Stericycle
Environmental Solutions

January 22, 2020

Mr. Dan Dailey
Michigan Department of Environmental Quality
Management and Tracking Unit
Hazardous Waste Section
PO Box 30241
Lansing, MI 48909

Subject: **PFAS Groundwater Sampling Report for Petro-Chem Processing Group of Nortru, LLC**
Detroit, MI. MID 980 615 298

Dear Mr. Dailey:

As requested of Petro-Chem Processing Group of Nortru, LLC, enclosed please find the PFAS Groundwater Sampling Report. The enclosed report presents PFAS groundwater data collected in October 2019.

If you have any questions, please contact me at 215-822-2337.

Sincerely,

Greg Fink
EHS Director

cc: Ed Burke, Stericycle
Kellie Wing, Bureau Veritas

PFAS Groundwater Sampling Report Nortru, LLC
Petro-Chem Processing Group Facility
421 Lycaste Street, Detroit, MI

January 22, 2020

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Greg Fink
EHS Director

APEX COMPANIES, LLC

PFAS Groundwater Sampling Report

Stericycle Environmental Solutions, Inc.
Philip Environmental Services Division,
Petro-Chem Processing Group of Nortru, LLC Facility
421 Lycaste Street
Detroit, Michigan

January 22, 2020
Project Number 11019-000123.00

Prepared for:
Stericycle Environmental Solutions, Inc.
Detroit, Michigan

Apex Companies, LLC
46555 Humboldt Drive, Suite 103
Novi, MI 48377

CONTENTS

1.0 INTRODUCTION

Stericycle Environmental Solutions, Inc. (Stericycle) retained Apex Companies, LLC (Apex) to conduct sampling for evaluation of per-and polyfluoroalkyl substances (PFAS) in groundwater at the Stericycle, Petro-Chem Processing Group (PCPG) of Nortru, LLC Facility (Site) located at 421 Lycaste Street in Detroit, Michigan (Figure 1). This work was conducted in accordance with the *Groundwater Sampling Workplan for PFAS*, dated April 2, 2019, and subsequently approved by the Michigan Department of Environment, Great Lakes and Energy (EGLE)

The PCPG Facility is located at 421 Lycaste Street, Wayne County, Detroit, Michigan, at the northwestern corner of Lycaste Street and Freud Street. It is situated on an estimated 8-acre parcel in an industrial and residential area approximately 0.5 miles north of the Detroit River. The average elevation at the site is 580 feet above mean sea level, as documented in the Facility Operating License. Parts of the Site historically operated as an Amoco refinery. The site currently operates as a fuel blending and solvent recycling plant. Spent solvents, rags, fuel sludges, and tank bottoms are brought to the facility where these materials are either cleaned and recycled, or sold as fuel to cement kilns. The site layout, showing the above noted buildings, is shown on Figure 2.

The Facility is surrounded by industrial properties to the north; Lycaste Street to the east, Freud Avenue to the south, and Old St. Jean Avenue to the west. See Figure 1 for site location.

The Facility is secured by a 6-foot-high chain-link security fence topped with barbed wire. A driveway on the east side of the facility is used for incoming and outgoing traffic at the facility. Other facility features include an employee and visitor parking area, aboveground storage tanks (ASTs), a drum storage area, and support facilities. PCPG continues to operate a fuel blending and solvent recycling plant in accordance with their current Operating License, dated December 18, 2012.

2.0 MONITORING WELL SAMPLING

During the groundwater sampling conducted on October 29, 2019, Apex performed the following tasks:

- Measured the total depth of each well to be sampled, and included Monitoring Wells MW-3, MW-4, MW-8 and MW-9.

- Measured the depth to groundwater in each well after the static water level stabilized to atmospheric equilibrium. Measurements were performed using an electronic interface probe. Decontamination was conducted using Liquinox® with laboratory-supplied potable water PFAS-free water.

- Purged the monitoring wells using low-flow purging methods (e.g., using a YSI Pro purge pump, or similar). The low-flow purging flow rates were on the order of 0.15 to 0.40 liters per minute (L/min). Field parameters (e.g., temperature, pH, and dissolved oxygen, etc.) stabilized prior to sampling Monitoring Well MW-9 while Monitoring Wells MW-3, MW-4, and MW-8 purged dry. These wells were allowed to recover for several hours prior to the collection of groundwater samples from the monitoring wells. See Appendix A for well development and purging data sheets. Single-use, disposable high-density polyethylene (HDPE) tubing was utilized for monitoring well purging and sampling.

- Collected each groundwater sample in laboratory-provided 15-milliliter (mL) centrifuge tubes (three per sample) following the instructions provided by the laboratory. Three QA/QC

samples were collected during the sampling event and included the following: (1) equipment blank, (2) field blank, and (3) field duplicate.

- Transported groundwater samples for analysis of PFAS to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan, in an ice-packed cooler under proper chain of custody.

- Collected purge and sampling water from the wells and containerized in a DOT-approved 55-gallon drum for proper disposal.

Groundwater samples were analyzed for per-and polyfluoroalkyl (PFA) substances per ASTM Method D7979 with Isotopic Dilution as recommended by EGLE. Merit is certified for the analysis of PFAS by ISO/IEC 17025. See Figure 2 for monitoring well locations.

3.0 EGLE CLEANUP CRITERIA

EGLE has published generic residential and non-residential land-use cleanup criteria for various possible exposure pathways. Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonate (PFOS) are the only PFA substances for which cleanup criteria have been published. The drinking water criteria for PFOA, PFOS, as well as PFOA and PFOS combined is 70 nanograms per liter (ng/L). It should be noted that since results are reported to the laboratory reporting limit, the full value of the reporting limit is added where the constituent is identified as non-detect, for the combined PFOA and PFOS. Additionally, groundwater surface water interface criteria for PFOA is 12,000 ng/L and is 12 ng/L for PFOS.

Table 2 summarizes the analytical results for the groundwater samples compared to EGLE generic cleanup criteria, dated June 25, 2018.

4.0 EVALUATION OF GROUNDWATER LABORATORY ANALYTICAL RESULTS

Based on the analytical results from samples collected on October 29, 2019, 13 of the 28 PFA substances, including PFOA and PFOS, were detected in the four monitoring wells sampled. See the attached table for a summary of the analytical results.

The following PFA substances were detected in one or more of the Monitoring Wells:

- Perfluorobutanoic Acid (PFBA)
- Perfluoropentanoic Acid (PFPeA)
- Perfluorohexanoic Acid (PFHxA)
- Perfluorobutane Sulfonic Acid (PFBS)
- Perfluoroheptanoic Acid (PFHpA)
- 6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)
- Perfluorooctanoic Acid (PFOA)
- Perfluorohexane Sulfonic Acid (PFHxS)
- Perfluorohexane Sulfonic Acid - Linear (PFHxS-LN)
- Perfluorononanoic Acid (PFNA)
- Perfluorooctane Sulfonic Acid (PFOS)

- Perfluorooctane Sulfonic Acid - Linear (PFOS-LN)
- Perfluorooctane Sulfonic Acid - Branched (PFOS-BR)

PFOA and PFOS were detected in Monitoring Well MW-9 at concentrations of 86 and 78 ng/L, respectively, which exceed the generic cleanup criteria for drinking water.

PFOS was detected in Monitoring Wells MW-3 and MW-9 at concentrations of 59 and 78 ng/L, respectively, which exceed the generic cleanup criteria for groundwater surface water interface (GSI).

Additionally, the combined concentrations of PFOA and PFOS exceed the drinking water criteria in Monitoring Wells MW-3 and MW-9.

A (blind) duplicate sample was collected from Monitoring Well MW-9 and analyzed for PFAS. Concentrations of the duplicate sample was within ±10%, which generally indicates good precision.

Neither the Field Blank or Rinseate Blank contained PFAS at concentrations greater than the laboratory reporting limit. This indicates that sufficient precautions were taken during the sampling and that detections identified in the monitoring wells are not likely due to cross contamination.

Appropriate quality assurance/quality control (QA/QC) documentation was provided with each batch of samples. Quality control replicates, laboratory spikes, and control blanks were analyzed according to standard protocols.

5.0 CONCLUSIONS

Results from this sampling event indicate that 13 PFAS constituents were detected in one or more of the four monitoring wells sampled. The remaining 15 PFAS reported were not detected above the laboratory reporting limit.

PFOA and PFOS were detected in Monitoring MW-9 at concentrations exceeding the generic cleanup criteria for drinking water and/or GSI. PFOS was detected in Monitoring Well MW-3 at a concentration exceeding drinking water and GSI. Additionally, the combined concentrations of PFOA and PFOS in Monitoring Wells MW-3 and MW-9 were found to be above the generic cleanup criteria for drinking water.

