

DATA REPORT AND PROPOSED ADDITIONAL MONITORING

TO: Brandon Pursel, USEPA
Dave Favero, RACER TRUST
Grant Trigger, RACER TRUST

FROM: Mike Smith, Applied EcoSystems, Inc.

DATE: December 12, 2018

SUBJECT: RACER Flint West Industrial Land (#12990)
Summary of Groundwater Monitoring
and Insitu Pilot Test Follow-up Monitoring

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ATTACHMENTS:

- Attachment 1: Cross Section Diagrams
- Attachment 2: Groundwater Analytical Tables (All investigations conducted by RACER to-date)
- Attachment 3: Groundwater Analytical Laboratory Reports
- Attachment 4: Soil Analytical Tables (All investigations conducted by RACER to-date)
- Attachment 5: Graph of TCE Concentrations

1.0 INTRODUCTION

Applied EcoSystems, Inc. (Applied EcoSystems) completed well redevelopment of on-site wells, routine monitoring of on-site wells, sampling of off-site wells on the adjoining Genesee County Parks (GCP) property (as outlined in the January 2018 Data Report and a letter dated April 11, 2018 submitted to the United States Environmental Protection Agency (USEPA) and additional correspondence with the Michigan Department of Environmental Quality (MDEQ) and USEPA), and pilot test Hydrogen Release Compound (HRC) injections into boreholes on- and off-site (as outlined in the Work Plan HRC Pilot Test and Addendum) for the RACER Trust Flint West Industrial Land - #12990 Site.

A Site Location Map is included as Figure 1. The Site consists of approximately five acres of land located west of Stevens Street and north of Glenwood Avenue in Flint, Genesee County, Michigan. Almost the entire Site consists of concrete pavement, remaining after the demolition of a former manufacturing building. The Site is secured with a locked chain-link fence.

The Site is developed with a Consumers Energy electrical substation with an equipment shelter in the central portion and a utility conduit shed on the southeast corner. Per John Ebenhoeh with Consumers Energy, the small building on the southeast corner is a shelter for conduits that run under the road to the GM tool and die facility. This building is accessed approximately once per year for approximately two hours. The building in the fenced area is a support equipment shelter for the substation. The fenced area is accessed approximately once per month for approximately two hours, and the building itself is accessed less frequently and for shorter durations.

A Work Plan for HRC Pilot Test was submitted to USEPA and MDEQ. USEPA approved the plan on January 13, 2017, and MDEQ approved the plan with amendments on October 13, 2017.

Access to the former railroad parcel was obtained on May 10, 2018 from GCP, which now owns the former railroad property to the north.

2.0 MONITORING ACTIVITIES COMPLETED

Groundwater Monitoring

- All monitoring wells (except MW-108S, MW-109S, MW-110S, and MW-113S) were re-developed on May 16, 2018, using an electric submersible pump. Groundwater was pumped from each well until visually clear of sediment.
- All wells (except MW-108S, MW-109S, MW-110S, and MW-113S) were gauged. No NAPL was encountered.
- All wells (except MW-100S, MW-104S, MW-106SR, MW-108S, MW-109S, MW-110S, and MW-113S) were sampled on May 29, 2018. Samples were analyzed for volatile organic compounds (VOCs), and the following metals (total and dissolved): arsenic, chromium (total and hexavalent), copper, lead, selenium, and zinc. In addition, per- and polyfluoroalkyl substances (PFAS), including Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS), and 1,4-dioxane (8260 SIMS mode) analysis was conducted for groundwater samples collected from the following monitoring wells: MW-101S, MW-102S, MW-111S and MW-112S.
- All monitoring wells were sampled on August 30, 2018 or September 5, 2018. Samples were analyzed for VOCs, and the following metals (total and dissolved): arsenic, chromium (total and hexavalent), copper, lead, selenium, and zinc. In addition, PFAS, including PFOA and PFOS analysis was conducted for groundwater samples collected from all monitoring wells.

Analytical results of each sampling event are attached. A Soil Boring and Well Location Map is attached as Figure 2. A Groundwater Contour Map, prepared using the August 30, 2018 groundwater elevation data, is included as Figure 3 in Appendix A. Cross section diagrams, showing soil types, groundwater elevations, and soil and groundwater data, are included in Attachment 1. A groundwater analytical results summary table is included in Attachment 2 Table 1.

HRC Pilot Test

- On June 28, 2018, prior to HRC injection, groundwater samples were collected from MW-109S, MW-111S, MW-112S and MW-113S and submitted to Merit Laboratories to be analyzed for the following: VOCs, total organic carbon, metals (total and dissolved) including arsenic, chromium (total and hexavalent), manganese, copper, lead, selenium, zinc, iron and lead, and methane. Oxidation reduction potential (ORP), pH, dissolved oxygen, and conductivity were measured with a meter in the field during sampling.

- Injection of HRC associated with the pilot test was conducted on July 2 and 3, 2018 on the Site and the adjoining GCP property. A Geoprobe® direct-push track-mounted unit was used to complete the injection. An injection point was advanced into the subsurface at each boring location until bedrock was encountered at approximately 20 feet below grade. The injection point was then retracted while the HRC was injected into a five-foot interval, using a grout pump. A total of 1,200 pounds of HRC were injected in equal volumes in 24 injection points at pressures of 600 to 1,000 pounds per square inch (psi). Approximately five gallons of potable water was injected through the drill tooling before and after injection of the HRC. The HRC was also preheated to approximately 140° F prior to injection.
- Groundwater samples were collected from monitoring wells MW-109S, MW-111S, MW-112S, MW-113S, and MW-114S on August 8 and 14, 2018. Samples were analyzed for the following: VOCs, total organic carbon, metals (total and dissolved) including arsenic, chromium (total and hexavalent), manganese, copper, lead, selenium, zinc, iron and lead, and methane. Oxidation reduction potential, pH, dissolved oxygen, and conductivity were measured with a meter in the field during sampling.
- Groundwater samples were collected from monitoring wells MW-109S, MW-111S, MW-112S, MW-113S, and MW-114S on October 16 and 17, 2018. Samples were analyzed for the following: VOCs, total organic carbon, metals (total and dissolved) including arsenic, chromium (total and hexavalent), manganese, copper, lead, selenium, zinc, iron and lead, and methane. Oxidation reduction potential, pH, dissolved oxygen, and conductivity were measured with a meter in the field during sampling. Results are reported on Attachment 2, Table 2.

3.0 MONITORING RESULTS

Comparison of groundwater data to current (December 30, 2013/June 25, 2018) (the June 25, 2018 date represents the date of some revised criteria) Michigan Department of Environmental Quality (MDEQ) Generic Residential and Non-Residential Cleanup Criteria (GRCC) indicates the following:

Metals: Select metals were detected above drinking water and GSI criteria as shown in the table below. The metals concentrations are consistent with expected regional conditions, do not appear to represent a plume, and are believed to generally be naturally-occurring. Although MDEQ has published state-wide and regional “background” concentrations for soils, there are no such values published for groundwater. The concentrations are generally consistent with concentrations encountered by Applied EcoSystems at other uncontaminated sites in the Flint area. The 104 ug/L arsenic result for MW-112S is consistent with concentrations from previous monitoring events (108 ug/L in October/November 2016 and 82 ug/L in June 2017, 100ug/L in January 2018). Total metals results are generally lower than previous sampling events. The dissolved metals concentrations are considered to be more representative of site conditions for the purposes of this assessment.

Table 1.0 – Dissolved Metals Exceedances in Groundwater

Well ID	Metal	Drinking Water Criterion	GSI Criterion	Result
MW-103S	Dissolved Arsenic	10	10	19
MW-105S	Dissolved Selenium	50	5	8
MW-112S	Dissolved Arsenic	10	10	52

- All results are expressed in ug/L

VOCs: Exceedances were present as follows:

Table 2.0 – VOCs Exceedances in Groundwater

Well ID	VOC	Drinking Water Criterion	GSI Criterion	Result
MW-105S	Tetrachloroethane	5	60	40
MW-109S	Vinyl Chloride	2	13	42
MW-109S	Trichloroethene	5	200	17
MW-111S	Trichloroethene	5	200	12
MW-112S	Vinyl Chloride	2	13	5
MW-112S	Trichloroethene	5	200	7
MW-114S	Vinyl Chloride	2	13	9.5
MW-114S	cis-1,2-Dichloroethene	70	620	490
MW-114S	Trichloroethene	5	200	210

- All results are expressed in ug/L

Criteria in **red** indicate an exceedance for that pathway.

Various PFAS, including PFOA, and PFOS compounds were detected. The concentrations do not exceed the 70 ng/L combined drinking water cleanup criterion for PFOA and PFOS established by MDEQ on January 10, 2018, except in MW-103S at a combined concentration of 93.6 ng/L. Detected concentrations of PFOA did not exceed the MDEQ's October 21, 2016 Rule 57 (surface water quality) drinking water value of 12,000 ng/L for non-drinking water sources. Detected concentrations of PFOS ranged from 6 to 91 ng/L. The reported concentrations of PFOS in MW-100S, MW-101S, MW-103S, MW-107S, MW-109S, MW-111S, MW-113S, and MW-114S exceed MDEQ's October 21, 2016 Rule 57 surface water quality value of 12 ng/L for non-drinking water sources.

A table of all groundwater sample analytical results for all groundwater samples collected on behalf of RACER is included as Attachment 2. Sample analytical results for the May 2018 and August/September 2018 groundwater monitoring event are included as Attachment 3. Overall contaminant concentrations appear to indicate a trend of decreasing concentrations of contaminants. Figure 4 illustrates the GSI and drinking water exceedances in groundwater identified in groundwater samples collected from 2012 through 2018. Figure 6 includes data boxes for PFAS results.

The primary constituents of concern are trichloroethene and vinyl chloride, which appear to be exhibiting natural attenuation. Note that elevated tetrachloroethene levels have been consistently detected in one up gradient well, MW-105S since April 2012 and trichloroethene has also consistently been detected in the same well, likely as a degradation product of the tetrachloroethene. This well is hydrogeologically downgradient from a former print shop located south of the Site.

Figure 5 is a map showing a summary of drinking water and GSI exceedances in soil from 2012 through 2014. Tables, showing all soil analytical results for samples collected on behalf of RACER, are included as Attachment 4.

Sample analytical results compared to drinking water (DW) and GSI cleanup criteria are presented on Table 1 in Attachment 2.

Concentrations of TCE in select (downgradient from the HRC injection area) wells (MW-109S, MW-111S, MW-113S, and MW-114S) over time are presented on a graph included as Attachment 5.

While groundwater monitoring results have shown a general downward trend in concentrations of TCE Site-wide over time, TCE concentrations in MW-114S and MW-109S following the HRC injection dropped substantially following the HRC injection. This is likely due to the location of these two wells, which are expected to have been most affected by the HRC injection due to likely higher volumes of HRC reaching those wells in the short term. MW-113S exhibited minor fluctuations in TCE concentrations, likely due to the greater distance from the HRC injection locations. The limited variability of TCE concentrations in MW-111S is likely due to limited injection of HRC upgradient from this well relative to the other wells.

4.0 ADDITIONAL MONITORING

No additional monitoring was conducted during this period.

5.0 SCHEDULE:

Post-injection sampling/analysis, as outlined in the Work Plan and Work Plan Addendum, is scheduled to be conducted in January, 2019.

The January, 2019 sampling/analysis will include the following:

- Static groundwater measurements will be collected from all wells. A new groundwater contour map will be completed.
- Groundwater samples will be collected from monitoring wells MW-109S, MW-111S, MW-113S, and MW-114S and analyzed for the following: VOCs, total organic carbon, metals (total and dissolved) including arsenic, chromium (total and hexavalent), manganese, copper, lead, selenium, zinc, iron and lead, and methane. Oxidation reduction potential, pH, dissolved oxygen, and conductivity will be measured with a meter in the field during sampling.
- A groundwater sample will be collected from MW103S and analyzed for PFAS.
- Two soil borings will be conducted near SB-122/133, and two soil borings will be conducted near SB-123/131/132. Soil samples will be field-screened using a photoionization detector (PID). Two soil samples will be collected from each boring from the intervals that exhibited the highest concentrations of TCE during previous soil sampling (deep clay intervals overlying the bedrock formation). Samples will be analyzed for VOCs.

FIGURES

SITE LOCATION MAP

RACER Flint West

FIGURE

1

DATE

2014

SCALE

As Shown

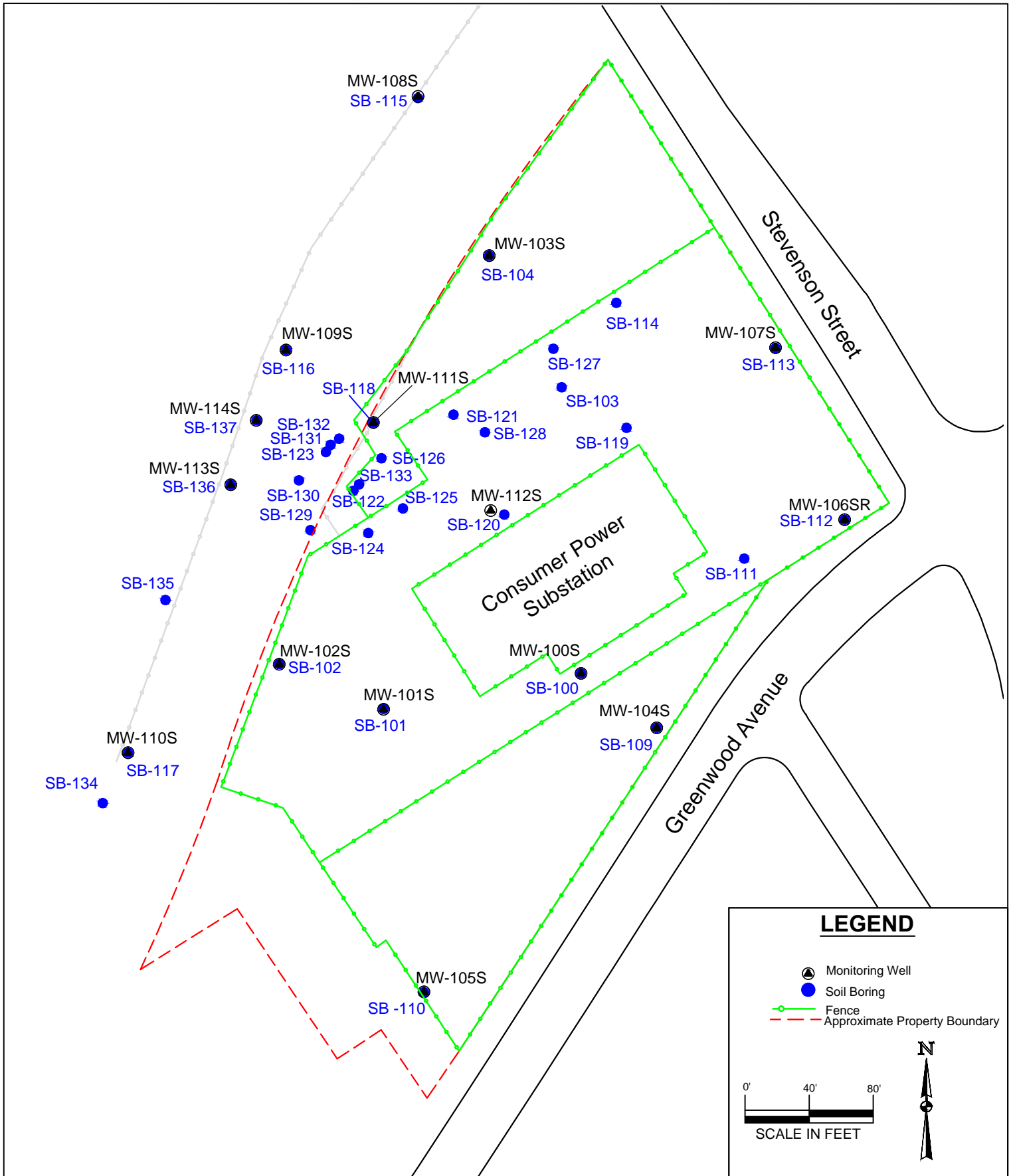
PROJECT No.

