GelmanSciences

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CASE NARRATIVE

Monthly Data Gelman Sciences
Project: 1,4-Dioxane Remediation
Date: May 2023

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

At the end of the month some of the 1,4-dioxane samples were sent to Ann Arbor Technical Services for analysis due to a reproducibility problem. The balance of the samples was analyzed for 1,4-dioxane at Gelman Science's Environmental Laboratory. All bromate samples were analyzed by Gelman Science's Environmental Laboratory. The test results in this report meet all NELAP requirements for parameters for which accreditation are required or available. Any exceptions to NELAP requirements are noted in this report. All exceptions are noted per laboratory standard operating procedure based on EPA Method 1624c. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

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, except for 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 if there is evidence that chilling has begun. All samples are iced or refrigerated at 4°C (±2°C) from the time of collection until sample preparation or analysis.

1,4-Dioxane (GC-MS)

All ground water and treated water samples were analyzed for 1,4-Dioxane (GC-MS) in accordance with EPA 1624C, which has been modified to enhance detection limits. Samples that were diluted to bring them within the calibrated range of the instrument are noted with a "D" under the Qualifier Code section of the data report. Reporting limits were adjusted based on each dilution.

Reporting limit for undiluted samples is 1ppb (part per billion, micrograms per liter, µg/L). All quality control parameters were within the acceptance limits for reported samples unless indicated.

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.

Qualifiers

1,4-Dioxane Qualifier Codes:

Qualifier Code	*Description*
nd:	The compound was analyzed for, but 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:

Qualifier Code	*Description*
nd:	The compound was analyzed 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: *Gage M. Trendel* _____ Date: 6/9/23

Report Checked by: Scott Davis Scott A. Davis Date: 6/9/2023

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Sample Analysis Report

May, 2023

Analyst Initials: CHT
Date: 6/9/23

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)
Residential Wells								
D0								
4601 Park 4 inch-05-18-23-08:50-1	1.2	1.0						
4601 Park 6 inch-05-18-23-10:19-1	1.8	1.0						
5005 Jackson Rd-05-04-23-13:00-1	13	1.0						
Extraction Wells								
C3								
TW-20-05-01-23-10:50-1	740	10						D
TW-24-05-01-23-10:20-1	1700	10						D
TW-25-05-31-23-10:15-1	1600	10						D
D2								
LB-1-05-31-23-10:00-1	380	10						D
LB-4-05-01-23-09:50-1	440	10						D
TW-21-05-01-23-10:10-1	190	10						D
TW-5-05-01-23-10:35-1	590	10						D
TW-5-05-26-23-15:00-1	580	10						D
TW-9-05-01-23-10:40-1	330	10						D
E								
TW-18-05-01-23-10:15-1	220	10						D
TW-29-05-01-23-09:55-1	540	10						D
TW-29-05-12-23-09:50-1	340	10						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)
Marshy								
PW-1-05-01-23-10:25-1	840	10						D
SW								
TW-22-05-01-23-11:00-1	370	10						D
TW-28-05-01-23-10:55-1	530	10						D
Monitoring Wells								
C3								
MW-105s-05-10-23-16:40-1	360	10						D
MW-125-05-30-23-15:00-1	230	10						D
MW-127s-05-30-23-08:51-1	nd	1.0						
MW-128s-05-31-23-11:06-1	1.8	1.0						
MW-18d-05-10-23-12:32-1	120	10						D
MW-20-05-15-23-13:55-1	nd	1.0						
MW-22-05-25-23-13:10-1	840	10						D
MW-28-05-31-23-11:40-1	nd	1.0						
MW-32-05-09-23-14:40-1	12	1.0						
MW-35-05-09-23-19:10-1	2.0	1.0						
MW-37-05-31-23-09:42-1	310	10						D
D0								
MW-137s-05-16-23-08:39-1	nd	1.0						
MW-138i-05-16-23-12:33-1	7.4	1.0						
MW-138s-05-16-23-11:18-1	nd	1.0						
MW-139i-05-18-23-13:10-1	nd	1.0						
MW-139s-05-18-23-11:55-1	nd	1.0						
MW-141s-05-26-23-09:30-1	3.4	1.0						
MW-142s-05-04-23-10:21-1	nd	1.0						