DRAFT
PFAS Groundwater Sampling Report
for
Philip Environmental Services Division,
Petro-Chem Processing Group Facility
421 Lycaste Street
Detroit, Michigan

Prepared for:
Stericycle Environmental Solutions, Inc.
Detroit, Michigan

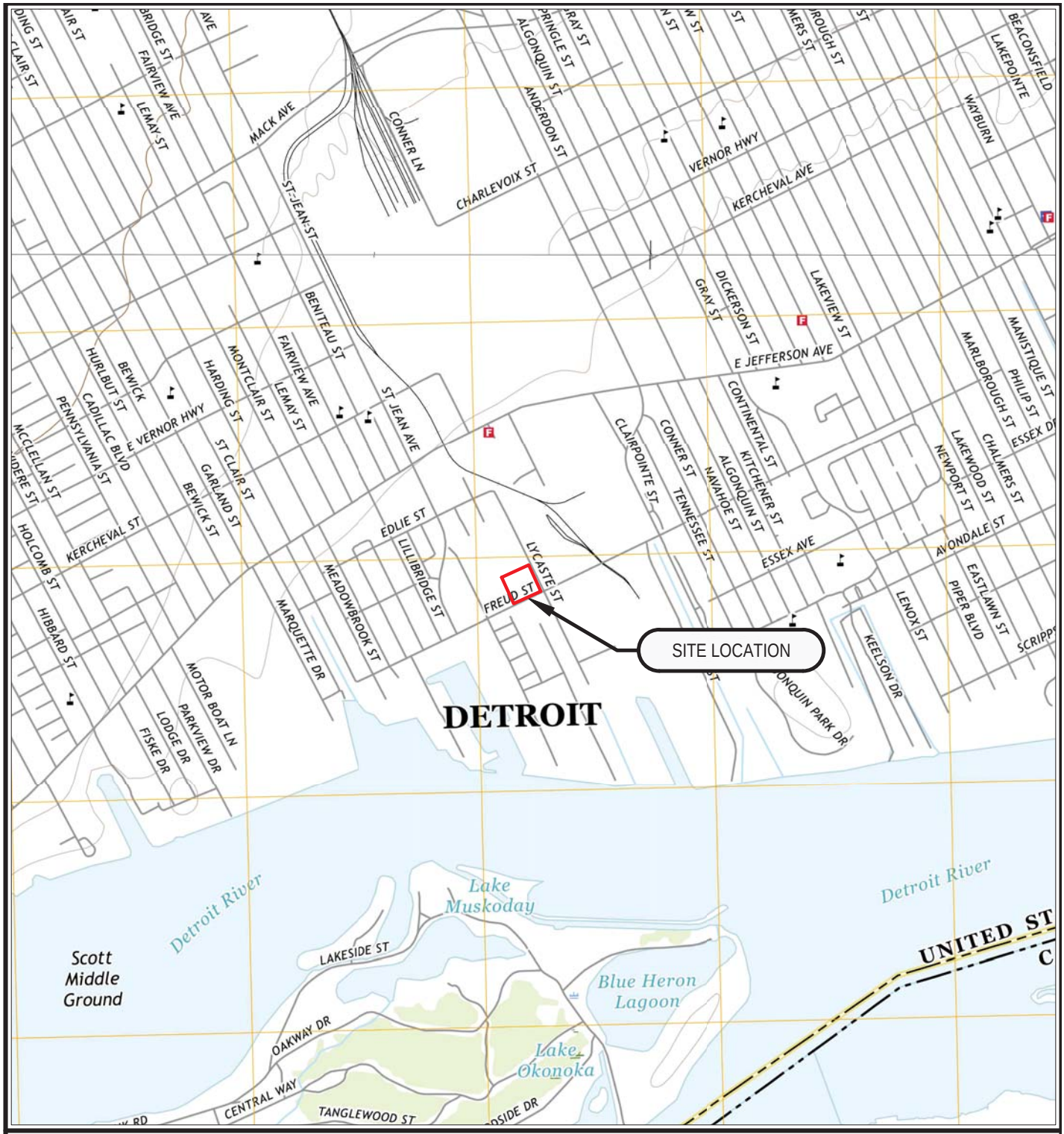
Project No. 11019-000123.00

Kellie L. Wing
Program Manager
Health, Safety and Environmental Services
Great Lakes Region

Tim McCann
Program Manager
Health, Safety and Environmental Services
Northeast Ohio Region

January 22, 2020

FIGURES



QUADRANGLE LOCATION

Scale 1:24000

0 1/2 1 MILE

1000 0 1000 2000 3000 FEET

SOURCE OF MAP IS US TOPO 7.5 MINUTE QUADRANGLE MAP, BELLE ISLE (2017), MICHIGAN: U.S. GEOLOGICAL SURVEY

SITE LOCATION/BOUNDARIES APPROXIMATED

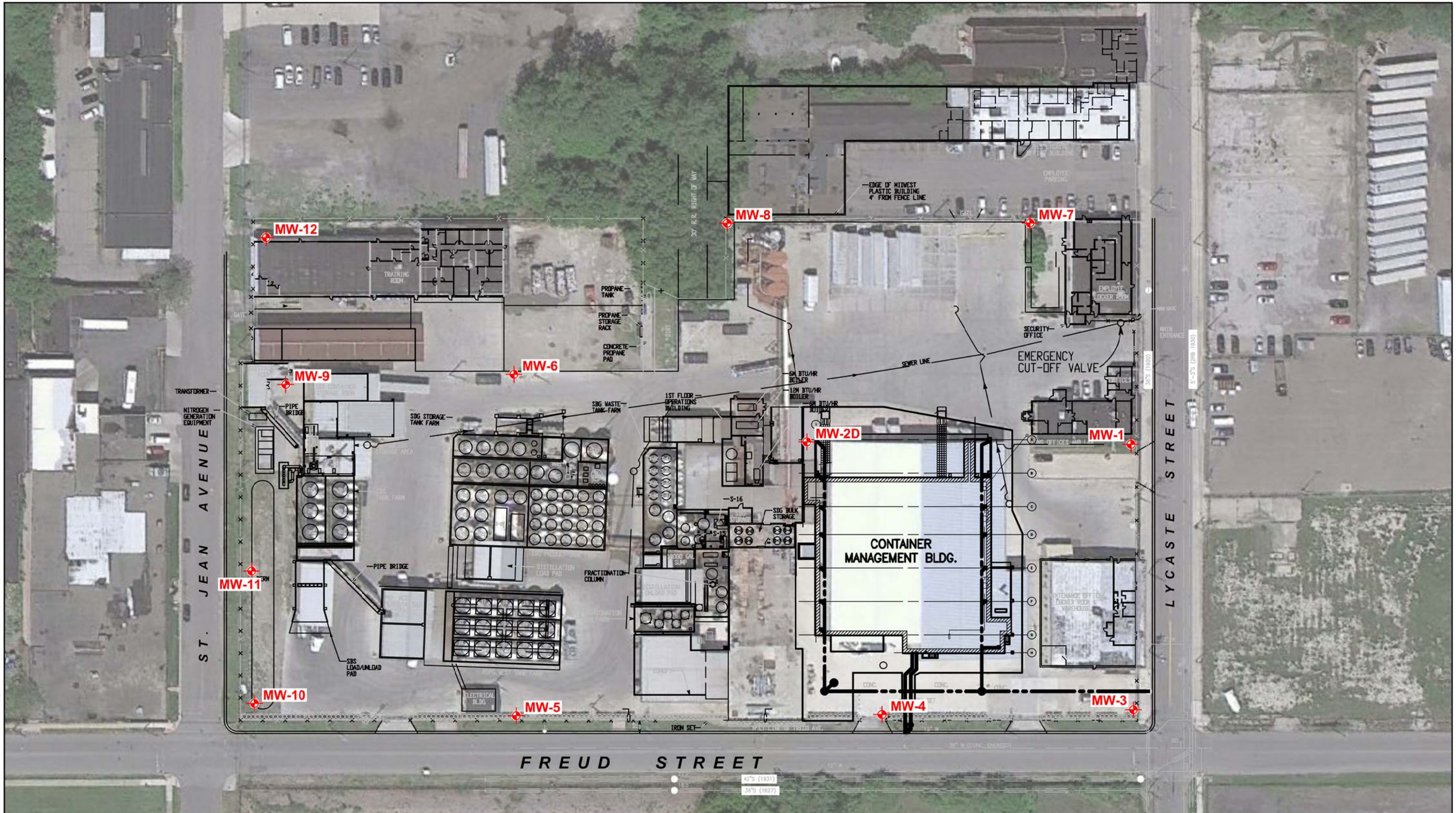
CHECK BY	KW
DRAWN BY	JL
DATE	7/25/2019
SCALE	AS SHOWN
CAD NO.	11.19.076.00A
PRJ NO.	11019-000076.00

SITE LOCATION MAP

PETRO-CHEM PROCESSING GROUP
421 LYCASTE STREET
DETROIT, MICHIGAN

APEX

FIGURE
1



LEGEND

MW-# MONITORING WELL LOCATION

SCALE IN FEET

0 40 80 160

CHECK BY	KW
DRAWN BY	JL
DATE	7/25/2019
SCALE	AS SHOWN
CAD NO.	11.16.143.00b
PRJ NO.	11016-000143.00

SAMPLING LOCATIONS

PETRO-CHEM PROCESSING GROUP
421 LYCASTE STREET
DETROIT, MICHIGAN

APEX

FIGURE 2

TABLES

Table
Summary of Groundwater Analytical Results

Petro-Chem Processing Group of Nortru, LLC - Detroit, Michigan
Project No. 11019-000123.00