11-4317-102



Source: United States Geological Survey

Property outline is approximate.



Applied EcoSystems, Inc.

Environmental Management, Consulting & Field Services
 G-4300 South Saginaw Street, Burton, Michigan 48529
 Phone: 810.715.2525; Fax: 810.715.2526

Soil Boring and Well Location Map

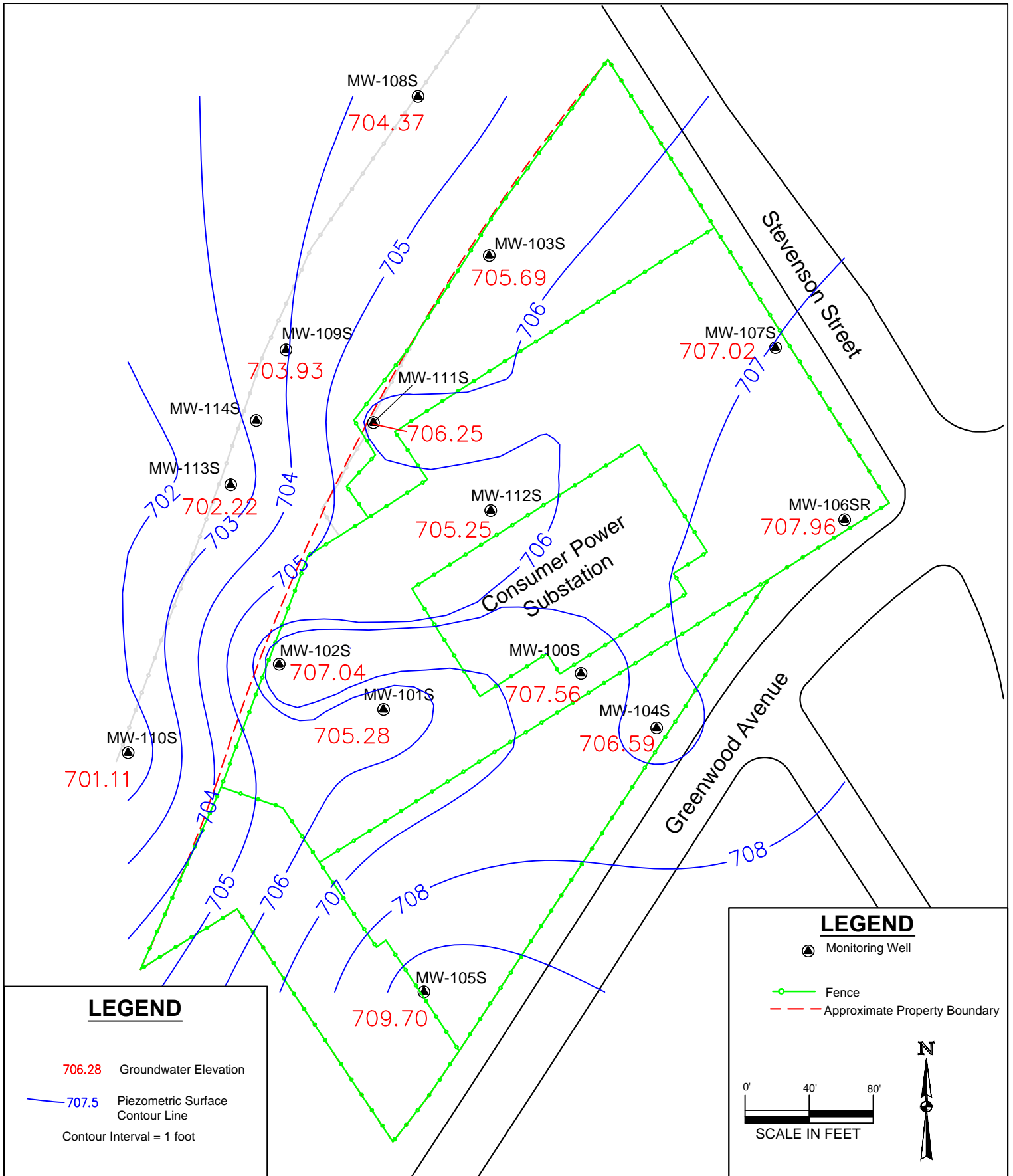
Racer Flint West -12990
 Flint West Industrial Land, Flint, Michigan

DATE:
 July 24, 2018

CHECKED BY:
 MDS

PROJECT:
 11-4317-102

FIGURE:
 2



Applied EcoSystems, Inc.

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Groundwater Contour Map
 (August 30, 2018)

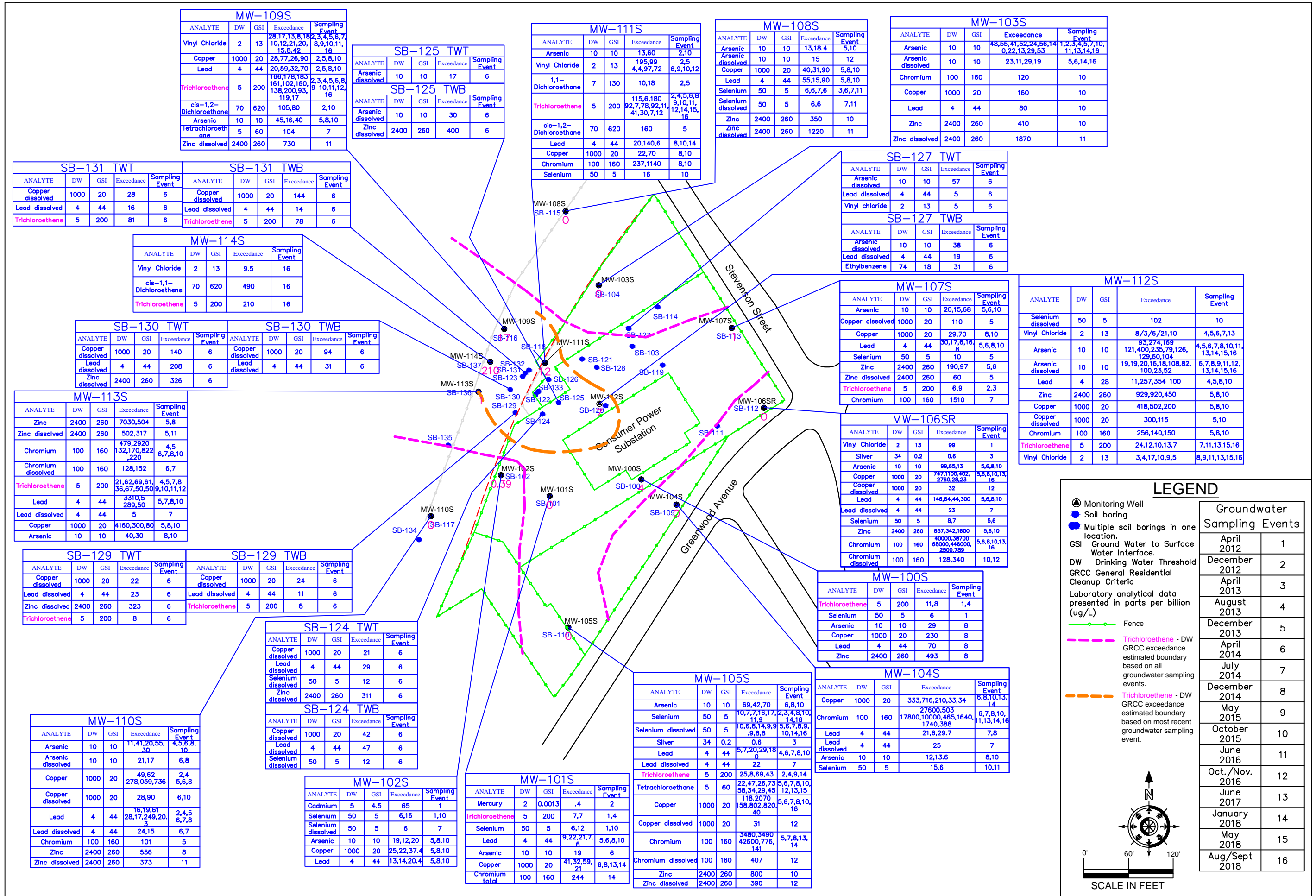
Racer Flint West -12990
 Flint West Industrial Land, Flint, Michigan

DATE:
 September 4, 2018

CHECKED BY:
 MDS

PROJECT:
 11-4317-102

FIGURE:
 3



CHECKED BY:	MDS
DATE:	August 15, 2018
PROJECT:	11-4317-102
FIGURE:	4

Summary of Drinking Water and Groundwater to Surface Water Interface Exceedances in Groundwater 2012 to 2018

Racer Flint West -12990
Flint West Industrial Land, Flint, Michigan

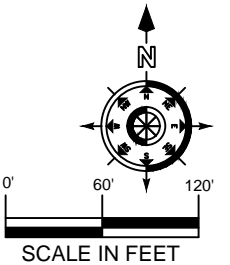
Applied EcoSystems, Inc.
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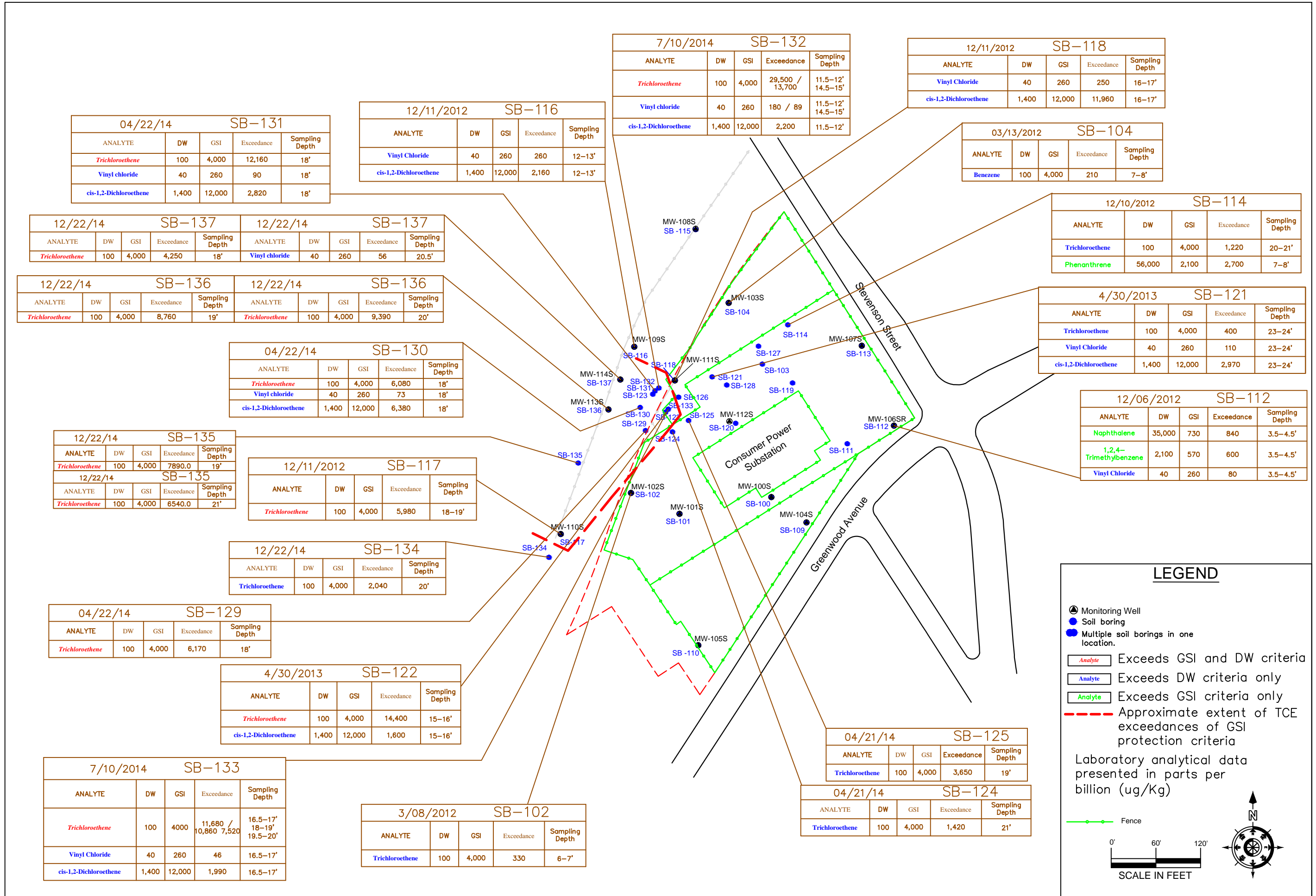


LEGEND

- Monitoring Well
- Soil boring
- Multiple soil borings in one location.
- GSI Ground Water to Surface Water Interface.
- DW Drinking Water Threshold GRCC General Residential Cleanup Criteria
- Laboratory analytical data presented in parts per billion (ug/L)
- Fence
- Trichloroethene - DW GRCC exceedance estimated boundary based on all groundwater sampling events.
- Trichloroethene - DW GRCC exceedance estimated boundary based on most recent groundwater sampling event.

