191

Sample Identification: MW-53d

Sample Date: 12/10/19
Sample Time: 10:00 AM
Sampled By: Client
Laboratory Receipt Date: 12/20/19
Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/27/19	13:56	JEB

Comments
All methods reference USEPA methods unless otherwise noted.



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: 1/3/20
ATS SRF: 1220191

Sample Identification: MW-53s

Sample Date: 12/10/19
Sample Time: 11:14 AM
Sampled By: Client
Laboratory Receipt Date: 12/20/19
Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/27/19	14:40	JEB

Comments
All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-53i

Sample Date: 12/10/19
 Sample Time: 12:28 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.032	0.001	12/27/19	15:24	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-103s

Sample Date: 12/10/19
 Sample Time: 2:10 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.077	0.001	12/27/19	16:08	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-84s

Sample Date: 12/10/19
 Sample Time: 3:49 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.031	0.001	12/27/19	16:51	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: Outfall

Sample Date: 12/10/19
 Sample Time: na
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.004	0.001	12/27/19	17:35	JEB

Comments

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

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: TW-17

Sample Date: 12/11/19
 Sample Time: 12:00 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 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	0.01	12/27/19	11:45	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-139s

Sample Date: 12/11/19
 Sample Time: 10:14 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/27/19	18:19	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-139d

Sample Date: 12/11/19
 Sample Time: 10:28 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/27/19	19:03	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-139i

Sample Date: 12/11/19
 Sample Time: 11:40 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/27/19	19:47	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-140s

Sample Date: 12/11/19
 Sample Time: 12:30 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/27/19	20:30	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: 175 JACKSON PLAZA

Sample Date: 12/11/19
 Sample Time: 2:38 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.88	0.01	12/27/19	21:58	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-140d

Sample Date: 12/11/19
 Sample Time: 1:05 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/27/19	21:14	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: OUTFALL

Sample Date: 12/11/19
 Sample Time: na
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.005	0.001	12/27/19	22:42	JEB

Comments

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

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**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-51

Sample Date: 12/12/19
 Sample Time: 9:40 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/27/19	23:25	JEB

Comments
 All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-131d

Sample Date: 12/12/19
 Sample Time: 11:08 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/28/19	0:09	JEB

Comments
 All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-131s

Sample Date: 12/12/19
 Sample Time: 12:21 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/28/19	0:52	JEB

Comments
 All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-39s

Sample Date: 12/12/19
 Sample Time: 1:43 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.002	0.001	12/28/19	1:36	JEB

Comments
 All methods reference USEPA methods unless otherwise noted.

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-39d

Sample Date: 12/12/19
 Sample Time: 2:57 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.040	0.001	12/28/19	2:20	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-61s

Sample Date: 12/13/19
 Sample Time: 9:22 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.005	0.001	12/30/19	17:33	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: OUTFALL

Sample Date: 12/12/19
 Sample Time: na
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.005	0.001	12/30/19	11:48	JEB

Comments

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

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-61d

Sample Date: 12/13/19
 Sample Time: 10:32 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 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	12/30/19	18:17	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-137d

Sample Date: 12/13/19
 Sample Time: 12:05 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/30/19	15:21	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-137s

Sample Date: 12/13/19
 Sample Time: 1:16 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	<0.001	0.001	12/30/19	19:00	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

X:\G001-002.19.SRF_1220191\ORIG_SRF_1220191

rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: OUTFALL

Sample Date: 12/15/19
 Sample Time: na
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.005	0.001	12/30/19	19:44	JEB

Comments

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

X:\G001-002.19.SRF_1220191\ORIG_SRF_1220191

rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: RED POND

Sample Date: 12/16/19
 Sample Time: 8:21 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analized By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.38	0.01	12/30/19	20:28	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: 465 DUPONT

Sample Date: 12/16/19
 Sample Time: 9:38 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	1.0	0.02	12/30/19	21:12	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-BE-1d

Sample Date: 12/16/19
 Sample Time: 11:07 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.74	0.01	12/30/19	21:55	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-BE-1s