Sample Identification	MW-3	MW-4	MW-8	MW-9	Duplicate	Field Blank	Rinseate Blank	EGLE Part 201 Generic Cleanup Criteria	
Collection Date	10/29/2019	10/29/2019	10/29/2019	10/29/2019	10/29/2019	10/29/2019	10/29/2019	Drinking Water	Groundwater Surface Water Interface
Analysis Dates	11/6/2019	11/6/2019	11/6/2019	11/6/2019	11/6/2019	11/6/2019	11/6/2019		
Collection Method	**Low-Flow Sampling**								
Concentration (ng/L)									
PFAS									
PFBA - Perfluorobutanoic acid	150	350	540	220	220	<20	<20	NA	NA
PFPeA - Perfluoropentanoic acid	320	250	640	92	93	<10	<10	NA	NA
4:2 FTSA - 4:2 Fluorotelomer sulfonic acid	<9.8	<10	<9.6 (I)	<9.8	<10	<10	<10	NA	NA
PFHxA - Perfluorohexanoic acid	130	26	460	75	73	<10	<10	NA	NA
PFBS - Perfluorobutane sulfonic acid	21	<10	140	<9.8	<10	<10	<10	NA	NA
PFHpA - Perfluoroheptanoic acid	68	<10	110	24	25	<10	<10	NA	NA
PFPeS - Perfluoropentane sulfonic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
6:2 FTSA - 6:2 Fluorotelomer sulfonic acid	<9.8	<10	90	62	65	<10	<10	NA	NA
PFOA - Perfluorooctanoic acid	47	<10	36	**86**	**93**	<10	<10	70	12,000
PFHxS - Perfluorohexane sulfonic acid	11	<10	<9.6	18	17	<10	<10	NA	NA
PFHxS-LN - Perfluorohexane sulfonic acid	<9.8	<10	<9.6	14	14	<10	<10	NA	NA
PFHxS-BR - Perfluorohexane sulfonic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFNA - Perfluorononanoic acid	12	<10	<9.6	<9.8	<10	<10	<10	NA	NA
8:2 FTSA - 8:2 Fluorotelomer sulfonic acid	<9.8	<10	<9.6	<9.8	<10 (I)	<10 (I)	<10	NA	NA
PFHpS - Perfluoroheptane sulfonic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFDA - Perfluorodecanoic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
N-MeFOSAA - N-methyl perfluorooctanesulfonamidoacetic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
EtFOSAA - N-Ethyl perfluorooctane sulfonamidoacetic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFOS - Perfluorooctane sulfonic acid	**59**	<10	<9.6	**78 (1)**	**73 (1)**	<10	<10	70	12
PFOS-LN - Perfluorooctane sulfonic acid - LN	19	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFOS-BR - Perfluorooctane sulfonic acid - BR	40	<10	<9.6	68 (1)	64 (1)	<10	<10	NA	NA
PFUnDA - Perfluoroundecanoic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFNS - Perfluorononane sulfonic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFDoDA - Perfluorododecanoic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFDS - Perfluorodecane sulfonic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFTrDA - Perfluorotridecanoic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
FOSA - Perfluorooctane sulfonamide	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFTeDA - Perfluorotetradecanoic acid	<9.8	<10	<9.6	<9.8	<10	<10	<10	NA	NA
PFOA + PFOS	**106**	20	45.6	**164**	**166**	ND	ND	70	NA

ng/L = nanograms per liter or parts per trillion (ppt)

EGLE = Michigan Department of Environment, Great Lakes and Energy

< = limit of detection for sample

ND = not detected

I = matrix interference with internal standard

1 = qualifier ion out of range

Yellow Shaded/Bold typeface indicates that concentration exceeds EGLE Part 201 criteria

Gray Shaded indicates that the criterion has been exceeded

APPENDIX A

WELL DEVELOPMENT AND PURGING DATA SHEETS

Well Number: 3

Well Development and Purging Data

Project Name: 11019-000123.00
Client Company: Stericycle Environmental Solutions
Site Name: Petro-Chem

Project Manager: Kellie Wing
Site Address: 421 Lycaste, Detroit, MI

Project No.: 11019-000123.00

Development Criteria

_____ 3 to 5 Casing Volumes of Water Removal
X Stabilization of Indicator Parameters
_____ Other_____

Methods of Development

Pump
_____ Centrifugal
_____ Submersible
X Peristaltic

Bailer
_____ Bottom Valve
_____ Double Check Valve
_____ Stainless-stell Kemmerer

Water Volume Calculation (2" = 0.1632; 4" = 0.6528)

Initial Depth of Well (feet):_____
Initial Depth to Water (feet):_____
Height of Water Column in Well (feet):_____
Diameter (inches): Well_____ Gravel Pack_____

Item	Water Volume in Well		Gallons - Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments

X Temperature Meter
X Conductivity Meter (+/- 3%)
X DO Meter (+/- 0.3 mg/L)
X pH Meter (+/- 0.1 unit)
X ORP Meter (+/- 10mV)
X Turbidity Meter (+/- 10%)

Water Disposal: 55-gallon drum

Water Removal Data

Date	Time	Development Method		Removal Rate	Intake Depth	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temp (°C)	Conductivity (mS/cm) (ppm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (<10 NTUs)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative							
10/29	10:10	X	--	320		17.20		1.0 gal	--	--							Start Purging
	11:12	X	--						--	--							Purge Dry
	11:20	X	--						--	--							Sample
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							

Circle the date and time that the development criteria are met

Comments: Odorless, clear. Purged dry then recharged quickly

Developer's Signature: [signature] Date: 10/29/19

Reviewer: KW Date: 11/15/19

Well Number: 4

Well Development and Purging Data

Project Name: 11019-000123.00
Client Company: Stericycle Environmental Solutions
Site Name: Petro-Chem

Project Manager: Kellie Wing
Site Address: 421 Lycaste, Detroit, MI

Project No.: 11019-000123.00

Development Criteria

_____ 3 to 5 Casing Volumes of Water Removal
X Stabilization of Indicator Parameters
_____ Other_____

Methods of Development

Pump		Bailer	
_____	Centrifugal	_____	Bottom Valve
_____	Submersible	_____	Double Check Valve
X	Peristaltic	_____	Stainless-stell Kemmerer

Water Volume Calculation (2" = 0.1632; 4" = 0.6528)

Initial Depth of Well (feet):_____
Initial Depth to Water (feet):_____
Height of Water Column in Well (feet):_____
Diameter (inches): Well_____ Gravel Pack_____

Item	Water Volume in Well		Gallons - Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments

X Temperature Meter
X Conductivity Meter (+/- 3%)
X DO Meter (+/- 0.3 mg/L)
X pH Meter (+/- 0.1 unit)
X ORP Meter (+/- 10mV)
X Turbidity Meter (+/- 10%)

Water Disposal: 55-gallon drum

Water Removal Data

Date	Time	Development Method		Removal Rate	Intake Depth	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temp (°C)	Conductivity (mS/cm) (ppm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (<10 NTUs)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative							
10/29	10:20	X	--	320		6.45			--	--							Start Purging
	10:25	X	--						--	--	16.8	2.615	19.8	6.93	89.8	8.85	
	10:27	X	--						--	--	16.8	2.503	20.2	6.95	-79.8	13.28	
	10:29	X	--			10.40'			--	--	16.7	2.508	21.3	6.98	-73.1	TS 0.01	
	10:32	X	--					1.0	--	1 L							Purge Dry
	~~10:38~~	X	--						--	--							
	13:00	X	--						--	--							Sampled
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							

Circle the date and time that the development criteria are met

Comments: Odorless with light sediment, clear, purged dry

Developer's Signature: Trevor M Hale Date: 10/29

Reviewer: KW Date: 11/15/19

Well Number: 8

Well Development and Purging Data

Project Name: 11019-000123.00
Client Company: Stericycle Environmental Solutions
Site Name: Petro-Chem

Project Manager: Kellie Wing
Site Address: 421 Lycaste, Detroit, MI

Project No.: 11019-000123.00

Development Criteria

_____ 3 to 5 Casing Volumes of Water Removal
X Stabilization of Indicator Parameters
_____ Other_____

Methods of Development

Pump
_____ Centrifugal
_____ Submersible
X Peristaltic

Bailer
_____ Bottom Valve
_____ Double Check Valve
_____ Stainless-stell Kemmerer

Water Volume Calculation (2" = 0.1632; 4" = 0.6528)

Initial Depth of Well (feet):_____
Initial Depth to Water (feet):_____
Height of Water Column in Well (feet):_____
Diameter (inches): Well_____ Gravel Pack_____

Item	Water Volume in Well		Gallons - Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments

X Temperature Meter
X Conductivity Meter (+/- 3%)
X DO Meter (+/- 0.3 mg/L)
X pH Meter (+/- 0.1 unit)
X ORP Meter (+/- 10mV)
X Turbidity Meter (+/- 10%)

Water Disposal: 55-gallon drum

Water Removal Data

Date	Time	Development Method		Removal Rate	Intake Depth	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temp (°C)	Conductivity (mS/cm) (ppm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (<10 NTUs)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative							
10/29	9:49	X	--	280					--	--							Start Purging
	9:54	X	--			13.16			--	--	13.8	2.802	15.2	7.25	-94.9	19.50	
		X	--			13.19		0.5	--	--							Purged Dry
	12:47	X	--						--	--							Sampled
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							

Circle the date and time that the development criteria are met

Comments: Odorless, with sediment, purged dry

Developer's Signature: Trevor M Zale Date: 10/29

Reviewer: 11/15/19 Date: RW

Well Number: 9

Well Development and Purging Data

Project Name: 11019-000123.00
Client Company: Stericycle Environmental Solutions
Site Name: Petro-Chem

Project Manager: Kellie Wing
Site Address: 421 Lycaste, Detroit, MI

Project No.: 11019-000123.00

Development Criteria

_____ 3 to 5 Casing Volumes of Water Removal
X Stabilization of Indicator Parameters
_____ Other_____

Methods of Development

Pump
_____ Centrifugal
_____ Submersible
X Peristaltic

Bailer
_____ Bottom Valve
_____ Double Check Valve
_____ Stainless-stell Kemmerer

Water Volume Calculation (2" = 0.1632; 4" = 0.6528)