Groundwater Sampling Events	
April 2012	1
December 2012	2
April 2013	3
August 2013	4
December 2013	5
April 2014	6
July 2014	7
December 2014	8
May 2015	9
October 2015	10
June 2016	11
Oct./Nov. 2016	12
June 2017	13
January 2018	14
May 2018	15
Aug/Sept 2018	16





04/22/14 SB-131				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	12,160	18'
Vinyl chloride	40	260	90	18'
cis-1,2-Dichloroethene	1,400	12,000	2,820	18'

12/11/2012 SB-116				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Vinyl Chloride	40	260	260	12-13'
cis-1,2-Dichloroethene	1,400	12,000	2,160	12-13'

7/10/2014 SB-132				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	29,500 / 13,700	11.5-12' / 14.5-15'
Vinyl chloride	40	260	180 / 89	11.5-12' / 14.5-15'
cis-1,2-Dichloroethene	1,400	12,000	2,200	11.5-12'

12/11/2012 SB-118				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Vinyl Chloride	40	260	250	16-17'
cis-1,2-Dichloroethene	1,400	12,000	11,960	16-17'

03/13/2012 SB-104				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Benzene	100	4,000	210	7-8'

12/10/2012 SB-114				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	1,220	20-21'
Phenanthrene	56,000	2,100	2,700	7-8'

4/30/2013 SB-121				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	400	23-24'
Vinyl Chloride	40	260	110	23-24'
cis-1,2-Dichloroethene	1,400	12,000	2,970	23-24'

12/06/2012 SB-112				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Naphthalene	35,000	730	840	3.5-4.5'
1,2,4-Trimethylbenzene	2,100	570	600	3.5-4.5'
Vinyl Chloride	40	260	80	3.5-4.5'

04/22/14 SB-130				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	6,080	18'
Vinyl chloride	40	260	73	18'
cis-1,2-Dichloroethene	1,400	12,000	6,380	18'

12/11/2012 SB-117				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	5,980	18-19'

12/22/14 SB-135				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	7890.0	19'

12/22/14 SB-135				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	6540.0	21'

12/22/14 SB-134				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	2,040	20'

04/22/14 SB-129				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	6,170	18'

4/30/2013 SB-122				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	14,400	15-16'
cis-1,2-Dichloroethene	1,400	12,000	1,600	15-16'

7/10/2014 SB-133				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4000	11,680 / 10,860 / 7,520	16.5-17' / 18-19' / 19.5-20'
Vinyl Chloride	40	260	46	16.5-17'
cis-1,2-Dichloroethene	1,400	12,000	1,990	16.5-17'

3/08/2012 SB-102				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	330	6-7'

04/21/14 SB-125				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	3,650	19'

04/21/14 SB-124				
ANALYTE	DW	GSI	Exceedance	Sampling Depth
Trichloroethene	100	4,000	1,420	21'

LEGEND

- Monitoring Well
- Soil boring
- Multiple soil borings in one location.
- Exceeds GSI and DW criteria
- Exceeds DW criteria only
- Exceeds GSI criteria only
- Approximate extent of TCE exceedances of GSI protection criteria

Laboratory analytical data presented in parts per billion (ug/Kg)

0' 60' 120'

SCALE IN FEET

CHECKED BY:	MDS
DATE:	July 23, 2018
PROJECT:	11-4317-102
FIGURE:	5

Summary of Drinking Water and GSI Exceedances in Soil
2012 - 2014

Racer Flint West -12990
Flint West Industrial Land, Flint, Michigan

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Environmental Management, Consulting & Field Services
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ANALYTE	DW	GSI	8/30/18
PFBS	NC	NC	5
PFHxS	NC	NC	2.6
PFHpS	NC	NC	<0.88
PFOS	CC	12	13
PFBA	NC	NC	7.1
PFPeA	NC	NC	<1.1
PFHxA	NC	NC	1
PFHpA	NC	NC	1.3
PFOA	CC	12,000	2.6
PFNA	NC	NC	<0.94
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	<1.2

ANALYTE	DW	GSI	9/5/18
PFBS	NC	NC	1.7
PFHxS	NC	NC	2.4
PFHpS	NC	NC	<0.88
PFOS	CC	12	26
PFBA	NC	NC	2.7
PFPeA	NC	NC	3.6
PFHxA	NC	NC	3.3
PFHpA	NC	NC	2.2
PFOA	CC	12,000	4.3
PFNA	NC	NC	1.3
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	1.9

ANALYTE	DW	GSI	9/5/18
PFBS	NC	NC	3.2
PFHxS	NC	NC	3.2
PFHpS	NC	NC	2.6
PFOS	CC	12	27
PFBA	NC	NC	2.9
PFPeA	NC	NC	<1.1
PFHxA	NC	NC	1.7
PFHpA	NC	NC	<1.2
PFOA	CC	12,000	2.6
PFNA	NC	NC	1.2
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	1.7

ANALYTE	DW	GSI	1/28/18	5/29/18	8/30/18
PFBS	NC	NC	<1.9	<0.9	2.4
PFHxS	NC	NC	1.9	1.6	3.8
PFHpS	NC	NC	<1.9	<0.88	<0.88
PFOS	CC	12	44	47	59
PFBA	NC	NC	4.8	<2.7	<2.7
PFPeA	NC	NC	<1.9	<1.1	1.3
PFHxA	NC	NC	2.6	<0.92	<0.92
PFHpA	NC	NC	<1.9	<1.2	<1.2
PFOA	CC	12,000	6.1	1.7	1.7
PFNA	NC	NC	<1.9	<0.94	<0.94
PFUnDA	NC	NC	<1.9	<0.31	<0.31
PFDoDA	NC	NC	<1.9	<0.46	<0.46
PFTDA	NC	NC	<1.9	0.78	<0.75
PFTeDA	NC	NC	<1.9	<1.2	<1.2

ANALYTE	DW	GSI	8/30/18
PFBS	NC	NC	1.7
PFHxS	NC	NC	2.9
PFHpS	NC	NC	<0.88
PFOS	CC	12	6
PFBA	NC	NC	<2.7
PFPeA	NC	NC	<1.1
PFHxA	NC	NC	<0.92
PFHpA	NC	NC	<1.2
PFOA	CC	12,000	0.58
PFNA	NC	NC	<0.94
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	<1.2

ANALYTE	DW	GSI	9/5/18
PFBS	NC	NC	2.2
PFHxS	NC	NC	<0.88
PFHpS	NC	NC	<0.88
PFOS	CC	12	31
PFBA	NC	NC	<2.7
PFPeA	NC	NC	<1.1
PFHxA	NC	NC	<0.92
PFHpA	NC	NC	<1.2
PFOA	CC	12,000	2.6
PFNA	NC	NC	1.1
PFDA	NC	NC	0.53
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	<1.2
N-EPSA	NC	NC	0.90

ANALYTE	DW	GSI	8/30/18
PFBS	NC	NC	<0.90
PFHxS	NC	NC	2.7
PFHpS	NC	NC	<0.88
PFOS	CC	12	18
PFBA	NC	NC	<2.7
PFPeA	NC	NC	<1.1
PFHxA	NC	NC	<0.92
PFHpA	NC	NC	<1.2
PFOA	CC	12,000	2.1
PFNA	NC	NC	<0.94
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	<1.2

ANALYTE	DW	GSI	1/28/18	5/29/18	8/30/18
PFBS	NC	NC	<2	1.3	2
PFHxS	NC	NC	<2	2	6.1
PFHpS	NC	NC	<2	0.81	2.4
PFOS	CC	12	7	12	11
PFBA	NC	NC	4.8	<2.7	3.2
PFPeA	NC	NC	2.3	1.2	1.4
PFHxA	NC	NC	2.5	1.8	4.1
PFHpA	NC	NC	<2	1.7	2
PFOA	CC	12,000	4.1	4.2	6.1
PFNA	NC	NC	<2	1	<0.94
PFUnDA	NC	NC	<2	<0.31	<0.31
PFDoDA	NC	NC	<2	<0.46	<0.46
PFTDA	NC	NC	<2	<0.75	<0.75
PFTeDA	NC	NC	<2	<1.2	<1.2

ANALYTE	DW	GSI	1/28/18	5/29/18	9/5/18
PFBS	NC	NC	8.1	<0.9	1.4
PFHxS	NC	NC	<1.9	<0.94	<0.94
PFHpS	NC	NC	<1.9	<0.88	<0.88
PFOS	CC	12	16	27	10
PFBA	NC	NC	180	41	48
PFPeA	NC	NC	<1.9	1.7	<1.1
PFHxA	NC	NC	<1.9	<0.92	<0.92
PFHpA	NC	NC	<1.9	<1.2	<1.2
PFOA	CC	12,000	4.2	2.5	2.2
PFNA	NC	NC	<1.9	1.8	<0.94
PFUnDA	NC	NC	<1.9	0.61	<0.31
PFDoDA	NC	NC	<1.9	<0.46	<0.46
PFTDA	NC	NC	<1.9	0.85	<0.75
PFTeDA	NC	NC	<1.9	<1.2	<1.2

ANALYTE	DW	GSI	8/30/18
PFBS	NC	NC	3.6
PFHxS	NC	NC	4.3
PFHpS	NC	NC	<0.88
PFOS	CC	12	8.5
PFBA	NC	NC	6.7
PFPeA	NC	NC	3
PFHxA	NC	NC	4.8
PFHpA	NC	NC	3.7
PFOA	CC	12,000	11
PFNA	NC	NC	<0.94
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	<1.2

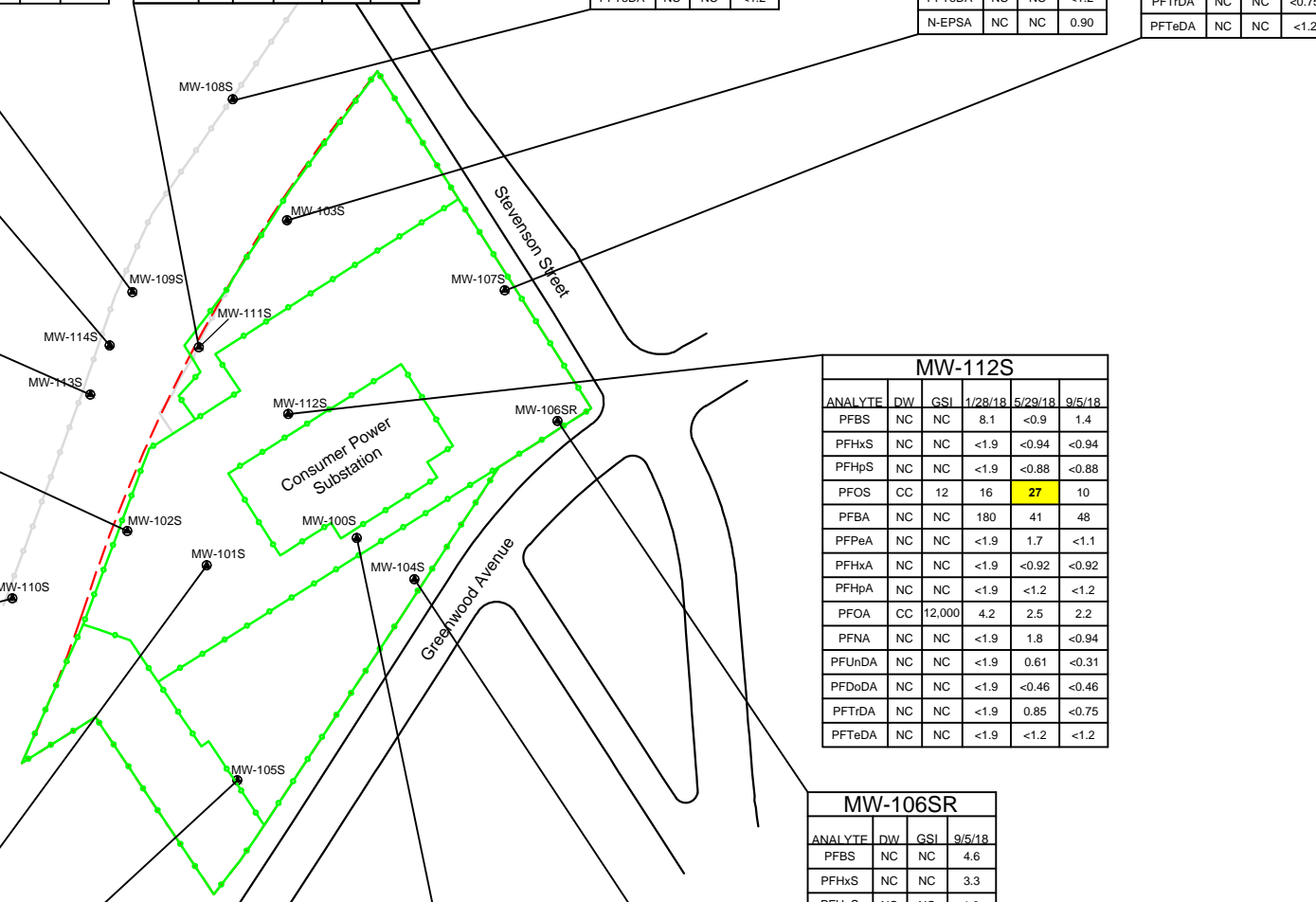
ANALYTE	DW	GSI	1/28/18	5/29/18	9/5/18
PFBS	NC	NC	<1.9	<0.9	1.4
PFHxS	NC	NC	<1.9	1.4	1.9
PFHpS	NC	NC	<1.9	<0.88	1.2
PFOS	CC	12	35	12	33
PFBA	NC	NC	3.1	<2.7	3.8
PFPeA	NC	NC	<1.9	<1.1	1.2
PFHxA	NC	NC	<1.9	<0.92	1.5
PFHpA	NC	NC	<1.9	<1.2	<1.2
PFOA	CC	12,000	4.4	2	4.5
PFNA	NC	NC	<1.9	1.1	1.2
PFUnDA	NC	NC	<1.9	<0.31	<0.31
PFDoDA	NC	NC	<1.9	0.51	<0.46
PFTDA	NC	NC	<1.9	0.82	<0.75
PFTeDA	NC	NC	<1.9	1.4	<1.2