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
MW-143s-05-03-23-11:05-1	nd	1.0						
MW-146-05-03-23-14:45-1	nd	1.0						
MW-53d-05-15-23-11:02-1	nd	1.0						
MW-53i-05-15-23-12:12-1	16	1.0						
MW-53s-05-15-23-09:53-1	nd	1.0						
D2								
MW-11d-05-09-23-16:05-1	200	10						D
MW-130i-05-01-23-10:10-1	7.8	1.0						
MW-130s-05-01-23-08:58-1	nd	1.0						
MW-134i-05-02-23-09:45-1	7.9	1.0						
MW-134s-05-02-23-08:35-1	13	1.0						
MW-149s-05-22-23-11:50-1	nd	1.0						
MW-17-05-26-23-11:11-1	260	10						D
MW-4d-05-09-23-20:37-1	440	10						D
MW-54s-05-01-23-12:50-1	nd	1.0						
MW-77-05-23-23-14:00-1	720	10						D
MW-94s-05-02-23-13:41-1	770	10						D
E								
MW-100-05-23-23-11:40-1	2100	10						D
MW-103s-05-17-23-11:18-1	95	10						D
MW-105d-05-10-23-17:50-1	180	10						D
MW-112i-05-17-23-09:54-1	8.9	1.0						
MW-112s-05-17-23-08:44-1	5.4	1.0						
MW-127d-05-30-23-10:01-1	nd	1.0						
MW-128d-05-31-23-12:17-1	nd	1.0						
MW-130d-05-01-23-11:20-1	nd	1.0						
MW-134d-05-02-23-10:55-1	5.8	1.0						

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
MW-137d-05-16-23-09:54-1	nd	1.0						
MW-138d-05-16-23-13:48-1	nd	1.0						
MW-139d-05-18-23-14:25-1	1.0	1.0						
MW-141d-05-26-23-09:15-1	3.5	1.0						
MW-142d-05-04-23-11:30-1	nd	1.0						
MW-143d-05-03-23-13:26-1	nd	1.0						
MW-143i-05-03-23-12:17-1	nd	1.0						
MW-149d-05-22-23-13:01-1	nd	1.0						
MW-64-05-24-23-13:50-1	38	1.0						
MW-66-05-09-23-17:50-1	2.1	1.0						
MW-71-05-22-23-10:10-1	1200	10						D
MW-76i-05-17-23-12:34-1	89	10						D
MW-76s-05-17-23-14:00-1	340	10						D
MW-84s-05-23-23-09:08-1	440	10						D
MW-94d-05-02-23-12:26-1	3.6	1.0						
MW-96-05-22-23-14:40-1	140	10						D
Saginaw Forest Cabin #1-05-30-23-12:40-1	nd	1.0						
Saginaw Forest Cabin #2-05-30-23-11:30-1	nd	1.0						
SW								
MW-49-05-19-23-12:56-1	nd	1.0						
MW-50-05-10-23-15:11-1	880	10						D
MW-52s-05-10-23-13:53-1	170	10						D
MW-57-05-25-23-09:18-1	3.1	1.0						
MW-58d-05-31-23-13:53-1	17	1.0						
MW-58s-05-31-23-15:03-1	170	10						D
MW-78-05-30-23-13:50-1	26	1.0						
TW-4-05-25-23-10:55-1	34	1.0						

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
Surface Water								
Not Applicable								
HC/HR-05-01-23-09:30-1			nd	2.0				
HC/HR-05-02-23-10:15-1			nd	2.0				
HC/HR-05-03-23-09:25-1			nd	2.0				
HC/HR-05-04-23-10:35-1			nd	2.0				
HC/HR-05-05-23-08:15-1			nd	2.0				
HC/HR-05-08-23-09:55-1			nd	2.0				
HC/HR-05-09-23-09:45-1			nd	2.0				
HC/HR-05-10-23-12:20-1			nd	2.0				
HC/HR-05-11-23-10:00-1			nd	2.0				
HC/HR-05-12-23-09:30-1			nd	2.0				
HC/HR-05-15-23-09:45-1			nd	2.0				
HC/HR-05-16-23-13:10-1			nd	2.0				
HC/HR-05-17-23-09:40-1			nd	2.0				
HC/HR-05-18-23-09:45-1			nd	2.0				
HC/HR-05-19-23-10:30-1			nd	2.0				
HC/HR-05-22-23-10:40-1			nd	2.0				
HC/HR-05-23-23-10:30-1			nd	2.0				
HC/HR-05-24-23-10:00-1			nd	2.0				
HC/HR-05-25-23-10:15-1			nd	2.0				
HC/HR-05-26-23-10:45-1			nd	2.0				
HC/HR-05-30-23-10:45-1			nd	2.0				
HC/HR-05-31-23-09:50-1			nd	2.0				
Treatment System								
OUTFALL-05-01-23-1	6.0	1.0						