Initial Depth of Well (feet):_____
Initial Depth to Water (feet):_____
Height of Water Column in Well (feet):_____
Diameter (inches): Well_____ Gravel Pack_____

Item	Water Volume in Well		Gallons - Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments

X Temperature Meter
X Conductivity Meter (+/- 3%)
X DO Meter (+/- 0.3 mg/L)
X pH Meter (+/- 0.1 unit)
X ORP Meter (+/- 10mV)
X Turbidity Meter (+/- 10%)

Water Disposal: 55-gallon drum

Water Removal Data

Date	Time	Development Method		Removal Rate	Intake Depth	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temp (°C)	Conductivity (mS/cm) (ppm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (<10 NTUs)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative							
10/29	11:45	X	--	[illegible]		9.15			--	--							Start Purging
	12:08	X	--	400		9.94			--	--	16.8	2.588	0.55	6.74	-99.6	8.82	
	12:10	X	--			9.93			--	--	16.9	2.589	0.57	6.74	-99.6	9.35	
	12:12	X	--			9.92			--	--	17.0	2.590	0.67	6.73	-98.8	8.06	
	12:14	X	--			9.92			--	--	17.1	2.601	0.76	6.73	-97.7	7.20	
	12:16	X	--			9.92			--	--	17.2	2.595	0.79	6.73	-97.1	7.80	
	12:19	X	--						--	--							Sampled
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							
		X	--						--	--							

Circle the date and time that the development criteria are met

Comments: Initial heavy sediment clearing up with time, odorless

Developer's Signature: [signature] Date: 10/29/19

Reviewer: KWO Date: 11/15/19

APPENDIX B

DETAILED ANALYTICAL RESULTS

Analytical Laboratory Report

Report ID: S08840.01(01)
Generated on 11/07/2019

Report to

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Report Summary

Lab Sample ID(s): S08840.01-S08840.07
Project: 11019-000123.00
Collected Date(s): 10/29/2019
Submitted Date/Time: 10/30/2019 11:00
Sampled by: Trevor Zalewski
P.O. #: 11019-000123.00

Table of Contents

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7

Sample Summary (7 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08840.01	Field Blank	Water	10/29/19 09:17
S08840.02	Rinsate Blank	Water	10/29/19 09:25
S08840.03	MW-3	Groundwater	10/29/19 11:20
S08840.04	MW-4	Groundwater	10/29/19 13:00
S08840.05	MW-8	Groundwater	10/29/19 12:47
S08840.06	MW-9	Groundwater	10/29/19 12:19
S08840.07	Duplicate	Groundwater	10/29/19 12:20

Analytical Laboratory Report

Lab Sample ID: S08840.01
Sample Tag: Field Blank
Collected Date/Time: 10/29/2019 09:17
Matrix: Water
COC Reference: 116004

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.7	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/06/19 01:05, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2	375-22-4	
PFPeA*	Not detected	10		ng/L	2	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2	757124-72-4	
PFHxA*	Not detected	10		ng/L	2	307-24-4	
PFBS*	Not detected	10		ng/L	2	375-73-5	
PFHpA*	Not detected	10		ng/L	2	375-85-9	
PFPeS*	Not detected	10		ng/L	2	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2	27619-97-2	
PFOA*	Not detected	10		ng/L	2	335-67-1	
PFHxS*	Not detected	10		ng/L	2	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2	39108-34-4	I
PFHpS*	Not detected	10		ng/L	2	375-92-8	
PFDA*	Not detected	10		ng/L	2	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2	2991-50-6	
PFOS*	Not detected	10		ng/L	2	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2	2058-94-8	
PFNS*	Not detected	10		ng/L	2	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2	307-55-1	
PFDS*	Not detected	10		ng/L	2	335-77-3	
PFTrDA*	Not detected	10		ng/L	2	72629-94-8	
FOSA*	Not detected	10		ng/L	2	754-91-6	
PFTeDA*	Not detected	10		ng/L	2	376-06-7	

I-Matrix interference with internal standard

Lab Sample ID: S08840.02
Sample Tag: Rinsate Blank
Collected Date/Time: 10/29/2019 09:25
Matrix: Water
COC Reference: 116004

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.7	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/06/19 01:26, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.99	375-22-4	
PFPeA*	Not detected	10.0		ng/L	1.99	2706-90-3	
4:2 FTSA*	Not detected	10.0		ng/L	1.99	757124-72-4	
PFHxA*	Not detected	10.0		ng/L	1.99	307-24-4	
PFBS*	Not detected	10.0		ng/L	1.99	375-73-5	
PFHpA*	Not detected	10.0		ng/L	1.99	375-85-9	
PFPeS*	Not detected	10.0		ng/L	1.99	2706-91-4	
6:2 FTSA*	Not detected	10.0		ng/L	1.99	27619-97-2	
PFOA*	Not detected	10.0		ng/L	1.99	335-67-1	
PFHxS*	Not detected	10.0		ng/L	1.99	355-46-4	
PFHxS-LN*	Not detected	10.0		ng/L	1.99	355-46-4-LN	
PFHxS-BR*	Not detected	10.0		ng/L	1.99	355-46-4-BR	
PFNA*	Not detected	10.0		ng/L	1.99	375-95-1	
8:2 FTSA*	Not detected	10.0		ng/L	1.99	39108-34-4	
PFHpS*	Not detected	10.0		ng/L	1.99	375-92-8	
PFDA*	Not detected	10.0		ng/L	1.99	335-76-2	
N-MeFOSAA*	Not detected	10.0		ng/L	1.99	2355-31-9	
EtFOSAA*	Not detected	10.0		ng/L	1.99	2991-50-6	
PFOS*	Not detected	10.0		ng/L	1.99	1763-23-1	
PFOS-LN*	Not detected	10.0		ng/L	1.99	1763-23-1-LN	
PFOS-BR*	Not detected	10.0		ng/L	1.99	1763-23-1-BR	
PFUnDA*	Not detected	10.0		ng/L	1.99	2058-94-8	
PFNS*	Not detected	10.0		ng/L	1.99	474511-07-4	
PFDoDA*	Not detected	10.0		ng/L	1.99	307-55-1	
PFDS*	Not detected	10.0		ng/L	1.99	335-77-3	
PFTrDA*	Not detected	10.0		ng/L	1.99	72629-94-8	
FOSA*	Not detected	10.0		ng/L	1.99	754-91-6	
PFTeDA*	Not detected	10.0		ng/L	1.99	376-06-7	

Lab Sample ID: S08840.03
Sample Tag: MW-3
Collected Date/Time: 10/29/2019 11:20
Matrix: Groundwater
COC Reference: 116004

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.7	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/06/19 01:48, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	150	20		ng/L	1.96	375-22-4	
PFPeA*	320	9.8		ng/L	1.96	2706-90-3	
4:2 FTSA*	Not detected	9.8		ng/L	1.96	757124-72-4	
PFHxA*	130	9.8		ng/L	1.96	307-24-4	
PFBS*	21	9.8		ng/L	1.96	375-73-5	
PFHpA*	68	9.8		ng/L	1.96	375-85-9	
PFPeS*	Not detected	9.8		ng/L	1.96	2706-91-4	
6:2 FTSA*	Not detected	9.8		ng/L	1.96	27619-97-2	
PFOA*	47	9.8		ng/L	1.96	335-67-1	
PFHxS*	11	9.8		ng/L	1.96	355-46-4	
PFHxS-LN*	Not detected	9.8		ng/L	1.96	355-46-4-LN	
PFHxS-BR*	Not detected	9.8		ng/L	1.96	355-46-4-BR	
PFNA*	12	9.8		ng/L	1.96	375-95-1	
8:2 FTSA*	Not detected	9.8		ng/L	1.96	39108-34-4	
PFHpS*	Not detected	9.8		ng/L	1.96	375-92-8	
PFDA*	Not detected	9.8		ng/L	1.96	335-76-2	
N-MeFOSAA*	Not detected	9.8		ng/L	1.96	2355-31-9	
EtFOSAA*	Not detected	9.8		ng/L	1.96	2991-50-6	
PFOS*	59	9.8		ng/L	1.96	1763-23-1	
PFOS-LN*	19	9.8		ng/L	1.96	1763-23-1-LN	
PFOS-BR*	40	9.8		ng/L	1.96	1763-23-1-BR	
PFUnDA*	Not detected	9.8		ng/L	1.96	2058-94-8	
PFNS*	Not detected	9.8		ng/L	1.96	474511-07-4	
PFDoDA*	Not detected	9.8		ng/L	1.96	307-55-1	
PFDS*	Not detected	9.8		ng/L	1.96	335-77-3	
PFTrDA*	Not detected	9.8		ng/L	1.96	72629-94-8	
FOSA*	Not detected	9.8		ng/L	1.96	754-91-6	
PFTeDA*	Not detected	9.8		ng/L	1.96	376-06-7	

Lab Sample ID: S08840.04
Sample Tag: MW-4
Collected Date/Time: 10/29/2019 13:00
Matrix: Groundwater
COC Reference: 116004

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.7	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/06/19 02:09, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	350	20		ng/L	2.02	375-22-4	
PFPeA*	250	10		ng/L	2.02	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.02	757124-72-4	
PFHxA*	26	10		ng/L	2.02	307-24-4	
PFBS*	Not detected	10		ng/L	2.02	375-73-5	
PFHpA*	Not detected	10		ng/L	2.02	375-85-9	
PFPeS*	Not detected	10		ng/L	2.02	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.02	27619-97-2	
PFOA*	Not detected	10		ng/L	2.02	335-67-1	
PFHxS*	Not detected	10		ng/L	2.02	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.02	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.02	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.02	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.02	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.02	375-92-8	
PFDA*	Not detected	10		ng/L	2.02	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.02	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.02	2991-50-6	
PFOS*	Not detected	10		ng/L	2.02	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.02	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.02	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.02	2058-94-8	
PFNS*	Not detected	10		ng/L	2.02	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.02	307-55-1	
PFDS*	Not detected	10		ng/L	2.02	335-77-3	
PFTrDA*	Not detected	10		ng/L	2.02	72629-94-8	
FOSA*	Not detected	10		ng/L	2.02	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.02	376-06-7	