ANALYTE	DW	GSI	9/5/18
PFBS	NC	NC	1.8
PFHxS	NC	NC	12
PFHpS	NC	NC	2.5
PFOS	CC	12	<1
PFBA	NC	NC	3.2
PFPeA	NC	NC	<1.1
PFHxA	NC	NC	1.6
PFHpA	NC	NC	<1.2
PFOA	CC	12,000	4.5
PFNA	NC	NC	<0.94
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	<1.2

ANALYTE	DW	GSI	9/5/18
PFBS	NC	NC	2.5
PFHxS	NC	NC	4
PFHpS	NC	NC	1.4
PFOS	CC	12	20
PFBA	NC	NC	<2.7
PFPeA	NC	NC	<1.1
PFHxA	NC	NC	1
PFHpA	NC	NC	<1.2
PFOA	CC	12,000	2
PFNA	NC	NC	<0.94
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	<1.2

ANALYTE	DW	GSI	9/5/18
PFBS	NC	NC	1.3
PFHxS	NC	NC	2.1
PFHpS	NC	NC	<0.88
PFOS	CC	12	<1
PFBA	NC	NC	<2.7
PFPeA	NC	NC	<1.1
PFHxA	NC	NC	1.2
PFHpA	NC	NC	<1.2
PFOA	CC	12,000	0.79
PFNA	NC	NC	<0.94
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	1.6

ANALYTE	DW	GSI	9/5/18
PFBS	NC	NC	4.6
PFHxS	NC	NC	3.3
PFHpS	NC	NC	1.3
PFOS	CC	12	7.3
PFBA	NC	NC	5.9
PFPeA	NC	NC	1.1
PFHxA	NC	NC	2
PFHpA	NC	NC	2
PFOA	CC	12,000	12
PFNA	NC	NC	<0.94
PFDA	NC	NC	0.58
PFUnDA	NC	NC	<0.31
PFDoDA	NC	NC	<0.46
PFTDA	NC	NC	<0.75
PFTeDA	NC	NC	2.8
N-EPSA	NC	NC	<0.83



LEGEND

● Monitoring Well
 DW = Drinking Water Threshold.
 GSI = Ground Water to Surface Water Interface based on Rule 57.
 NC = Insufficient data to develop criterion/no criterion.
 CC = Combined PFOA and PFOS concentrations compared to 0.070 ppb (70 ppt) for the drinking water pathway.

☐ = Compound exceeds GSI criteria
 ☐ = Compound exceeds GSI and DW criteria (CC).

Concentrations presented in parts per trillion (ng/L).
 Only detected constituents listed.

PFA Constituents

Perfluorobutane sulfonic acid	(PFBS)
Perfluorohexane sulfonic acid	(PFHxS)
Perfluoroheptane sulfonic acid	(PFHpS)
Perfluorooctane sulfonic acid	(PFOS)
Perfluorobutanoic acid	(PFBA)
Perfluoropentanoic acid	(PFPeA)
Perfluorohexanoic acid	(PFHxA)
Perfluoroheptanoic acid	(PFHpA)
Perfluorooctanoic acid	(PFOA)
Perfluorononanoic acid	(PFNA)
Perfluorodecanoic acid	(PFDA)
Perfluoroundecanoic acid	(PFUnDA)
Perfluorododecanoic acid	(PFDoDA)
Perfluorotridecanoic acid	(PFTDA)
Perfluorotetradecanoic acid	(PFTeDA)
N-Ethyl perfluorooctane sulfonamidoacetic acid	(N-EPSA)

--- Fence

0' 75' 150'
 SCALE IN FEET

CHECKED BY:	MDS
DATE:	November 15, 2018
PROJECT:	11-4317-102
FIGURE:	6

PFOS-PFAS Groundwater Analytical Map

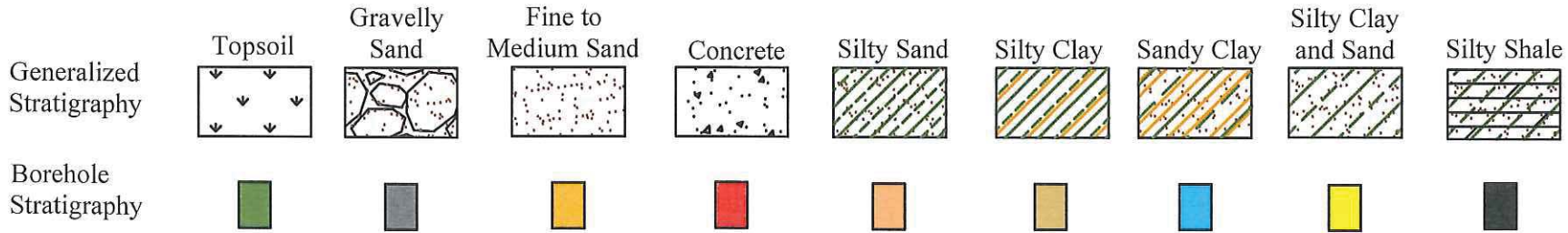
 Racer Flint West -12990
 Flint West Industrial Land, Flint, Michigan

Applied EcoSystems, Inc.
 Environmental Management, Consulting & Field Services
 G-4300 South Saginaw Street, Burton, Michigan 48529
 Phone: 810.715.2525; Fax: 810.715.2526

ATTACHMENTS

ATTACHMENT #1: CROSS SECTION DIAGRAMS

Cross Section Diagram Key



DW Residential Drinking Water
Generic Cleanup Criteria

Monitoring Wells Installed by
AE

GSI Groundwater Surface Water
Interface Generic Cleanup Criteria
GSI criteria calculation based on
257ppm total hardness in the Flint
River

Soil and Groundwater analytical results are expressed as defined below;

Well
Screen



Dissolved arsenic exceedance
above DW and GSI GRCCs

Dissolved copper exceedance
above GSI GRCCs

Dissolved lead exceedance
above DW GRCCs

Dissolved chromium exceedance
above DW GRCCs

Dissolved zinc exceedance
above GSI GRCCs

Dissolved selenium exceedance
above GSI GRCCs

TCE exceedance
above DW GRCCs

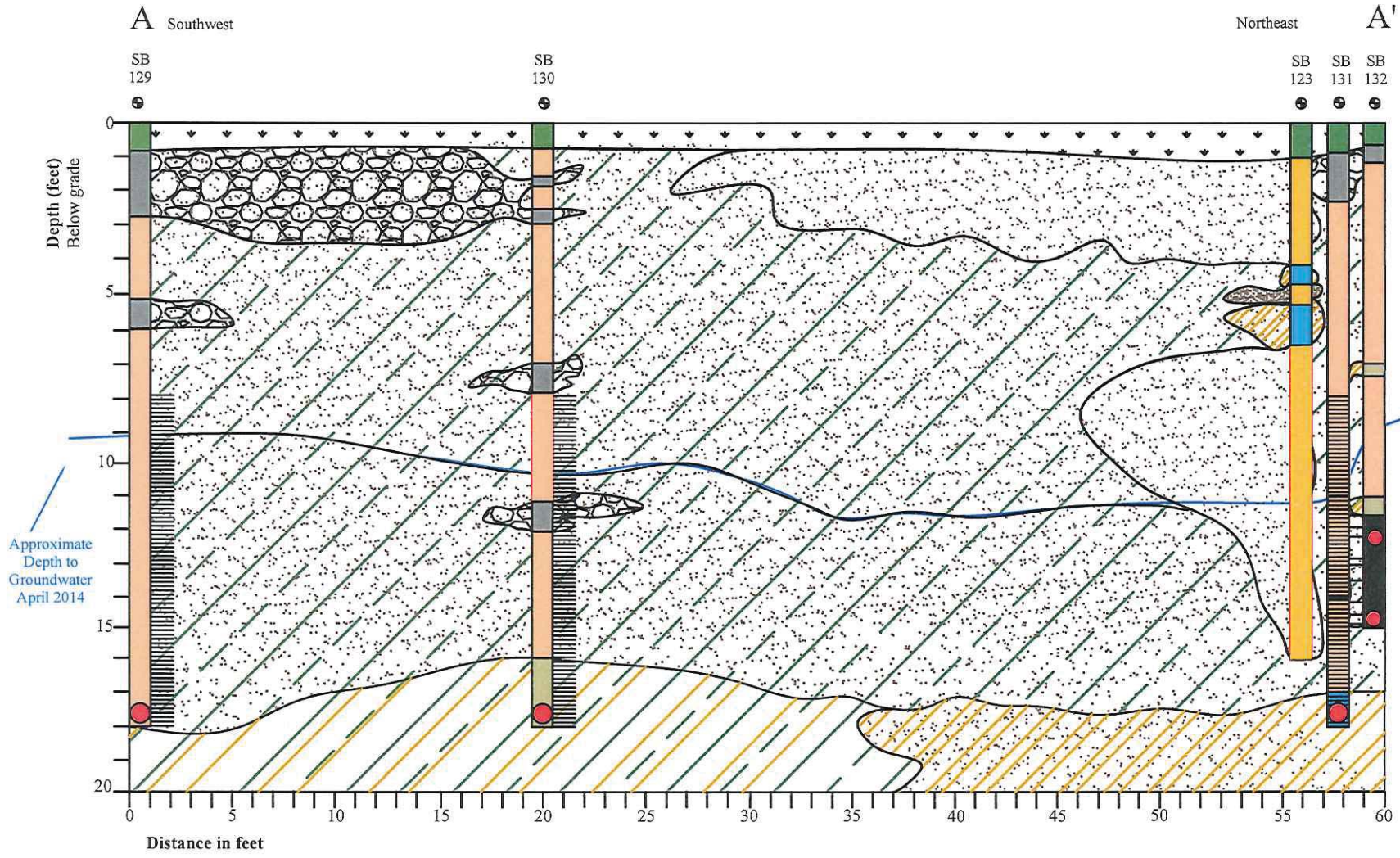
TCE exceedance
above DW and GSI GRCCs

Dissolved selenium
exceedance above DW and
GSI GRCCs

SCALE:	None
DATE:	2016
PROJECT:	11-4317-102
Attachment:	1

Cross Section Diagram Key
Racer Flint West - 12990
Flint West Industrial Land, Flint, MI

Applied EcoSystems, Inc.
Environmental Management, Consulting & Field Services
G-4300 South Saginaw Street, Burton, Michigan 48529
Phone: 810.715.2525; Fax: 810.715.2526

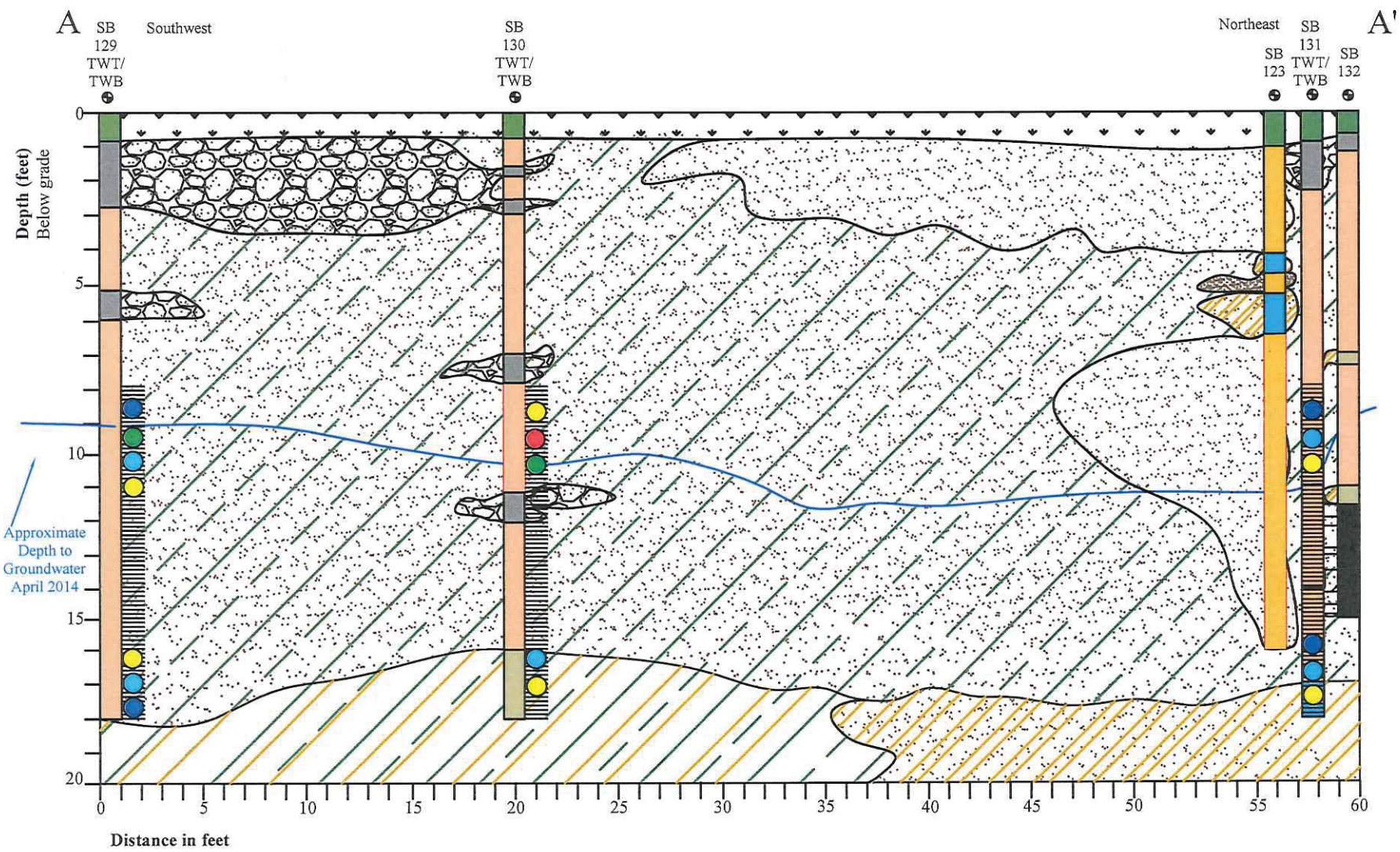


Cross Section Diagram A - A'
TCE Exceedances in Soil
 Racer Flint West - 12990
 Flint West Industrial Land, Flint, MI