Sample Date: 12/16/19
 Sample Time: 12:21 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	0.73	0.02	12/30/19	22:39	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SRF: 1220191

Sample Identification: MW-100

Sample Date: 12/16/19
 Sample Time: 1:50 PM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis							
1,4-Dioxane	EPA 1624	mg/L	2.0	0.04	12/30/19	23:23	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

X:\G001-002\19SRF_122019\ORG_SRF_1220191

rev. 1/3/20

**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: 1/3/20
 ATS SR#: 1220191

Sample Identification: OUTFALL

Sample Date: 12/16/19
 Sample Time: na
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.005	0.001	12/31/19	0:06	JEB

Comments

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

X:\G001-002\19\SRF_122019\ORIG_SRF_1220191

rev. 1/3/20

**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: 1/3/20
 ATS SR#: 1220191

Sample Identification: IW-2

Sample Date: 12/17/19
 Sample Time: 9:09 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.44	0.01	12/31/19	0:50	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

X:\G001-002\19\SRF_122019\ORIG_SRF_1220191

rev. 1/3/20

**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: 1/3/20
 ATS SR#: 1220191

Sample Identification: IW-2

Sample Date: 12/17/19
 Sample Time: 9:30 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	0.48	0.01	12/31/19	1:34	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**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: 1/3/20
 ATS SR#: 1220191

Sample Identification: IW-2

Sample Date: 12/17/19
 Sample Time: 10:40 AM
 Sampled By: Client
 Laboratory Receipt Date: 12/20/19
 Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	1.9	0.04	12/31/19	23:43	JEB

Comments

All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

**Organic Analysis
Data Summary Sheet**

**Quality Assurance / Quality Control
Data Summary**

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

ATS Project: Pall Corporation #G001-002
Report Date: 1/3/20
ATS SRF: 1220191

QC Batch Number: QCORG1227191
Parameter: 1,4-Dioxane (EPA 1624)

ATS Project: Pall Corporation #G001-002
Report Date: 1/3/20

Results of QA Samples run concurrently with project samples

Sample	Replicate #1	Replicate #2	Mean	Relative Range (percent)
#G001-002 TW-17 12/10/19 Matrix Spike	0.64 mg/L	0.70 mg/L	0.67 mg/L	8.8

Sample/Analyte	Known Concentration	Spike Concentration	Analyzed Concentration	Recovery (percent)
#G001-002 Laboratory Fortified Blank 12/27/19	<0.001 mg/L	0.010 mg/L	0.011 mg/L	107.2
TW-17 12/10/19 Matrix Spike	0.20 mg/L	0.50 mg/L	0.64 mg/L	89.4
TW-17 12/10/19 Matrix Spike Duplicate	0.20 mg/L	0.50 mg/L	0.70 mg/L	101.3

Sample	Analyzed Concentration	QC Decision
#G001-002 Laboratory Reagent Blank 12/27/19	<0.001 mg/L	Acceptable

Sample Identification: IW-2

Sample Date: 12/17/19
Sample Time: 1:17 PM
Sampled By: Client
Laboratory Receipt Date: 12/20/19
Sample Matrix: Water

Parameter	Method	Units	Result	Reporting Limit	Analysis Date	Analysis Time	Analyzed By
Organic Analysis 1,4-Dioxane	EPA 1624	mg/L	2.1	0.04	1/1/20	0:27	JEB

Comments:
Calculations performed prior to rounding.

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

Comments:
All methods reference USEPA methods unless otherwise noted.