Lab Sample ID: S08840.05
Sample Tag: MW-8
Collected Date/Time: 10/29/2019 12:47
Matrix: Groundwater
COC Reference: 116004

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.7	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/06/19 02:30, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	540	19		ng/L	1.92	375-22-4	
PFPeA*	640	9.6		ng/L	1.92	2706-90-3	
4:2 FTSA*	Not detected	9.6		ng/L	1.92	757124-72-4	I
PFHxA*	460	9.6		ng/L	1.92	307-24-4	
PFBS*	140	9.6		ng/L	1.92	375-73-5	
PFHpA*	110	9.6		ng/L	1.92	375-85-9	
PFPeS*	Not detected	9.6		ng/L	1.92	2706-91-4	
6:2 FTSA*	90	9.6		ng/L	1.92	27619-97-2	
PFOA*	36	9.6		ng/L	1.92	335-67-1	
PFHxS*	Not detected	9.6		ng/L	1.92	355-46-4	
PFHxS-LN*	Not detected	9.6		ng/L	1.92	355-46-4-LN	
PFHxS-BR*	Not detected	9.6		ng/L	1.92	355-46-4-BR	
PFNA*	Not detected	9.6		ng/L	1.92	375-95-1	
8:2 FTSA*	Not detected	9.6		ng/L	1.92	39108-34-4	
PFHpS*	Not detected	9.6		ng/L	1.92	375-92-8	
PFDA*	Not detected	9.6		ng/L	1.92	335-76-2	
N-MeFOSAA*	Not detected	9.6		ng/L	1.92	2355-31-9	
EtFOSAA*	Not detected	9.6		ng/L	1.92	2991-50-6	
PFOS*	Not detected	9.6		ng/L	1.92	1763-23-1	
PFOS-LN*	Not detected	9.6		ng/L	1.92	1763-23-1-LN	
PFOS-BR*	Not detected	9.6		ng/L	1.92	1763-23-1-BR	
PFUnDA*	Not detected	9.6		ng/L	1.92	2058-94-8	
PFNS*	Not detected	9.6		ng/L	1.92	474511-07-4	
PFDoDA*	Not detected	9.6		ng/L	1.92	307-55-1	
PFDS*	Not detected	9.6		ng/L	1.92	335-77-3	
PFTrDA*	Not detected	9.6		ng/L	1.92	72629-94-8	
FOSA*	Not detected	9.6		ng/L	1.92	754-91-6	
PFTeDA*	Not detected	9.6		ng/L	1.92	376-06-7	

I-Matrix interference with internal standard

Analytical Laboratory Report

Lab Sample ID: S08840.06
Sample Tag: MW-9
Collected Date/Time: 10/29/2019 12:19
Matrix: Groundwater
COC Reference: 116004

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.7	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/06/19 02:51, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	220	20		ng/L	1.95	375-22-4	
PFPeA*	92	9.8		ng/L	1.95	2706-90-3	
4:2 FTSA*	Not detected	9.8		ng/L	1.95	757124-72-4	
PFHxA*	75	9.8		ng/L	1.95	307-24-4	
PFBS*	Not detected	9.8		ng/L	1.95	375-73-5	
PFHpA*	24	9.8		ng/L	1.95	375-85-9	
PFPeS*	Not detected	9.8		ng/L	1.95	2706-91-4	
6:2 FTSA*	62	9.8		ng/L	1.95	27619-97-2	
PFOA*	86	9.8		ng/L	1.95	335-67-1	
PFHxS*	18	9.8		ng/L	1.95	355-46-4	
PFHxS-LN*	14	9.8		ng/L	1.95	355-46-4-LN	
PFHxS-BR*	Not detected	9.8		ng/L	1.95	355-46-4-BR	
PFNA*	Not detected	9.8		ng/L	1.95	375-95-1	
8:2 FTSA*	Not detected	9.8		ng/L	1.95	39108-34-4	
PFHpS*	Not detected	9.8		ng/L	1.95	375-92-8	
PFDA*	Not detected	9.8		ng/L	1.95	335-76-2	
N-MeFOSAA*	Not detected	9.8		ng/L	1.95	2355-31-9	
EtFOSAA*	Not detected	9.8		ng/L	1.95	2991-50-6	
PFOS*	78	9.8		ng/L	1.95	1763-23-1	1
PFOS-LN*	Not detected	9.8		ng/L	1.95	1763-23-1-LN	
PFOS-BR*	68	9.8		ng/L	1.95	1763-23-1-BR	1
PFUnDA*	Not detected	9.8		ng/L	1.95	2058-94-8	
PFNS*	Not detected	9.8		ng/L	1.95	474511-07-4	
PFDoDA*	Not detected	9.8		ng/L	1.95	307-55-1	
PFDS*	Not detected	9.8		ng/L	1.95	335-77-3	
PFTrDA*	Not detected	9.8		ng/L	1.95	72629-94-8	
FOSA*	Not detected	9.8		ng/L	1.95	754-91-6	
PFTeDA*	Not detected	9.8		ng/L	1.95	376-06-7	

1-Qualifier ion out of range.

Analytical Laboratory Report

Lab Sample ID: S08840.07
Sample Tag: Duplicate
Collected Date/Time: 10/29/2019 12:20
Matrix: Groundwater
COC Reference: 116004

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.7	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/06/19 03:12, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	220	21		ng/L	2.05	375-22-4	
PFPeA*	93	10		ng/L	2.05	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.05	757124-72-4	
PFHxA*	73	10		ng/L	2.05	307-24-4	
PFBS*	Not detected	10		ng/L	2.05	375-73-5	
PFHpA*	25	10		ng/L	2.05	375-85-9	
PFPeS*	Not detected	10		ng/L	2.05	2706-91-4	
6:2 FTSA*	65	10		ng/L	2.05	27619-97-2	
PFOA*	93	10		ng/L	2.05	335-67-1	
PFHxS*	17	10		ng/L	2.05	355-46-4	
PFHxS-LN*	14	10		ng/L	2.05	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.05	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.05	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.05	39108-34-4	I
PFHpS*	Not detected	10		ng/L	2.05	375-92-8	
PFDA*	Not detected	10		ng/L	2.05	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.05	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.05	2991-50-6	
PFOS*	73	10		ng/L	2.05	1763-23-1	1
PFOS-LN*	Not detected	10		ng/L	2.05	1763-23-1-LN	
PFOS-BR*	64	10		ng/L	2.05	1763-23-1-BR	1
PFUnDA*	Not detected	10		ng/L	2.05	2058-94-8	
PFNS*	Not detected	10		ng/L	2.05	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.05	307-55-1	
PFDS*	Not detected	10		ng/L	2.05	335-77-3	
PFTrDA*	Not detected	10		ng/L	2.05	72629-94-8	
FOSA*	Not detected	10		ng/L	2.05	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.05	376-06-7	

I-Matrix interference with internal standard
1-Qualifier ion out of range.

Merit Laboratories Login Checklist

Lab Set ID: S08840
Client: APEX (APEX Companies LLC)
Project: 11019-000123.00
Submitted: 10/30/2019 11:00 Login User: MMC

Attention: Kellie Wing
Address: APEX Companies LLC
46555 Humboldt Drive
Suite 103
Novi, MI 48377

Phone: 248-764-3451 FAX:
Email: kellie.wing@apexcos.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 5.7
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[ ] Yes	[ ] No	[X] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[ ] Yes	[X] No	[ ] N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[ ] Yes	[ ] No	[X] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[ ] No	[X] N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

116004

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Kellie Wing
COMPANY: Apex Companies
ADDRESS: 46555 Humboldt Drive Suite 103
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: (248) 764-3451 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: Kellie.wing@apexcos.com QUOTE NO.:

INVOICE TO

CONTACT NAME: Same ☐ SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 11019-000123.00
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Trevor Zalewski Trevor Mi 07979

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES

Project Locations
☒ Detroit ☐ New York
☐ Other

Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	AS TM Method
08840.01	10/29	9:17	Field Blank	GW	1								X
.02	10/29	9:25	Rinsate Blank		3								X
.03	10/29	11:20	MW-3		3								X
.04	10/29	13:00	MW-4		3								X
.05	10/29	12:47	MW-8		3								X
.06	10/29	12:19	MW-9		3								X
.07	10/29	12:20	Duplicate	↓	3								X

RELINQUISHED BY: SIGNATURE/ORGANIZATION: Trevor M Zalewski M Chilcote ☒ Sampler	DATE: 10/30/19	TIME:	
RECEIVED BY: SIGNATURE/ORGANIZATION: M Chilcote	DATE: 10/30/19	TIME: 1100	
RELINQUISHED BY: SIGNATURE/ORGANIZATION:	DATE:	TIME:	
RECEIVED BY: SIGNATURE/ORGANIZATION:	DATE:	TIME:	

RELINQUISHED BY: SIGNATURE/ORGANIZATION:	DATE:	TIME:	
RECEIVED BY: SIGNATURE/ORGANIZATION:	DATE:	TIME:	