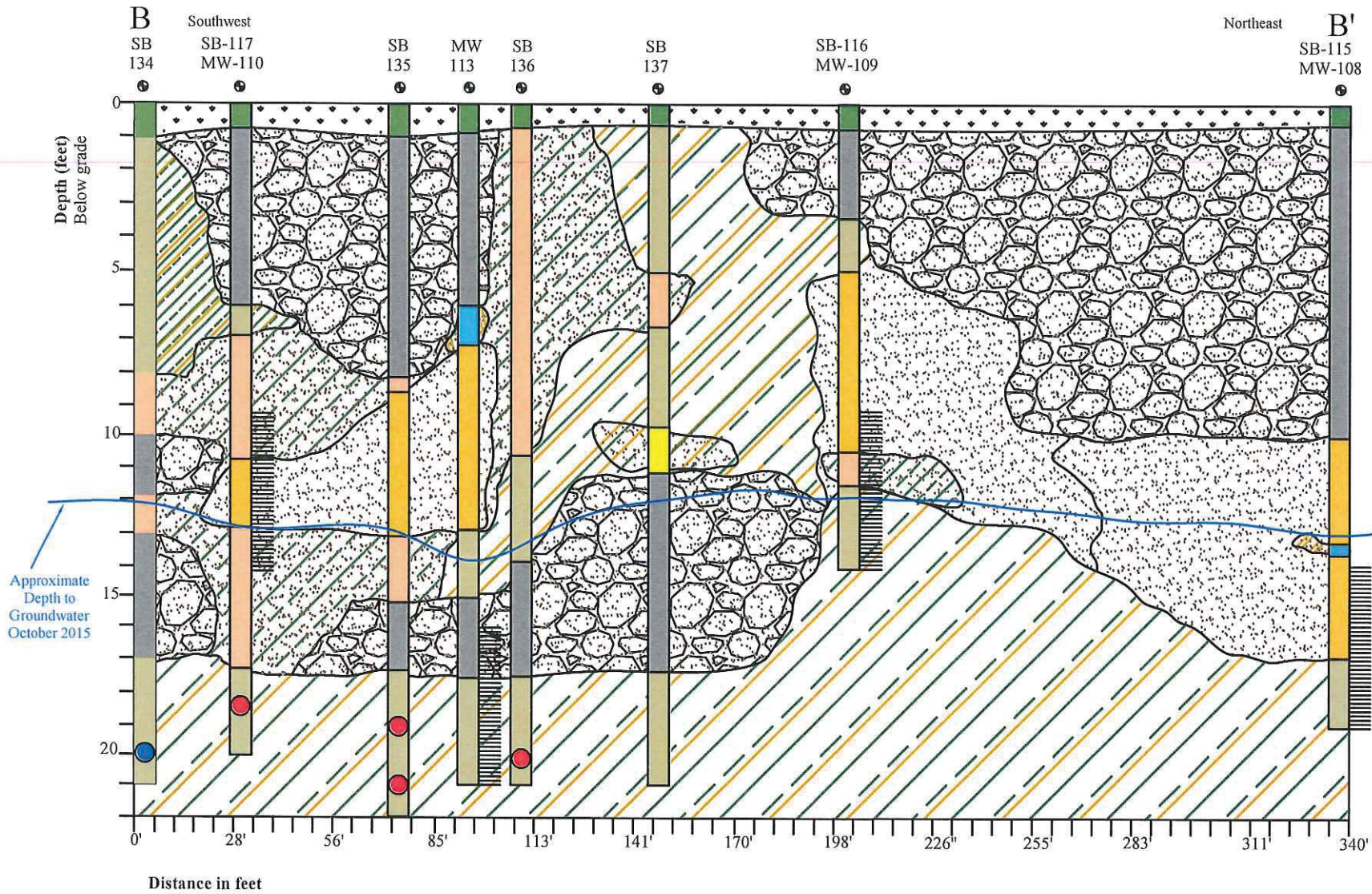
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DATE:	2016
PROJECT:	11-4317-102
Attachment:	1A (1)

Applied EcoSystems, Inc.
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 G-4300 South Saginaw Street, Burton, Michigan 48529
 Phone: 810.715.2525; Fax: 810.715.2526

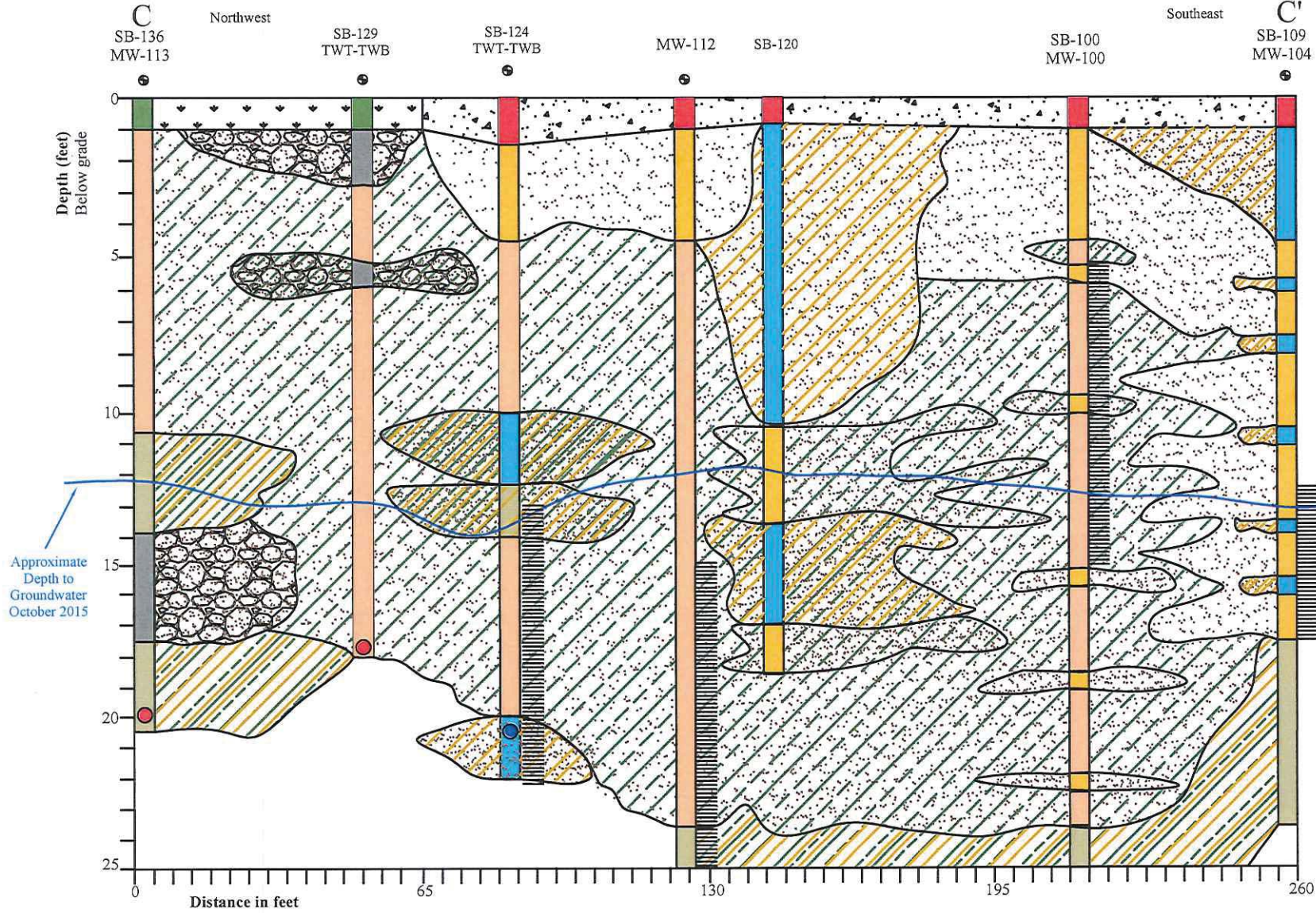




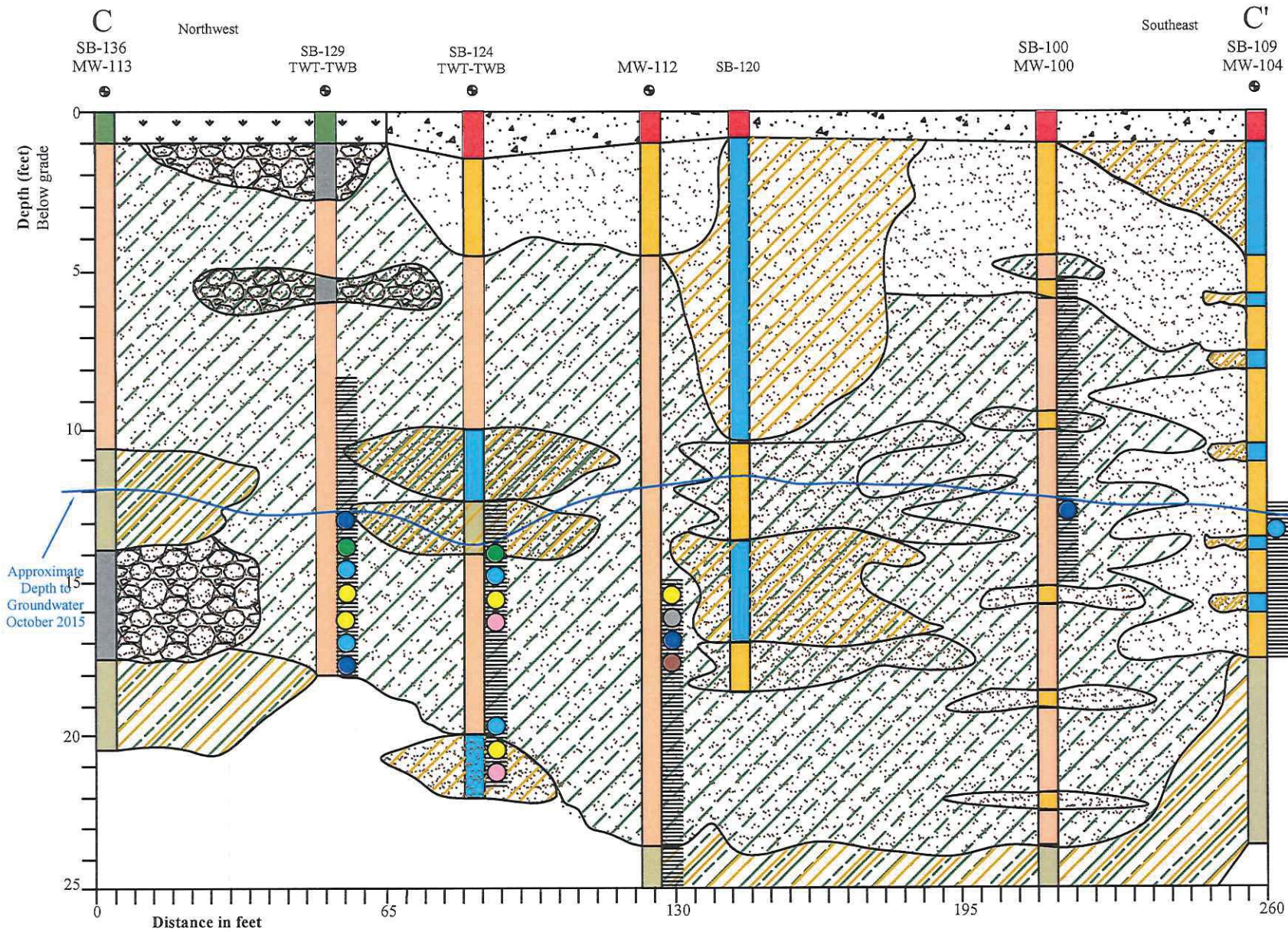
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DATE:	2015
PROJECT:	11-4317-102
Cross Section Diagram A - A'	
Dissolved Metals and TCE	
Exceedances in Groundwater	
Racer Flint West - 12990	
Flint West Industrial Land, Flint, MI	
Applied EcoSystems, Inc.	
Environmental Management, Consulting & Field Services	
G-4300 South Saginaw Street, Burton, Michigan 48529	
Phone: 810.715.2525; Fax: 810.715.2526	



SCALE:	As Noted
DATE:	2015
PROJECT:	11-4317-102
ATTACHMENT:	1B (1)
Cross Section Diagram B - B' TCE Exceedances in Soil Racer Flint West - 12990 Flint West Industrial Land, Flint, MI	
Applied EcoSystems, Inc. Environmental Management, Consulting & Field Services G-4300 South Saginaw Street, Burton, Michigan 48529 Phone: 810.715.2525; Fax: 810.715.2526	



SCALE:	As Noted
DATE:	2016
PROJECT:	11-4317-102
Attachment:	IC (1)
Cross Section Diagram C - C' TCE Exceedances in Soil Racer Flint West - 12990 Flint West Industrial Land, Flint, MI	
Applied EcoSystems, Inc. Environmental Management, Consulting & Field Services G-4300 South Saginaw Street, Burton, Michigan 48529 Phone: 810.715.2525; Fax: 810.715.2526	



SCALE:	As Noted
DATE:	2016
PROJECT:	11-4317-102
Attachment:	1C (2)
Cross Section Diagram C - C'	
Dissolved Metals and TCE Exceedances in Groundwater	
Racer Flint West - 12990	
Flint West Industrial Land, Flint, MI	
Applied EcoSystems, Inc.	
Environmental Management, Consulting & Field Services	
G-4300 South Saginaw Street, Burton, Michigan 48529	
Phone: 810.715.2525; Fax: 810.715.2526	