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rev. 1/3/20

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rev 1/3/20

**Quality Assurance / Quality Control
Data Summary**

C Batch Number: QCORG1230191
Parameter: 1,4-Dioxane (EPA 1624)

ATS Project: Pall Corporation #G001-002
Report Date: 1/3/20

Results of QA Samples run concurrently with project samples

Sample	Replicate #1	Replicate #2	Mean	Relative Range (percent)
#G001-002 MW-137d 12/13/19 Matrix Spike	0.010 mg/L	0.009 mg/L	0.010 mg/L	17.4

Sample/Analyte	Known Concentration	Spike Concentration	Analyzed Concentration	Recovery (percent)
#G001-002 Laboratory Fortified Blank 12/30/19	<0.001 mg/L	0.010 mg/L	0.010 mg/L	105.9
MW-137d 12/13/19 Matrix Spike	<0.001 mg/L	0.010 mg/L	0.010 mg/L	104.4
MW-137d 12/13/19 Matrix Spike Duplicate	<0.001 mg/L	0.010 mg/L	0.009 mg/L	87.7

Sample	Analyzed Concentration	QC Decision
#G001-002 Laboratory Reagent Blank 12/30/19	<0.001 mg/L	Acceptable

Comments:
Calculations performed prior to rounding.

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

CHAIN OF CUSTODY RECORD

300 South Wagner Road
Ann Arbor, Michigan 48103
Tel. 734.995.0955 Fax. 734.995.3731
Michigan Laboratory ID: 9604
Wisconsin Laboratory ID: 998321720

Project ID: 12-20-19
Sample ID: 12-20-19
Sample Name: 1,4-Dioxane

Client: Pall Corp
Analyst: JEB

Collection Date: 12/17/19
Analysis Date: 1/3/20

Method: EPA 1624

Matrix: Water

Volume: 100 mL

Container: 100 mL

Preservative: None

Storage: 4°C

Shipping: None

Signature: [Signature]

Date: 1/3/20

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rev 1/3/20

Data Transmittal Cover Page

**LABORATORY OPERATIONS
CASE NARRATIVE**

Project Name: Pall Corporation
ATS Project Number: G001-002
ATS Report Number(s): Org_SRF_0103201

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

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

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided 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.

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:

Client Sample Identification	Sample Date	Sample Time	Turn Around Time	Analysis	Matrix
Outfall	1/3/19	na	Standard	1,4-Dioxane	Treated Water
Outfall	1/1/20	na	Standard	1,4-Dioxane	Treated Water
Outfall	1/2/20	na	Standard	1,4-Dioxane	Treated Water

Recipient: Ms. Sue Peters Email: Sue_Peters@Pall.com
FAX Number:

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

No. of Pages (including cover pg.): 9

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

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.

Additional Message:

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 (SOP) 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.

Date: 1/8/20 Signed: 

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).

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

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G001-002.20/CN_0103201.doc

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

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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 (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:
• 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

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:
• None


/ January 8, 2020

Mark T. DeLong (Quality Assurance Coordinator)


/ January 8, 2020

Philip B. Simon (Laboratory Director)

Quality Assurance / Quality Control
Data Summary

IC Batch Number: QCORG0105201
 Parameter: 1,4-Dioxane (EPA 1624)

ATS Project: Pall Corporation #G001-002
 Report Date: 1/8/20

Results of QA Samples run concurrently with project samples

REPLICATE ANALYSIS

Sample	Replicate #1	Replicate #2	Mean	Relative Range (percent)
#G001-002 Outfall 12/31/19 Matrix Spike	0.015 mg/L	0.015 mg/L	0.015 mg/L	0.9

SPIKES and/or QC CHECK SAMPLES

Sample/Analyte	Known Concentration	Spike Concentration	Analyzed Concentration	Recovery (percent)
#G001-002 Laboratory Fortified Blank 1/8/20	<0.001 mg/L	0.010 mg/L	0.008 mg/L	82.1*
Outfall 12/31/19 Matrix Spike	0.005 mg/L	0.010 mg/L	0.015 mg/L	101.5
Outfall 12/31/19 Matrix Spike Duplicate	0.005 mg/L	0.010 mg/L	0.015 mg/L	102.8

BLANK ANALYSIS

Sample	Analyzed Concentration	QC Decision
#G001-002 Laboratory Reagent Blank 1/8/20	<0.001 mg/L	Acceptable

Comments:
 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%)