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 5.7

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

Quality Control Report

Report ID: QC-S08840-01
Generated on 01/15/2020

Report to

Attention: Kellie Wing
APEX Companies LLC
46555 Humboldt Drive
Suite 103
Novi, MI 48377

Phone: 248-764-3451 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Report Summary

Lab Sample ID(s): S08840.01-S08840.07
Project: 11019-000123.00
Submitted Date/Time: 10/30/2019 11:00
Sampled by: Trevor Zalewski
P.O. #: 11019-000123.00

QC Report Sections

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

Lab Sample ID: S08840.01
Sample Tag: Field Blank
Collected Date/Time: 10/29/2019 09:17
Matrix: Water
COC Reference: 116004

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
24 PFAs	ASTMD7979-17M	11/06/19 01:05	AK191105	PF191105W1	Yes	BLK/LCS/LCSD/MS/DU

Lab Sample ID: S08840.02
Sample Tag: Rinsate Blank
Collected Date/Time: 10/29/2019 09:25
Matrix: Water
COC Reference: 116004

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
24 PFAs	ASTMD7979-17M	11/06/19 01:26	AK191105	PF191105W1	Yes	BLK/LCS/LCSD/MS/DU

Lab Sample ID: S08840.03
Sample Tag: MW-3
Collected Date/Time: 10/29/2019 11:20
Matrix: Groundwater
COC Reference: 116004

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
24 PFAs	ASTMD7979-17M	11/06/19 01:48	AK191105	PF191105W1	Yes	BLK/LCS/LCSD/MS/DU

Lab Sample ID: S08840.04
Sample Tag: MW-4
Collected Date/Time: 10/29/2019 13:00
Matrix: Groundwater
COC Reference: 116004

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
24 PFAs	ASTMD7979-17M	11/06/19 02:09	AK191105	PF191105W1	Yes	BLK/LCS/LCSD/MS/DU

Lab Sample ID: S08840.05
Sample Tag: MW-8
Collected Date/Time: 10/29/2019 12:47
Matrix: Groundwater
COC Reference: 116004

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
24 PFAs	ASTMD7979-17M	11/06/19 02:30	AK191105	PF191105W1	Yes	BLK/LCS/LCSD/MS/DU

Lab Sample ID: S08840.06
Sample Tag: MW-9
Collected Date/Time: 10/29/2019 12:19
Matrix: Groundwater
COC Reference: 116004

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
24 PFAs	ASTMD7979-17M	11/06/19 02:51	AK191105	PF191105W1	Yes	BLK/LCS/LCSD/MS/DU

Lab Sample ID: S08840.07

Sample Tag: Duplicate

Collected Date/Time: 10/29/2019 12:20

Matrix: Groundwater

COC Reference: 116004

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
24 PFAs	ASTMD7979-17M	11/06/19 03:12	AK191105	PF191105W1	Yes	BLK/LCS/LCSD/MS/DU

QC Report - Prep Batch Summary

Organics - Volatiles, Prep Batch ID: PF191105W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S08840.01	24 PFAs	ASTMD7979-17M	11/06/19 01:05	AK191105
S08840.02	24 PFAs	ASTMD7979-17M	11/06/19 01:26	AK191105
S08840.03	24 PFAs	ASTMD7979-17M	11/06/19 01:48	AK191105
S08840.04	24 PFAs	ASTMD7979-17M	11/06/19 02:09	AK191105
S08840.05	24 PFAs	ASTMD7979-17M	11/06/19 02:30	AK191105
S08840.06	24 PFAs	ASTMD7979-17M	11/06/19 02:51	AK191105
S08840.07	24 PFAs	ASTMD7979-17M	11/06/19 03:12	AK191105

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S08840.01

Sample Tag: Field Blank

Collected Date/Time: 10/29/2019 09:17

Matrix: Water

COC Reference: 116004

Organics - Volatiles, Analysis: 24 PFAs

Run in Batch: AK191105, Run Date: 11/06/2019 01:05, Matrix: WW, Dilution: 2

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**119.6**	50.0	150.0
M2-6:2FTSA		**119.6**	50.0	150.0
M2-8:2FTSA	*	**153.1**	50.0	150.0
M2PFTeDA		**105.6**	12.0	218.0
M3PFBS		**115.5**	50.0	150.0
M3PFHxS		**115.9**	50.0	150.0
M4PFHpA		**114.0**	50.0	150.0
M5PFHxA		**111.7**	50.0	150.0
M5PFPeA		**109.6**	50.0	150.0
M6PFDA		**119.9**	50.0	150.0
M7PFUnDA		**132.3**	50.0	150.0
M8FOSA		**110.0**	50.0	150.0
M8PFOA		**114.2**	50.0	150.0
M8PFOS		**107.0**	50.0	150.0
M9-PFNA		**124.3**	50.0	150.0
MPFBA		**80.1**	50.0	150.0
MPFDoDA		**130.2**	50.0	150.0
d3N-MeFOSAA		**125.6**	50.0	150.0
d5EtFOSAA		**118.0**	50.0	150.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S08840.02

Sample Tag: Rinsate Blank

Collected Date/Time: 10/29/2019 09:25

Matrix: Water

COC Reference: 116004

Organics - Volatiles, Analysis: 24 PFAs

Run in Batch: AK191105, Run Date: 11/06/2019 01:26, Matrix: WW, Dilution: 1.99

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**124.1**	50.0	150.0
M2-6:2FTSA		**105.3**	50.0	150.0
M2-8:2FTSA		**146.0**	50.0	150.0
M2PFTeDA		**138.0**	12.0	218.0
M3PFBS		**110.2**	50.0	150.0
M3PFHxS		**114.4**	50.0	150.0
M4PFHpA		**115.4**	50.0	150.0
M5PFHxA		**107.1**	50.0	150.0
M5PFPeA		**110.0**	50.0	150.0
M6PFDA		**113.5**	50.0	150.0
M7PFUnDA		**115.7**	50.0	150.0
M8FOSA		**109.9**	50.0	150.0
M8PFOA		**116.5**	50.0	150.0
M8PFOS		**116.9**	50.0	150.0
M9-PFNA		**122.0**	50.0	150.0
MPFBA		**80.3**	50.0	150.0
MPFDoDA		**123.6**	50.0	150.0
d3N-MeFOSAA		**117.2**	50.0	150.0
d5EtFOSAA		**127.9**	50.0	150.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S08840.03

Sample Tag: MW-3

Collected Date/Time: 10/29/2019 11:20

Matrix: Groundwater

COC Reference: 116004

Organics - Volatiles, Analysis: 24 PFAs

Run in Batch: AK191105, Run Date: 11/06/2019 01:48, Matrix: WW, Dilution: 1.96

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**131.4**	50.0	150.0
M2-6:2FTSA		**120.9**	50.0	150.0
M2-8:2FTSA		**134.5**	50.0	150.0
M2PFTeDA		**143.7**	12.0	218.0
M3PFBS		**113.7**	50.0	150.0
M3PFHxS		**120.8**	50.0	150.0
M4PFHpA		**115.4**	50.0	150.0
M5PFHxA		**114.1**	50.0	150.0
M5PFPeA		**113.2**	50.0	150.0
M6PFDA		**112.5**	50.0	150.0
M7PFUnDA		**125.3**	50.0	150.0
M8FOSA		**122.5**	50.0	150.0
M8PFOA		**111.5**	50.0	150.0
M8PFOS		**109.6**	50.0	150.0
M9-PFNA		**123.8**	50.0	150.0
MPFBA		**117.7**	50.0	150.0
MPFDoDA		**115.9**	50.0	150.0
d3N-MeFOSAA		**118.3**	50.0	150.0
d5EtFOSAA		**124.2**	50.0	150.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S08840.04

Sample Tag: MW-4

Collected Date/Time: 10/29/2019 13:00

Matrix: Groundwater

COC Reference: 116004

Organics - Volatiles, Analysis: 24 PFAs

Run in Batch: AK191105, Run Date: 11/06/2019 02:09, Matrix: WW, Dilution: 2.02

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**144.6**	50.0	150.0
M2-6:2FTSA		**115.1**	50.0	150.0
M2-8:2FTSA		**143.7**	50.0	150.0
M2PFTeDA		**148.4**	12.0	218.0
M3PFBS		**113.9**	50.0	150.0
M3PFHxS		**109.8**	50.0	150.0
M4PFHpA		**119.0**	50.0	150.0
M5PFHxA		**116.3**	50.0	150.0
M5PFPeA		**115.9**	50.0	150.0
M6PFDA		**121.2**	50.0	150.0
M7PFUnDA		**124.6**	50.0	150.0
M8FOSA		**116.2**	50.0	150.0
M8PFOA		**112.0**	50.0	150.0
M8PFOS		**121.5**	50.0	150.0
M9-PFNA		**115.0**	50.0	150.0
MPFBA		**111.8**	50.0	150.0
MPFDoDA		**135.9**	50.0	150.0
d3N-MeFOSAA		**115.6**	50.0	150.0
d5EtFOSAA		**111.8**	50.0	150.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S08840.05