ATTACHMENT #2: GROUNDWATER ANALYTICAL TABLES

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105SR	MW-106S	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	SB124-TWT	SB125-TWT	SB127-TWT	SB129-TWT	SB130-TWT	SB131-TWT	SB124-TWB	SB125-TWB	SB127-TWB	SB129-TWB	SB130-TWB	SB131-TWB	Dup1	Dup2	Dup3
ANALYTE (ug/L)	DW	GSI																											
Arsenic (dissolved)	10.00	10.00			11.00		4.00				21.00		19.00			17.00	57.00	4.00	3.00	2.00	3.00	30.00	38.00						
Chromium (dissolved)	100.00	160.00	G	35.00		22.00	18.00				7.00	12.00		128.00	13.00			147.00	64.00	25.00	16.00		17.00	89.00	19.00	33.00	14.00		
Copper (dissolved)	1,000.00	20.00	G								28.00				21.00		5.00	22.00	140.00	28.00	42.00	12.00	24.00	94.00	144.00				
Lead (dissolved)	4.00	28.00	G								24.00				29.00		5.00	23.00	208.00	16.00	47.00	1.00	19.00	11.00	31.00	14.00			
Selenium (dissolved)	50.00	5.00				6.00	5.00		5.00						12.00				4.00		12.00				5.00	3.00			
Zinc (dissolved)	2,400.00	26.00	G		97.00	23.00	5.00	62.00	5.00	16.00	18.00	81.00	21.00	9.00	24.00	311.00	167.00	82.00	323.00	326.00	103.00	241.00	400.00	166.00	68.00	241.00	191.00	12.00	

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105SR	MW-106S	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	SB124-TWT	SB125-TWT	SB127-TWT	SB129-TWT	SB130-TWT	SB131-TWT	SB124-TWB	SB125-TWB	SB127-TWB	SB129-TWB	SB130-TWB	SB131-TWB	Dup1	Dup2	Dup3		
ANALYTE (ug/L)	DW	GSI																													
Acetone	730	1,700		1.13	2.36		0.88	1.82	3.58	3.82		1.22	2.11	0.72	5.17	0.93		9.1	5.7						10.3	66	25.8	5.9		5.8	1.06
Methyl iodide	NC	NC																					0.86	0.4							
Carbon disulfide	800	NC																					11.6	8.6							
2-Butanone (MEK)	13,000	2,200		0.73	0.86		0.41	0.83	0.78	0.94				2.98																	
Chloromethane	260	NC																			0.33			0.61							
Vinyl Chloride	2.0	13									0.64		18	4	6	0.45										2				4	
Chloroethane	430	1,100											0.6	1.13																	
Trichlorofluoromethane	2,600	NA																													
1,1-Dichloroethene	7.0	130										4	1	0.40																1	
Methylene Chloride	5.0	1,500																													
trans-1,2-Dichloroethene	100	1,500											0.92	0.24	0.23															0.28	0.26
1,1-Dichloroethane	880	740								0.21			3.00	2	0.69	2.00				3.00									2.00	2.00	
cis-1,2-Dichloroethene	70	620								3			59	46	2	26											0.36	0.93	3.00	21.00	43.00
Tetrahydrofuran	95	11,000																													
Chloroform	80	350				3.00				0.35	0.35	0.29																	0.41	0.29	
1,1,1-Trichloroethane	200	89								0.48	0.75										0.042							0.71	0.73		
4-Methyl-2-pentanone (M)	1800	1000000000												0.67				0.390				0.590	2.190								
2-Hexanone	1000	1000000000																0.750			0.210	2.170	4.570								
Carbon tetrachloride	5.0	45												2																	
Benzene	5.0	200								0.25																					
Bromodichloromethane	80.0	NC					0.89																								
Trichloroethene	5.0	200		3	2																										
Toluene	790	270											0.35	0.63																	
Tetrachloroethene	5.0	60										47																			
Chlorobenzene	100	25																													
Styrene	100	80																													
Ethylbenzene	74	18																													
Total Xylenes	280	41																													
1,2-Dichlorobenzene	600	13																													
1,2,4-Trimethylbenzene	63	17																													
1,2,3-Trimethylbenzene	NC	NC								0.07	0.07																				
Naphthalene	520	11																													
2-Methylnaphthalene	260	19																													

NOTES:

- X Blank cells indicate no detectable concentrations
- X Exceeds residential and non-residential DW criteria
- X Exceeds GSI criteria
- X Exceeds both DW and GSI criteria
- X Compound also found in associated method blank, suggesting a laboratory artifact.
- NC Insufficient data to develop criterion/no criterion
- G Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105SR	MW-106S	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Dup1	Dup2	Dup3
Date Collected	6/25/14	6/25/14	6/25/14	6/26/14	6/25/14	6/26/14	6/25/14	6/25/14	6/26/14	6/26/14	6/26/14	6/26/14	6/25/14	6/26/14			
ANALYTE (ug/L)	DW	GSI															
Arsenic (dissolved)	10.00	10.00											19				
Chromium (dissolved)	100.00	160.00	G		51									152			
Copper (dissolved)	1,000.00	20.00	G											4			
Lead (dissolved)	4.00	28.00	G				25	22	23			15		5			
Selenium (dissolved)	50.00	5.00			66		8			6							
Zinc (dissolved)	2,400.00	26.00	G	5	11		10			5	7		8	13			

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105SR	MW-106S	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Dup1	Dup2	Dup3
Date Collected	6/25/14	6/25/14	6/25/14	6/26/14	6/25/14	6/26/14	6/25/14	6/25/14	6/26/14	6/26/14	6/26/14	6/26/14	6/25/14	6/26/14			
ANALYTE (ug/L)	DW	GSI															
Acetone	730	1,700	1.74	1.45	2.04	2.67	1.55	1.86	1.59	2.82	1.32	1.47	1.29	1.48	4.93	1.32	
Methyl iodide	NC	NC															
Carbon disulfide	800	NC												0.42	0.36		
2 Butanone (MEK)	13,000	2,200							0.4	0.65	0.29		0.29	1.99			
Chloromethane	260	NC	0.32				0.34									0.29	
Vinyl Chloride	2.0	13									10			21	2		
Chloroethane	430	1,100												2.9			
trichlorofluoromethane	2,600	NA															
1,1-Dichloroethene	7.0	130										4		2.00	0.39		
Methylene Chloride	5.0	1,500															
trans-1,2-Dichloroethene	100	1,500										0.7		0.64	0.24		
1,1-Dichloroethane	880	740												1.00	3.00		
cis-1,2-Dichloroethene	70	620	0.62											7	59		
Tetrahydrofuran	95	11,000												70.0			
Chloroform	80	350					5.00		0.22			0.5	0.37		0.320		
1,1,1-Trichloroethane	200	89											0.50		1.00		
4-Methyl-2-pentanone (M)	1800	1000000000												0.83			
2-Hexanone	1000	1000000000												1.46			
Carbontetrachloride	5.0	45									2						
Benzene	5.0	200															
Bromodichloromethane	80.0	NC					0.82										
Trichloroethene	5.0	200	5	1	3			26		2		104	2	24	69		
Toluene	790	270															
Tetrachloroethene	5.0	60															
Chlorobenzene	100	25															
Styrene	100	80															
Ethylbenzene	74	18															
Total Xylenes	280	41															
1,2 -Dichlorobenzene	600	13															
1,2,4-Trimethylbenzene	63	17															
1,2,3-Trimethylbenzene	NC	NC															
Naphthalene	520	11															
2-Methylnaphthalene	260	19															

NOTES:

	Blank cells indicate no detectable concentrations
X	Exceeds residential and non-residential DW criteria
X	Exceeds GSI criteria G
X	Exceeds both DW and GSI criteria
X	Compound also found in associated method blank, suggesting a laboratory artifact.
NC	Insufficient data to develop criterion/no criterion
G	Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

ANALYTE (ug/L)	Sample ID		MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Dup1	Dup2	
	Date Collected		12/22/14	12/22/14	11/18/14	12/22/14	11/18/14	11/18/14	11/18/14	11/18/14	11/20/14	11/20/14	11/18/14	11/20/14	11/18/14	11/20/14	11/18/14	11/20/14	
Arsenic (dissolved)	10.00	10.00	na																
Arsenic	10.00	10.00	29	4	12	na	12	42	13	2	5	16	55	9	400	40	11.00	5.00	
Cadmium (dissolved)	5.00	4.50	GX	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Cadmium	5.00	4.50	GX	6.90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Chromium (dissolved)	100.00	1,600.00	G	na	na	7	na	9	6	15			7	7				10	
Chromium	100.00	1,600.00	GX	na	na	62	na	17,800	42,600	68,000	14	19	16	69	237	140	822	14,000	11
Copper (dissolved)	1,000.00	20.00	G	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Copper	1,000.00	20.00	GX	230	32	22	na	716	802	402	29	31	26	736	22	502	300	583	21
Lead (dissolved)	4.00	44.00	G	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Lead	4.00	44.00	GX	70	21	14	na	6	29	44	6	15	32	249	20	354	289	5	23
Selenium (dissolved)	50.00	5.00		na			na	14	5										
Selenium	50.00	5.00					na	16	5									6	
Zinc (dissolved)	2,400.00	260.00	G	na	66		na	28		15	9	13	11	25	34	9	23	36	43
Zinc	2,400.00	260.00	GX	493	74	33	na	29	52	210	27	222	47	556	36	920	504	23	75

ANALYTE (ug/L)	Sample ID		MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Dup1	Dup2
	Date Collected		12/22/14	12/22/14	11/18/14	12/22/14	11/18/14	11/18/14	11/18/14	11/18/14	11/20/14	11/20/14	11/18/14	11/20/14	11/18/14	11/20/14	11/18/14	11/20/14
Acetone	730	1,700	1.83	2.77		na									42			
Methyl iodide	NC	NC				na												
Carbon disulfide	800	NC	0.29			na	0.70											
2 Butanone (MEK)	13,000	2,200	0.55			na									24			
Chloromethane	260	NC				na	0.27	0.35		0.33		0.53	0.58	0.88		0.48	0.58	
Vinyl Chloride	2.0	13				na				0.58		12			3			
Chloroethane	430	1,100				na									0.88			
trichlorofluoromethane	2,600	NA				na												
1,1-Dichloroethene	7.0	130				na						5						
Methylene Chloride	5.0	1,500				na												
trans-1,2-Dichloroethene	100	1,500				na						0.9						
1,1-Dichloroethane	880	740				na			0.71			1		0.76	0.47			
cis-1,2-Dichloroethene	70	620	1			na			2	0.57	45		1	3	9			0.56
Tetrahydrofuran	95	11,000				na												
Chloroform	80	350				na	3				2	0.18					3	2
1,1,1-Trichloroethane	200	89				na						0.37				0.29		
4-Methyl-2-pentanone (MIBK)	1800	1000000000				na									3.88			
2-Hexanone	1000	1000000000				na									12			
Carbontetrachloride	5.0	45				na					2							2
Benzene	5.0	200				na							0.12		0.29			
Bromodichloromethane	80.0	NC				na	0.54											
Trichloroethene	5.0	200	2	4	0.36	na				5		160		7	61		0.46	
Toluene	790	270				na							0.22		0.51		0.3	
Tetrachloroethene	5.0	60		0.23		na		73				0.2			0.20			
Chlorobenzene	100	25				na												
Styrene	100	80				na												
Ethylbenzene	74	18				na												
Total Xylenes	280	41				na									0.17			
1,2-Dichlorobenzene	600	13				na												
1,2,4-Trimethylbenzene	63	17				na												
1,2,3-Trimethylbenzene	NC	NC				na												
Naphthalene	520	11				na												
2-Methylnaphthalene	260	19				na												

NOTES:

	Blank cells indicate no detectable concentrations
X	Exceeds DW criteria
X	Exceeds GSI criteria
X	Exceeds both DW and GSI criteria
X	Compound also found in associated method blank, suggesting a laboratory artifact.
NC	Insufficient data to develop criterion/no criterion
G	Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River
na	Sample not analyzed for this constituent

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

ANALYTE (mg/L)	Sample ID		MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105SR	MW-106S	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Dup1	Dup2	Dup3
	Date Collected		DRY	4/28/15	4/28/15	4/30/15	4/28/15	4/28/15	4/28/15	4/28/15	4/30/15	4/30/15	4/30/15	4/30/15	4/28/15	4/30/15	4/28/15	4/30/15	
	DW	GSI																	
Arsenic (dissolved)	10	10				6									16				6
Arsenic	10	10		4		23			5				2	6	277	6			20
Chromium (dissolved)	100	160	G		22		5	8									10		
Chromium	100	160	G	17	24		1590	829	58300				29	9	73	16			
Copper (dissolved)	1000	20	G																
Copper	1000	20	G	31	9		40	13	306					14	12				
Lead (dissolved)	4	44	G																
Lead	4	44	G	24					26					9	11				
Selenium (dissolved)	50	5						9											
Selenium	50	5						9											
Zinc (dissolved)	2400	260	G	9			8		120		6		9	39	22	11			
Zinc	2400	260	G	9			8		133		6		9	39	22	11			

ANALYTE (mg/L)	Sample ID		MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105SR	MW-106S	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Dup1	Dup2	Dup3
	Date Collected		DRY	4/28/15	4/28/15	4/30/15	4/28/15	4/28/15	4/28/15	4/28/15	4/30/15	4/30/15	4/30/15	4/30/15	4/28/15	4/30/15	4/28/15	4/30/15	
	DW	GSI																	
Acetone	730	1,700													10				
Methyl iodide	NC	NC																	
Carbon disulfide	800	NC							0.17						0.16				
2 Butanone (MEK)	13,000	2,200													6.6				
Chloromethane	260	NC		4	6	2	6	5	5	4	4	4	5	5	4	2			3
Vinyl Chloride	2.0	13								0.6		21	4	4	4	2			
Chloroethane	430	1,100				0.7									5				0.77
trichlorofluoromethane	2,600	NA																	
1,1-Dichloroethene	7.0	130										4		0.88					
Methylene Chloride	5.0	1,500																	
trans-1,2-Dichloroethene	100	1,500										1		0.99		0.26			
1,1-Dichloroethane	880	740								0.56		2		2	0.52	3			
cis-1,2-Dichloroethene	70	620								2		51		48	0.66	19			
Tetrahydrofuran	95	11,000																	
Chloroform	80	350					1		0.7		1	0.28		0.29	0.21	0.19			
1,1,1-Trichloroethane	200	89										0.51		0.36					
2-Hexanone	1000	1E+09													3				
Benzene	5.0	200		0.26		0.23													0.25
Trichloroethene	5.0	200		2	0.51					2		138		78	0.62	36			
Tetrachloroethene	5.0	60						69											
Chlorobenzene	100	25																	0.17
Styrene	100	80				0.15													0.21
Ethylbenzene	?	?																	
Total Xylenes	280	41																	
1,2 -Dichlorobenzene	?	?																	
1,2,4-Trimethylbenzene	63	17																	
1,2,3-Trimethylbenzene	NC	NC																	
Naphthalene	520	11																	
2-Methylnaphthalene	260	19																	