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
OUTFALL-05-01-23-2			7.4	5.0				
OUTFALL-05-02-23-1	6.0	1.0						
OUTFALL-05-02-23-2			nd	5.0				
OUTFALL-05-03-23-1	5.8	1.0						
OUTFALL-05-03-23-2			8.0	5.0				
OUTFALL-05-04-23-1	5.7	1.0						
OUTFALL-05-04-23-2			8.8	5.0				
OUTFALL-05-07-23-2			8.8	5.0				
OUTFALL-05-07-23-1	5.0	1.0						
OUTFALL-05-08-23-2			5.4	5.0				
OUTFALL-05-08-23-1	5.0	1.0						
OUTFALL-05-09-23-2			5.4	5.0				
OUTFALL-05-09-23-1	5.0	1.0						
OUTFALL-05-10-23-2			8.7	5.0				
OUTFALL-05-10-23-1	5.2	1.0						
OUTFALL-05-11-23-2			nd	5.0				
OUTFALL-05-11-23-1	5.6	1.0						
OUTFALL-05-14-23-1	5.2	1.0						
OUTFALL-05-14-23-2			8.4	5.0				
OUTFALL-05-15-23-1	5.2	1.0						
OUTFALL-05-15-23-2			6.5	5.0				
OUTFALL-05-16-23-2			nd	5.0				
OUTFALL-05-16-23-1	5.4	1.0						
OUTFALL-05-17-23-2			7.2	5.0				
OUTFALL-05-17-23-1	5.5	1.0						
OUTFALL-05-18-23-2			6.2	5.0				
OUTFALL-05-18-23-1	5.6	1.0						

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
OUTFALL-05-21-23-2			6.0	5.0				
OUTFALL-05-21-23-1	4.3	1.0						
OUTFALL-05-22-23-2			5.4	5.0				
OUTFALL-05-22-23-1	3.7	1.0						
OUTFALL-05-23-23-2			6.6	5.0				
OUTFALL-05-23-23-1	4.0	1.0						
OUTFALL-05-24-23-1	5.1	1.0						
OUTFALL-05-24-23-2			7.0	5.0				
OUTFALL-05-25-23-2			5.2	5.0				
OUTFALL-05-25-23-1	5.7	1.0						
OUTFALL-05-28-23-2			nd	5.0				
OUTFALL-05-28-23-1	5.8	1.0						
OUTFALL-05-29-23-2			nd	5.0				
OUTFALL-05-29-23-1	5.8	1.0						
OUTFALL-05-30-23-2			nd	5.0				
OUTFALL-05-30-23-1	5.9	1.0						
OUTFALL-05-31-23-2			nd	5.0				
OUTFALL-05-31-23-1	5.9	1.0						
Red Pond-05-01-23-07:30-1	460	10						D
Red Pond-05-03-23-07:40-1	450	10						D
Red Pond-05-05-23-06:30-1	410	10						D
Red Pond-05-08-23-07:30-1	430	10						D
Red Pond-05-10-23-07:45-1	420	10						D
Red Pond-05-12-23-07:35-1	440	10						D
Red Pond-05-15-23-07:55-1	430	10						D
Red Pond-05-17-23-07:40-1	430	10						D
Red Pond-05-19-23-08:30-1	420	10						D

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
Red Pond-05-22-23-08:00-1	380	10						D
Red Pond-05-24-23-07:45-1	440	10						D
Red Pond-05-26-23-07:45-1	440	10						D
Red Pond-05-30-23-08:50-1	420	10						D