Sample Tag: MW-8

Collected Date/Time: 10/29/2019 12:47

Matrix: Groundwater

COC Reference: 116004

Organics - Volatiles, Analysis: 24 PFAs

Run in Batch: AK191105, Run Date: 11/06/2019 02:30, Matrix: WW, Dilution: 1.92

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA	*	**176.4**	50.0	150.0
M2-6:2FTSA		**120.9**	50.0	150.0
M2-8:2FTSA		**131.9**	50.0	150.0
M2PFTeDA		**129.6**	12.0	218.0
M3PFBS		**112.2**	50.0	150.0
M3PFHxS		**106.1**	50.0	150.0
M4PFHpA		**111.5**	50.0	150.0
M5PFHxA		**114.1**	50.0	150.0
M5PFPeA		**113.4**	50.0	150.0
M6PFDA		**121.2**	50.0	150.0
M7PFUnDA		**119.1**	50.0	150.0
M8FOSA		**113.2**	50.0	150.0
M8PFOA		**108.2**	50.0	150.0
M8PFOS		**117.8**	50.0	150.0
M9-PFNA		**119.3**	50.0	150.0
MPFBA		**116.6**	50.0	150.0
MPFDoDA		**125.9**	50.0	150.0
d3N-MeFOSAA		**127.8**	50.0	150.0
d5EtFOSAA		**121.4**	50.0	150.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S08840.06

Sample Tag: MW-9

Collected Date/Time: 10/29/2019 12:19

Matrix: Groundwater

COC Reference: 116004

Organics - Volatiles, Analysis: 24 PFAs

Run in Batch: AK191105, Run Date: 11/06/2019 02:51, Matrix: WW, Dilution: 1.95

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**123.4**	50.0	150.0
M2-6:2FTSA		**111.6**	50.0	150.0
M2-8:2FTSA		**137.4**	50.0	150.0
M2PFTeDA		**138.4**	12.0	218.0
M3PFBS		**114.4**	50.0	150.0
M3PFHxS		**109.7**	50.0	150.0
M4PFHpA		**117.1**	50.0	150.0
M5PFHxA		**113.0**	50.0	150.0
M5PFPeA		**113.1**	50.0	150.0
M6PFDA		**113.3**	50.0	150.0
M7PFUnDA		**126.5**	50.0	150.0
M8FOSA		**114.3**	50.0	150.0
M8PFOA		**117.3**	50.0	150.0
M8PFOS		**109.2**	50.0	150.0
M9-PFNA		**117.4**	50.0	150.0
MPFBA		**117.6**	50.0	150.0
MPFDoDA		**130.4**	50.0	150.0
d3N-MeFOSAA		**118.1**	50.0	150.0
d5EtFOSAA		**134.6**	50.0	150.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S08840.07

Sample Tag: Duplicate

Collected Date/Time: 10/29/2019 12:20

Matrix: Groundwater

COC Reference: 116004

Organics - Volatiles, Analysis: 24 PFAs

Run in Batch: AK191105, Run Date: 11/06/2019 03:12, Matrix: WW, Dilution: 2.05

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**117.5**	50.0	150.0
M2-6:2FTSA		**110.1**	50.0	150.0
M2-8:2FTSA	*	**151.3**	50.0	150.0
M2PFTeDA		**130.1**	12.0	218.0
M3PFBS		**110.9**	50.0	150.0
M3PFHxS		**113.0**	50.0	150.0
M4PFHpA		**112.2**	50.0	150.0
M5PFHxA		**112.8**	50.0	150.0
M5PFPeA		**111.3**	50.0	150.0
M6PFDA		**115.7**	50.0	150.0
M7PFUnDA		**122.9**	50.0	150.0
M8FOSA		**115.7**	50.0	150.0
M8PFOA		**113.5**	50.0	150.0
M8PFOS		**121.8**	50.0	150.0
M9-PFNA		**121.8**	50.0	150.0
MPFBA		**116.4**	50.0	150.0
MPFDoDA		**122.3**	50.0	150.0
d3N-MeFOSAA		**115.8**	50.0	150.0
d5EtFOSAA		**127.1**	50.0	150.0

Organics - Volatiles, Prep Batch ID: PF191105W1

QC Types: BLK/LCS/LCSD/MS/DUP

Blank (BLK)

Lab Sample ID: AK191105.BLK191105X

Run in Batch: AK191105, Run Date: 11/05/2019 23:19, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**120.4**	50.0	150.0
M2-6:2FTSA		**112.0**	50.0	150.0
M2-8:2FTSA		**125.9**	50.0	150.0
M2PFTeDA		**140.6**	12.0	218.0
M3PFBS		**113.3**	50.0	150.0
M3PFHxS		**111.8**	50.0	150.0
M4PFHpA		**114.2**	50.0	150.0
M5PFHxA		**109.1**	50.0	150.0
M5PFPeA		**111.4**	50.0	150.0
M6PFDA		**115.2**	50.0	150.0
M7PFUnDA		**124.4**	50.0	150.0
M8FOSA		**110.7**	50.0	150.0
M8PFOA		**116.7**	50.0	150.0
M8PFOS		**114.4**	50.0	150.0
M9-PFNA		**111.2**	50.0	150.0
MPFBA		**54.1**	50.0	150.0
MPFDoDA		**120.7**	50.0	150.0
d3N-MeFOSAA		**117.1**	50.0	150.0
d5EtFOSAA		**120.1**	50.0	150.0

Laboratory Control Sample (LCS)

Lab Sample ID: AK191105.LCS191105

Run in Batch: AK191105, Run Date: 11/05/2019 22:37, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**113.1**	50.0	150.0
M2-6:2FTSA		**102.8**	50.0	150.0
M2-8:2FTSA		**126.6**	50.0	150.0
M2PFTeDA		**134.1**	12.0	218.0
M3PFBS		**103.4**	50.0	150.0
M3PFHxS		**102.9**	50.0	150.0
M4PFHpA		**102.3**	50.0	150.0
M5PFHxA		**101.6**	50.0	150.0
M5PFPeA		**102.2**	50.0	150.0
M6PFDA		**110.5**	50.0	150.0
M7PFUnDA		**108.5**	50.0	150.0
M8FOSA		**108.2**	50.0	150.0
M8PFOA		**110.3**	50.0	150.0
M8PFOS		**107.5**	50.0	150.0
M9-PFNA		**109.5**	50.0	150.0
MPFBA		**64.5**	50.0	150.0
MPFDoDA		**107.0**	50.0	150.0
d3N-MeFOSAA		**114.1**	50.0	150.0
d5EtFOSAA		**103.3**	50.0	150.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: AK191105.LCSD191105, Parent Sample ID: AK191105.LCS191105

Run in Batch: AK191105, Run Date: 11/05/2019 22:58, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**116.9**	50.0	150.0
M2-6:2FTSA		**114.2**	50.0	150.0
M2-8:2FTSA		**121.5**	50.0	150.0
M2PFTeDA		**137.4**	12.0	218.0
M3PFBS		**106.3**	50.0	150.0
M3PFHxS		**110.2**	50.0	150.0
M4PFHpA		**105.7**	50.0	150.0
M5PFHxA		**109.8**	50.0	150.0
M5PFPeA		**105.1**	50.0	150.0
M6PFDA		**107.6**	50.0	150.0
M7PFUnDA		**106.9**	50.0	150.0
M8FOSA		**105.5**	50.0	150.0
M8PFOA		**110.7**	50.0	150.0
M8PFOS		**111.7**	50.0	150.0
M9-PFNA		**113.5**	50.0	150.0
MPFBA		**54.5**	50.0	150.0
MPFDoDA		**120.0**	50.0	150.0
d3N-MeFOSAA		**119.7**	50.0	150.0
d5EtFOSAA		**117.6**	50.0	150.0

Matrix Spike (MS)

Lab Sample ID: AK191105.0883501M, Parent Sample ID: S08835.01

Run in Batch: AK191105, Run Date: 11/06/2019 00:01, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1.96

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**107.8**	50.0	150.0
M2-6:2FTSA		**102.6**	50.0	150.0
M2-8:2FTSA		**131.3**	50.0	150.0
M2PFTeDA		**116.0**	12.0	218.0
M3PFBS		**98.1**	50.0	150.0
M3PFHxS		**99.4**	50.0	150.0
M4PFHpA		**107.2**	50.0	150.0
M5PFHxA		**103.9**	50.0	150.0
M5PFPeA		**102.2**	50.0	150.0
M6PFDA		**94.5**	50.0	150.0
M7PFUnDA		**104.7**	50.0	150.0
M8FOSA		**104.5**	50.0	150.0
M8PFOA		**102.8**	50.0	150.0
M8PFOS		**99.7**	50.0	150.0
M9-PFNA		**113.7**	50.0	150.0
MPFBA		**105.4**	50.0	150.0
MPFDoDA		**105.2**	50.0	150.0
d3N-MeFOSAA		**102.0**	50.0	150.0
d5EtFOSAA		**102.9**	50.0	150.0

Duplicate (DUP)

Lab Sample ID: AK191105.0883502D, Parent Sample ID: S08835.02

Run in Batch: AK191105, Run Date: 11/06/2019 00:44, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1.98

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA	*	**226.3**	50.0	150.0
M2-6:2FTSA	*	**151.0**	50.0	150.0
M2-8:2FTSA	*	**154.2**	50.0	150.0
M2PFTeDA		**168.1**	12.0	218.0
M3PFBS		**107.5**	50.0	150.0
M3PFHxS		**109.0**	50.0	150.0
M4PFHpA		**114.2**	50.0	150.0
M5PFHxA		**115.1**	50.0	150.0
M5PFPeA		**118.3**	50.0	150.0
M6PFDA		**134.0**	50.0	150.0
M7PFUnDA		**137.0**	50.0	150.0
M8FOSA		**109.7**	50.0	150.0
M8PFOA		**115.8**	50.0	150.0
M8PFOS		**114.9**	50.0	150.0
M9-PFNA		**124.0**	50.0	150.0
MPFBA		**122.6**	50.0	150.0
MPFDoDA	*	**153.0**	50.0	150.0
d3N-MeFOSAA	*	**181.5**	50.0	150.0
d5EtFOSAA	*	**192.2**	50.0	150.0