NOTES:

	Blank cells indicate no detectable concentrations
X	Exceeds DW criteria
X	Exceeds GSI criteria G
X	Exceeds both DW and GSI criteria
X	Compound also found in associated method blank, suggesting a laboratory artifact.
NC	Insufficient data to develop criterion/no criterion
G	Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

	Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Trip Blank	Field Blank
	Date Collected	DRY	10/26/15	10/26/15	10/27/15	10/26/15	10/26/15	10/26/15	10/26/15	10/27/15	10/27/15	10/27/15	10/27/15	10/26/15	10/27/15	10/26/15	10/26/15
ANALYTE (ug/L)	DW	GSI															
Arsenic (dissolved)	10	10	DRY			4						3.31	0.51	4	1.09		
Arsenic	10	10	DRY	4.3	20	140	13.6	70	53	68	18.4	40	30	60	235	30	
Chromium (dissolved)	100	160	G	DRY	2.39	7.1	0.51		23	128	0.67	0.5	0.66	4.35	0.57	0.76	
Chromium	100	160	G	DRY	49.1	90	120	10,000	16.2	446,000	29.5	70	70	16.4	1,140	150	220
Copper (dissolved)	1000	20	G	DRY				1.04	1.89	1.5	4.88	2.28	7.11	12	2.85	115	3.13
Copper	1000	20	G	DRY	14.42	37.44	160	210	820	2,760	70	90	90	90	70	200	80
Lead (dissolved)	4	44	G	DRY				1.57		1.11						1.27	
Lead	4	44	G	DRY	7.61	20.45	80	29.78	180	300	16.86	90	70	20.3	40	100	50
Selenium (dissolved)	50	5	DRY		1.3			1.9	9.9	4.6	2.2	1.4	2	1.2		102	
Selenium	50	5	DRY	12	16			15	17					16			
Zinc (dissolved)	2400	260	G	DRY	35	111	12	42	24	22	17	16	15	19	34	101	84
Zinc	2400	260	G	DRY	40.3	100	410	160	800	1,600	110	350	230	70	140	450	170
	Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Trip Blank	Field Blank
	Date Collected	DRY	10/26/15	10/26/15	10/27/15	10/26/15	10/26/15	10/26/15	10/26/15	10/27/15	10/27/15	10/27/15	10/27/15	10/26/15	10/27/15	10/26/15	10/26/15
ANALYTE (ug/L)	DW	GSI															
Acetone	730	1,700	DRY														
Methyl iodide	NC	NC	DRY														
Carbon disulfide	800	NC	DRY														
2 Butanone (MEK)	13,000	2,200	DRY			1.74										0.82	0.79
Chloromethane	260	NC	DRY														
Vinyl Chloride	2.0	13	DRY									20		97			
Chloroethane	430	1,100	DRY														
trichlorofluoromethane	2,600	NA	DRY														
1,1-Dichloroethene	7.0	130	DRY								5.3		4	0.76			
Methylene Chloride	5.0	1,500	DRY														
trans-1,2-Dichloroethene	100	1,500	DRY										1		0.27		
1,1-Dichloroethane	880	740	DRY										2		1		
cis-1,2-Dichloroethene	70	620	DRY						0.42	0.66	80		42	1	23		
Tetrahydrofuran	95	11,000	DRY														
Chloroform	80	350	DRY				2			3							
1,1,1-Trichloroethane	200	89	DRY										0.33		0.45		
4-Methyl-2-pentanone (MIBK)	1800	1E+09	DRY											1.09			
2-Hexanone	1000	1E+09	DRY											1.64			
Carbontetrachloride	5.0	45	DRY							3							
Benzene	5.0	200	DRY			0.21		0.26	0.22					0.2			
Bromodichloromethane	80.0	NC	DRY				0.65										
Trichloroethene	5.0	200	DRY	3	0.68		0.68			2	0.33	200		92		67	
Toluene	790	270	DRY					0.58	0.4	0.31				0.37			
Tetrachloroethene	5.0	60	DRY					58									
Chlorobenzene	100	25	DRY														
Styrene	100	80	DRY														
Ethylbenzene	74	18	DRY														
Total Xylenes	280	41	DRY														
1,2 -Dichlorobenzene	600	13	DRY														
1,2,4-Trimethylbenzene	63	17	DRY														
1,2,3-Trimethylbenzene	NC	NC	DRY														
Naphthalene	520	11	DRY														
2-Methylnaphthalene	260	19	DRY														

NOTES:

	Blank cells indicate no detectable concentrations
X	Exceeds DW criteria
X	Exceeds GSI criteria
X	Exceeds both DW and GSI criteria
X	Compound also found in associated method blank, suggesting a laboratory artifact.
NC	Insufficient data to develop criterion/no criterion
G	Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

		MW-112 MW-113 MW-120																							
Sample ID		MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Trip Blank	Field Blank	Trip Blank	Field Blank	Dup1	Trip Blank	Field Blank	Dup2	Dup3	
Date Collected		5/11/16	5/11/16	NS	6/8/16	6/1/16	NS	5/11/16	5/11/16	6/1/16	6/1/16	6/1/16	6/8/16	5/11/16	6/1/16	5/11/16	5/11/16	6/1/16	6/1/16	6/1/16	6/8/16	6/8/16	6/8/16	6/8/16	
ANALYTE (ug/L)	DW	GSI																							
Arsenic (dissolved)	10	10			NS	6	1.65	NS			0.65	1.21	0.55	18	2.08										
Arsenic	10	10		3	NS	22	1.62	NS	3		0.96	5	3	1	79	9									
Chromium (dissolved)	100	160	G		NS	1.16	1.19	NS			1.42	1.17	1.77	3.33	1.73										
Chromium (total)	100	160	G	5	13	NS	1	465	NS	77	3	1.91	3.38	1.3	4	4.86									
Chromium VI (dissolved)	100	160			NS			NS																	
Chromium VI (total)	100	160		NA	NA	NS	NA	NS	NA			NA		NA	NA										
Copper (dissolved)	1000	20	G		NS	2.02	0.51	NS			2.32	6	1.49	1.25	0.73										
Copper	1000	20	G	4	7	NS	0.77	16	NS	7	3	1.95	8	0.74	1.38										
Lead (dissolved)	4	44	G		NS	0.278	0.764	NS			0.187	0.325	0.32	0.094	1	0.155									
Lead	4	44	G	2	3	NS	0.105	0.554	NS	2		0.785	2.6	0.5											
Selenium (dissolved)	50	5			NS			NS			6														
Selenium	50	5			NS		6	NS																	
Zinc (dissolved)	2400	260	G	21		NS	1870	18	NS			1220	730	373	49	5	317								
Zinc	2400	260	G	11	22	NS	2.46	1.48	NS	12	7	6	10		2.95	7									
Sample ID		MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Trip Blank	Field Blank	Trip Blank	Field Blank	Dup2	Trip Blank	Field Blank	Dup3	Dup3	
Date Collected		5/11/16	5/11/16	NS	6/8/16	6/1/16	NS	5/11/16	5/11/16	6/1/16	6/1/16	6/1/16	6/8/16	5/11/16	6/1/16	5/11/16	5/11/16	6/1/16	6/1/16	6/1/16	6/8/16	6/8/16	6/8/16	6/8/16	
ANALYTE (ug/L)	DW	GSI																							
Acetone	730	1,700	2.72	1.62	NS			NS	2.72	2.1		0.6	0.67		4.21			1.98		0.69					
Methyl iodide	NC	NC			NS			NS																	
Carbon disulfide	800	NC			NS			NS																	
2 Butanone (MEK)	13,000	2,200			NS			NS						1.36				0.37							
Chloromethane	260	NC			NS			NS																	
Vinyl Chloride	2.0	13			NS			NS			15			17											
Chloroethane	430	1,100			NS			NS						2.59											
Trichlorofluoromethane	2,600	NA			NS			NS																	
1,1-Dichloroethene	7.0	130			NS			NS			3														
Methylene Chloride	5.0	1,500			NS			NS																	
trans-1,2-Dichloroethene	100	1,500			NS			NS			0.59			0.36											
1,1-Dichloroethane	880	740			NS			NS			1			1	3										
cis-1,2-Dichloroethene	70	620	0.34		NS			NS						3	30										
Tetrahydrofuran	95	11,000			NS			NS																	
Chloroform	80	350			NS		3	NS			1							0.490	3.000						
1,1,1-Trichloroethane	200	89			NS			NS			0.31				0.3										
4-Methyl-2-pentanone (MIBK)	1800	ID			NS			NS						0.3											
2-Hexanone	1000	ID			NS			NS						0.47											
Carbon tetrachloride	5.0	45			NS			NS		2															
Benzene	5.0	200			NS			NS																	
Bromodichloromethane	80.0	NC			NS		0.74	NS												0.710					
Trichloroethene	5.0	200	4	2	NS			NS	4	0.26	93		11	12	50										
Toluene	790	270			NS			NS																	
Tetrachloroethene	5.0	60			NS			NS																	
Chlorobenzene	100	25			NS			NS																	
Styrene	100	80			NS			NS																	
Ethylbenzene	74	18			NS			NS																	
Total Xylenes	280	41			NS			NS																	
1,2-Dichlorobenzene	600	13			NS			NS																	
1,2,4-Trimethylbenzene	63	17			NS			NS																	
1,2,3-Trimethylbenzene	NC	NC			NS			NS																	
Naphthalene	520	11			NS			NS																	
2-Methylnaphthalene	260	19			NS			NS																	
Diethyl ether	10 (E)	ID			NS			NS																	
tert-Methyl butyl ether (MTBE)	40 (E)	7,100 (X)			NS			NS																	
Acrylonitrile	2.6	2.0 (M); 1.2			NS			NS																	
Dichlorodifluoromethane	1,700	ID			NS			NS																	
Bromomethane	10	35			NS			NS																	
1,2-Dichloroethane	5.0 (A)	360 (X)			NS			NS																	
Trichloroethene	5.0 (A)	200 (X)			NS			NS																	
1,2-Dichloropropane	5.0 (A)	230 (X)			NS			NS																	
cis-1,3-Dichloropropene	NC	NC			NS			NS																	
trans-1,3-Dichloropropene	NC	NC			NS			NS																	
1,1,2-Trichloroethane	5.0 (A)	330 (X)			NS			NS																	
trans-1,4-Dichloro-2-butene	NC	NC			NS			NS																	
Dibromochloromethane	80 (A,W)	ID			NS			NS																	
1,2-Dibromoethane	NC	NC			NS			NS																	
1,1,1,2-Tetrachloroethane	77	ID			NS			NS																	
Isopropylbenzene	800	28			NS			NS																	
Bromoform	80 (A,W)	ID			NS			NS																	
1,1,2,2-Tetrachloroethane	8.5	78 (X)			NS			NS																	
1,2,3-Trichloropropane	42	NA			NS			NS																	
n-Propylbenzene	80	ID			NS			NS																	
Bromobenzene	18	NA			NS			NS																	
1,3,5-Trimethylbenzene	72 (E)	45			NS			NS																	
tert-Butylbenzene	80	ID			NS			NS																	
1,2,4-Trimethylbenzene	63 (E)	17			NS			NS																	
1,2,3-Trichlorobenzene	NC	NC			NS			NS																	

NOTES:

	Blank cells indicate no detectable concentrations
X	Exceeds DW criteria
X	Exceeds GSI criteria
X	Exceeds both DW and GSI criteria
X	Compound also found in associated method blank, suggesting a laboratory artifact.
NC	Insufficient data to develop criterion/no criterion
G	Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River
NS	No Sample
1	Filtered in lab
2	Filtered and preserved in lab
NA	Not analyzed due to turbidity

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

ANALYTE (ug/L)	Sample ID	Date Collected	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S		Dup		Dup
			10/27/16	10/27/16	11/1/16	10/31/16	11/1/16	11/1/16	11/1/16	10/27/16	10/27/16	10/31/16	10/31/16	10/31/16	10/31/16	10/27/16	10/31/16	10/31/16		10/27/16
Arsenic (dissolved)	10	10			1.63			1.23		0.79	15			6	108	4		34		
Arsenic	10	10	1.69	0.7	4			6	0.93	1.05	52	1.26		11	265	17		259		2
Chromium (dissolved)	100	160	G 0.95	20	6		24	407	340	0.18	0.56		0.41	2.41	2.86		0.59			0.64
Chromium (total)	100	160	G 10	63	8	0.059	146	6540	619	19	1.31	0.62	6	2	9	22		6		1.38
Chromium VI (dissolved)	100	160											14							
Chromium VI (total)	100	160																		
Copper (dissolved)	1000	20	G 0.91	4.31	2.20	0.99	2.22	31	32	1.25		6		6	6			3		0.86
Copper	1000	20	G 5	18	1.41	1.1	4.16	203	64	2.46		6	1.85	6	10	2.94		6		1.63
Lead (dissolved)	4	44	G 0.144	0.148	0.97	0.116		0.85	0.451			0.151	0.075	0.978	1.651			0.191		0.361
Lead	4	44	G 2.32	0.895	1.33	0.306		3.00	0.632	0.35	0.161	0.479	0.523	1.3	5	2.855		3.000		0.928
Selenium (dissolved)	50	5																		
Selenium	50	5																		
Zinc (dissolved)	2400	260	G 20.6	2.28	5	4.19		390	2.89	10	2.36	3.46		8	16	2.05		10		6
Zinc	2400	260	G 12	5	6	2.35		1380	2	11		3.59	2.3	7	32	9		21		6