Organics - Volatiles, Prep Batch ID: PF191105W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Blank (BLK)

Lab Sample ID: AK191105.BLK191105X

Run in Batch: AK191105, Run Date: 11/05/2019 23:19, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
PFBA		ND	20.0	ng/l
PFPeA		ND	10.0	ng/l
4:2 FTSA		ND	10.0	ng/l
PFHxA		ND	10.0	ng/l
PFBS		ND	10.0	ng/l
HFPO-DA		ND	1	ng/l
PFHpA		ND	10.0	ng/l
PFPeS		ND	10.0	ng/l
ADONA		ND	1	ng/l
6:2 FTSA		ND	10.0	ng/l
PFOA		ND	10.0	ng/l
PFHxS-BR		ND	10.0	ng/l
PFHxS		ND	10.0	ng/l
PFHxS-LN		ND	10.0	ng/l
PFNA		ND	10.0	ng/l
PFHpS		ND	10.0	ng/l
8:2 FTSA		ND	10.0	ng/l
N-MeFOSAA		ND	10.0	ng/l
PFDA		ND	10.0	ng/l
PFOS-BR		ND	10.0	ng/l
PFOS		ND	10.0	ng/l
EtFOSAA		ND	10.0	ng/l
PFOS-LN		ND	10.0	ng/l
PFUnDA		ND	10.0	ng/l
9CL-PF3ONS		ND	1	ng/l
PFNS		ND	10.0	ng/l
PFDoDA		ND	10.0	ng/l
PFDS		ND	10.0	ng/l
PFTrDA		ND	10.0	ng/l
11CL-PF3OUdS		ND	1	ng/l
FOSA		ND	10.0	ng/l
PFTeDA		ND	10.0	ng/l

Laboratory Control Sample (LCS)

Lab Sample ID: AK191105.LCS191105

Run in Batch: AK191105, Run Date: 11/05/2019 22:37, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
PFBA		81.9	70.0	130.0
PFPeA		98.1	70.0	130.0
4:2 FTSA		99.0	70.0	130.0
PFHxA		108.0	70.0	130.0
PFBS		101.0	70.0	130.0
PFHpA		116.0	70.0	130.0
PFPeS		99.0	70.0	130.0
6:2 FTSA		113.0	70.0	130.0
PFOA		102.0	70.0	130.0

Organics - Volatiles, Prep Batch ID: PF191105W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: AK191105.LCS191105

Run in Batch: AK191105, Run Date: 11/05/2019 22:37, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
PFHxS		103.0	70.0	130.0
PFNA		106.0	70.0	130.0
PFHpS		107.0	70.0	130.0
8:2 FTSA		96.6	70.0	130.0
N-MeFOSAA		96.1	70.0	130.0
PFDA		104.0	70.0	130.0
PFOS		107.0	70.0	130.0
EtFOSAA	*	137.0	70.0	130.0
PFUnDA		100.0	70.0	130.0
PFNS		101.0	70.0	130.0
PFDoDA		107.0	70.0	130.0
PFDS		106.0	70.0	130.0
PFTrDA		119.0	70.0	130.0
FOSA		101.0	70.0	130.0
PFTeDA		108.0	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: AK191105.LCSD191105, Parent Sample ID: AK191105.LCS191105

Run in Batch: AK191105, Run Date: 11/05/2019 22:58, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
PFBA		96.8	70.0	130.0	16.7	30.0
PFPeA		97.4	70.0	130.0	0.7	30.0
4:2 FTSA		98.9	70.0	130.0	0.1	30.0
PFHxA		99.1	70.0	130.0	8.6	30.0
PFBS		96.1	70.0	130.0	5.0	30.0
PFHpA		105.0	70.0	130.0	10.0	30.0
PFPeS		102.0	70.0	130.0	3.0	30.0
6:2 FTSA		107.0	70.0	130.0	5.5	30.0
PFOA		101.0	70.0	130.0	1.0	30.0
PFHxS		101.0	70.0	130.0	2.0	30.0
PFNA		101.0	70.0	130.0	4.8	30.0
PFHpS		93.7	70.0	130.0	13.3	30.0
8:2 FTSA		94.0	70.0	130.0	2.7	30.0
N-MeFOSAA		90.9	70.0	130.0	5.6	30.0
PFDA		111.0	70.0	130.0	6.5	30.0
PFOS		99.1	70.0	130.0	7.7	30.0
EtFOSAA	*	98.6	70.0	130.0	32.6	30.0
PFUnDA		101.0	70.0	130.0	1.0	30.0
PFNS		94.8	70.0	130.0	6.3	30.0
PFDoDA		97.4	70.0	130.0	9.4	30.0
PFDS		97.1	70.0	130.0	8.8	30.0
PFTrDA		106.0	70.0	130.0	11.6	30.0
FOSA		109.0	70.0	130.0	7.6	30.0
PFTeDA		103.0	70.0	130.0	4.7	30.0

Organics - Volatiles, Prep Batch ID: PF191105W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Matrix Spike (MS)

Lab Sample ID: AK191105.0883501M, Parent Sample ID: S08835.01

Run in Batch: AK191105, Run Date: 11/06/2019 00:01, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1.96

Analyte	Flags	% Rec	LCL	UCL
PFBA		112.2	70.0	130.0
PFPeA		108.2	70.0	130.0
4:2 FTSA		102.0	70.0	130.0
PFHxA		104.1	70.0	130.0
PFBS		99.0	70.0	130.0
PFHpA		112.2	70.0	130.0
PFPeS		122.4	70.0	130.0
6:2 FTSA		112.2	70.0	130.0
PFOA		110.2	70.0	130.0
PFHxS		112.2	70.0	130.0
PFNA		102.0	70.0	130.0
PFHpS		102.0	70.0	130.0
8:2 FTSA		92.9	70.0	130.0
N-MeFOSAA		102.0	70.0	130.0
PFDA		122.4	70.0	130.0
PFOS		111.2	70.0	130.0
EtFOSAA		122.4	70.0	130.0
PFUnDA		112.2	70.0	130.0
PFNS		102.0	70.0	130.0
PFDoDA		112.2	70.0	130.0
PFDS		112.2	70.0	130.0
PFTrDA		102.0	70.0	130.0
FOSA		102.0	70.0	130.0
PFTeDA		112.2	70.0	130.0

Duplicate (DUP)

Lab Sample ID: AK191105.0883502D, Parent Sample ID: S08835.02

Run in Batch: AK191105, Run Date: 11/06/2019 00:44, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1.98

Analyte	Flags	RPD	RPD CL
PFBA		NC	30.0
PFPeA		NC	30.0
4:2 FTSA		NC	30.0
PFHxA		NC	30.0
PFBS		NC	30.0
PFHpA		NC	30.0
PFPeS		NC	30.0
6:2 FTSA		NC	30.0
PFOA		NC	30.0
PFHxS-BR		NC	30.0
PFHxS		NC	30.0
PFHxS-LN		NC	30.0
PFNA		NC	30.0
PFHpS		NC	30.0
8:2 FTSA		NC	30.0
N-MeFOSAA		NC	30.0
PFDA		NC	30.0

Organics - Volatiles, Prep Batch ID: PF191105W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Duplicate (DUP) (continued)

Lab Sample ID: AK191105.0883502D, Parent Sample ID: S08835.02

Run in Batch: AK191105, Run Date: 11/06/2019 00:44, Prep Date: 11/05/2019, Matrix: WW, Dilution: 1.98

Analyte	Flags	RPD	RPD CL
PFOS-BR		NC	30.0
PFOS		NC	30.0
EtFOSAA		NC	30.0
PFOS-LN		NC	30.0
PFUnDA		NC	30.0
PFNS		NC	30.0
PFDoDA		NC	30.0
PFDS		NC	30.0
PFTrDA		NC	30.0
FOSA		NC	30.0
PFTeDA		NC	30.0

Merit Laboratories, Inc.

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C.O.C. PAGE # 1 OF 1

116004

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Kellie Wing
COMPANY: Apex Companies
ADDRESS: 46555 Humboldt Drive Suite 103
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: (248) 764-3451 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: Kellie.wing@apexcos.com QUOTE NO.:

INVOICE TO

CONTACT NAME: Same ☐ SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 11019-000123.00
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Trevor Zalewski Trevor Mi 07979

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES

Project Locations
☒ Detroit ☐ New York
☐ Other

Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	AS TM Method
08840.01	10/29	9:17	Field Blank	GW	1								X
.02	10/29	9:25	Rinsate Blank		3								X
.03	10/29	11:20	MW-3		3								X
.04	10/29	13:00	MW-4		3								X
.05	10/29	12:47	MW-8		3								X
.06	10/29	12:19	MW-9		3								X
.07	10/29	12:20	Duplicate	↓	3								X

RELINQUISHED BY: SIGNATURE/ORGANIZATION: Trevor M Zalewski M Chilcote ☒ Sampler	DATE: 10/30/19	TIME:	
RECEIVED BY: SIGNATURE/ORGANIZATION: M Chilcote	DATE: 10/30/19	TIME: 1100	
RELINQUISHED BY: SIGNATURE/ORGANIZATION:	DATE:	TIME:	
RECEIVED BY: SIGNATURE/ORGANIZATION:	DATE:	TIME:	

RELINQUISHED BY: SIGNATURE/ORGANIZATION:	DATE:	TIME:	
RECEIVED BY: SIGNATURE/ORGANIZATION:	DATE:	TIME:	

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 5.7

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12