ANALYTE (ug/L)	Sample ID	Date Collected	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Trip Blank	Field Blank	Dup	Trip Blank	Field Blank	Dup
			10/27/16	10/27/16	11/1/16	10/31/16	11/1/16	11/1/16	11/1/16	10/27/16	10/27/16	10/31/16	10/31/16	10/31/16	10/31/16	10/27/16	10/31/16	10/27/16	10/27/16	10/27/16	10/31/16	10/31/16
Acetone	730	1,700													10							
Methyl iodide	NC	NC																				
Carbon disulfide	800	NC																				
2 Butanone (MEK)	13,000	2,200																				
Chloromethano	260	NC																				
Vinyl Chloride	2.0	13									8		72	2							2	
Chloroethane	430	1,100													3						3	
Trichlorofluoromethane	2,600	NA																				
1,1-Dichloroethene	7.0	130										3		4								
Methylene Chloride	5.0	1,500																				
trans-1,2-Dichloroetheno	100	1,500																				
1,1-Dichloroethane	880	740										2		2								
cis-1,2-Dichloroethene	70	620								2		32		10	2	11					2	
Tetrahydrofuran	95	11,000																				
Chloroform	80	350				1					3											2
1,1,1-Trichloroethane	200	89																				
4-Methyl-2-pentanone (MIBK)	1800	ID																				
2-Hexanone	1000	ID																				
Carbontetrachloride	5.0	45									2											1
Benzene	5.0	200																				
Bromodichloromethane	80.0	NC																				
Trichloroethene	5.0	200	3	2						3		119		41	3	50			2			
Toluene	790	270																				
Tetrachloroethene	5.0	60						34														
Chlorobenzene	100	25																				
Styrene	100	80																				
Ethylbenzene	74	18																				
Total Xylenes	280	41																				
1,2-Dichlorobenzene	600	13																				
1,2,4-Trimethylbenzene	63	17																				
1,2,3-Trimethylbenzene	NC	NC																				
Naphthalene	520	11																				
2-Methylnaphthalene	260	19																				
Diethyl ether	10 (E)	ID																				
tert-Methyl butyl ether (MTBE)	40 (E)	7,100 (X)																				
Acrylonitrile	2.6	2.0 (M); 1.2																				
Dichlorodifluoromethane	1,700	ID																				
Bromomethane	10	35																				
1,2-Dichloroethane	5.0 (A)	360 (X)																				
Trichloroethene	5.0 (A)	200 (X)																				
1,2-Dichloropropane	5.0 (A)	230 (X)																				
cis-1,3-Dichloropropene	NC	NC																				
trans-1,3-Dichloropropene	NC	NC																				
1,1,2-Trichloroethane	5.0 (A)	330 (X)																				
trans-1,4-Dichloro-2-butene	NC	NC																				
Dibromochloromethane	80 (A,W)	ID																				
1,2-Dibromoethane	NC	NC																				
1,1,1,2-Tetrachloroethane	77	ID																				
Isopropylbenzene	800	28																				
Bromoform	80 (A,W)	ID																				
1,1,1,2,2-Tetrachloroethane	8.5	78 (X)																				
1,2,3-Trichloropropane	42	NA																				
n-Propylbenzene	80	ID																				
Bromobenzene	18	NA																				
1,3,5-Trimethylbenzene	72 (E)	45																				
tert-Butylbenzene	80	ID																				
1,2,4-Trimethylbenzene	63 (E)	17																				
1,2,3-Trichlorobenzene	NC	NC																				

NOTES:

	Blank cells indicate no detectable concentrations
X	Exceeds DW criteria
X	Exceeds GSI criteria
X	Exceeds both DW and GSI criteria
NC	Insufficient data to develop criterion/no criterion
G	Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River
NS	No Sample
1	Filtered in lab
2	Filtered and preserved in lab
NA	Not analyzed due to turbidity

Detected Concentrations for compounds also found in the method blank that appear to be laboratory artifacts are not provided.

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID			MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Field Dupe	Trip Blank	Field Blank	Equip Blank	
Date Collected			1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	
METALS ANALYTE (ug/L)	DW	GSI																			
Arsenic (dissolved)	10	10		2	1.094	29	<2	<2		0.548				4	100		108				
Arsenic	10	10		3	3	34	<2	<2		<2				10	129		131				
Chromium (dissolved)	100	160	G	41	9	<5	86	13		<5				37	1.217		0.537				
Chromium (total)	100	160	G	244	28	<5	1,740	141		<5				68	1.540		0.4368				
Chromium VI (dissolved)	100	160		<10	<10	<10	<10	<10		<10				<10	<10		<10				
Chromium VI (total)	100	160		<10	<10	<20	<10	<10		<10				<10	<20		<20				
Copper (dissolved)	1000	20	G	5	2.446	0.908	5	1.182		1.134				3.403	0.547		0.555				
Copper	1000	20	G	21	4.359	0.736	34	3.337		1.057				7	1.333		1.671				
Lead (dissolved)	4	44	G	1.836	1.058	<3	<3	<3		<3				2.084	<3		<3				
Lead	4	44	G	4	3	<3	0.739	<3		<3				6	<3		1.217				
Selenium (dissolved)	50	5		2	4	<5	2	8		1				1	1		1				
Selenium	50	5		2	4	<5	2	11		1				1	<5		1				
Zinc (dissolved)	2400	260	G	8	5	1.90	<5	2		2.24				7	2.480		2.5				
Zinc	2400	260	G	18	11	2.55	14	2.31		1.55				12	6		15				
VOC ANALYTE (ug/L)	DW	GSI																			
Acetone	730	1,700																		6.3	6.4
Methyl iodide	NC	NC																			
Carbon disulfide	800	NC																			
2 Butanone (MEK)	13,000	2,200																			
Chloromethane	260	NC																			
Vinyl Chloride	2.0	13				0.29				0.77					2		1				
Chloroethane	430	1,100															0.31				
trichlorofluoromethane	2,600	NA																			
1,1-Dichloroethene	7.0	130												0.31							
Methylene Chloride	5.0	1,500																			
trans-1,2-Dichloroethene	100	1,500												0.16							
1,1-Dichloroethane	880	740								0.97				2	0.70		0.75				
cis-1,2-Dichloroethene	70	620								2.00				51	3		2				
Tetrahydrofuran	95	11,000																			
Chloroform	80	350					2.00							0.24							
1,1,1-Trichloroethane	200	89																			
4-Methyl-2-pentanone (MIBK)	1800	ID															0.410				
2-Hexanone	1000	ID															0.95				
Carbon tetrachloride	5.0	45																			
Benzene	5.0	200				0.20				0.18											
Bromodichloromethane	80.0	NC					0.68														
Trichloroethene	5.0	200		3						5.00				30	2		0.83				
Toluene	790	270																			
Tetrachloroethene	5.0	60						43													
Chlorobenzene	100	25																			
Styrene	100	80																			

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Field Dupe	Trip Blank	Field Blank	Equip Blank
Date Collected	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18
VOC ANALYTE (ug/L) {cont}	DW	GSI																
Ethylbenzene	74	18																
Total Xylenes	280	41																
1,2 -Dichlorobenzene	600	13																
1,3 -Dichlorobenzene	6.6	28		0.36	0.46	0.43		0.23					0.30	0.30		0.26		
1,2,4-Trimethylbenzene	63	17																
1,2,3-Trimethylbenzene	NC	NC																
Naphthalene	520	11																
2-Methylnaphthalene	260	19																
Diethyl ether	10 (E)	ID																
tert-Methyl butyl ether (MTBE)	40 (E)	7,100 (X)																
Acrylonitrile	2.6	2.0 (M); 1.2																
Dichlorodifluoromethane	1,700	ID																
Bromomethane	10	35																
1,2-Dichloroethane	5.0 (A)	360 (X)																
Trichloroethene	5.0 (A)	200 (X)																
1,2-Dichloropropane	5.0 (A)	230 (X)																
cis-1,3-Dichloropropene	NC	NC																
trans-1,3-Dichloropropene	NC	NC																
1,1,2-Trichloroethane	5.0 (A)	330 (X)																
trans-1,4-Dichloro-2-butene	NC	NC																
Dibromochloromethane	80 (A,W)	ID																
1,2-Dibromoethane	NC	NC																
1,1,1,2-Tetrachloroethane	77	ID																
Isopropylbenzene	800	28																
Bromoform	80 (A,W)	ID																
1,1,2,2-Tetrachloroethane	8.5	78 (X)																
1,2,3-Trichloropropane	42	NA																
n-Propylbenzene	80	ID																
Bromobenzene	18	NA																
1,3,5-Trimethylbenzene	72 (E)	45																
tert-Butylbenzene	80	ID																
1,2,4-Trimethylbenzene	63 (E)	17																
1,2,3-Trichlorobenzene	NC	NC																
n-Butylbenzene	NC	NC																
1,4-Dioxane (EPA8260)	7.2	2,800 (X)																

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID			MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Field Dupe	Trip Blank	Field Blank	Equip Blank
Date Collected			1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18	1/28/18
PFA ANALYTE (ng/L)	DW	GSI																		
Perfluorobutanesulfonic acid (PFBS)	NC	NC													8.1		5.3			
Perfluorohexanesulfonic acid (PFHxS)	NC	NC												1.9						
Perfluoroheptanesulfonic Acid (PFHpS)	NC	NC																		
Perfluorooctanesulfonic acid (PFOS)	CC	12 (X)		35	7									44	16		16			
Perfluorodecanesulfonic acid (PFDS)	NC	NC																		
Perfluorobutanoic acid (PFBA)	NC	NC		3.1	4.8									4.8	180		180			
Perfluoropentanoic acid (PFPeA)	NC	NC			2.3															
Perfluorohexanoic acid (PFHxA)	NC	NC			2.5									2.6						
Perfluoroheptanoic acid (PFHpA)	NC	NC																		
Perfluorooctanoic acid (PFOA)	CC	12,000 (X)		4.4	4.1									6.1	4.2		4			
Perfluorononanoic acid (PFNA)	NC	NC																		
Perfluorodecanoic acid (PFDA)	NC	NC																		
Perfluoroundecanoic acid (PFUnA)	NC	NC																		
Perfluorododecanoic acid (PFDoA)	NC	NC																		
Perfluorotridecanoic Acid (PFTriA)	NC	NC																		
Perfluorotetradecanoic acid (PFTeA)	NC	NC																		
Perfluorooctane Sulfonamide (FOSA)	NC	NC																		

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

NOTES:

DW - Drinking Water Residential Generic Criteria.

GSI - Groundwater Surface Water Interface Generic Criteria per MDEQ Surface Water Division Rule 57.

Blank cells indicate no detectable concentrations	
Exceeds DW criteria	X
Exceeds GSI criteria	X
Exceeds both DW and GSI criteria	X
Compound also found in associated method blank, suggesting a laboratory artifact.	X
Insufficient data to develop criterion/no criterion	NC
Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River	G
No Sample	NS
Filtered in lab	1
Filtered and preserved in lab	2
Not analyzed due to turbidity	NA
Combined PFOA and PFOS concentrations compared to 0.070 ppb (70 ppt) for the drinking water pathway.	CC

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID			MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Field Dupe	Trip Blank	Field Blank	Equip Blank
Date Collected			5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18		5/29/18	5/29/18
METALS ANALYTE (ng/L)	DW	GSI	DRY				DRY		DRY		NS	NS	NS			NS	MW-102S			
Arsenic (dissolved)	10	10				1.41									23					
Arsenic	10	10				9									60					
Chromium (dissolved)	100	160	G		1.62	14	0.168		1.01		0.328				4.13	0.431		14		
Chromium (total)	100	160	G		2.64	14	0.276		44		0.208				4.17	0.296		14		0.095
Chromium VI (dissolved)	100	160																		
Chromium VI (total)	100	160																		
Copper (dissolved)	1000	20	G		0.381	0.498			0.816		1.73				0.611			0.469		
Copper	1000	20	G		0.748	0.341			1.78		1.43				2.42					
Lead (dissolved)	4	44	G																	
Lead	4	44	G		0.408		0.068		0.304		0.121				0.067	0.062				
Selenium (dissolved)	50	5																		
Selenium	50	5																		
Zinc (dissolved)	2400	260	G		6	8	7		8		12				15	8		9		
Zinc	2400	260	G		6	7	8		7		8				6	4.76		9		1.79
VOC ANALYTE (ug/L)	DW	GSI																		
Acetone	730	1,700			5	4.5	6.4		5.6						5.9	8.2		5.6	4.8	8.4
Methyl iodide	NC	NC																		
Carbon disulfide	800	NC																		
2 Butanone (MEK)	13,000	2,200																		
Chloromethane	260	NC																		
Vinyl Chloride	2.0	13																		
Chloroethane	430	1,100																		
trichlorofluoromethane	2,600	NA																		
1,1-Dichloroethene	7.0	130																		
Methylene Chloride	5.0	1,500																		
trans-1,2-Dichloroethene	100	1,500																		
1,1-Dichloroethane	880	740																		
cis-1,2-Dichloroethene	70	620																		
Tetrahydrofuran	95	11,000																	4.8	
Chloroform	80	350																		0.46
1,1,1-Trichloroethane	200	89																		
4-Methyl-2-pentanone (MIBK)	1800	ID																		
2-Hexanone	1000	ID																		
Carbon tetrachloride	5.0	38 (X)																		
Benzene	5.0	200																		
Bromodichloromethane	80.0	NC																		
Trichloroethene	5.0	200			1	0.67									7	13		0.7		
Toluene	790	270				0.39														
Tetrachloroethene	5.0	60							45											
Chlorobenzene	100	25																		
Styrene	100	80																		

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Field Dupe	Trip Blank	Field Blank	Equip Blank
Date Collected	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18		5/29/18	5/29/18
VOC ANALYTE (ug/L) {cont}	DW	GSI																
Ethylbenzene	74	18																
Total Xylenes	280	49																
1,2-Dichlorobenzene	600	13																
1,3-Dichlorobenzene	6.6	28			0.23													
1,2,4-Trimethylbenzene	63	17																
1,2,3-Trimethylbenzene	NC	NC																
Naphthalene	520	11		0.21														
2-Methylnaphthalene	260	19																
Diethyl ether	10 (E)	ID																
tert-Methyl butyl ether (MTBE)	40 (E)	7,100 (X)																
Acrylonitrile	2.6	2.0 (M); 1.2																
Dichlorodifluoromethane	1,700	ID																
Bromomethane	10	4.2; [5(M)]																
1,2-Dichloroethane	5.0 (A)	360 (X)																
Trichloroethene	5.0 (A)	200 (X)																
1,2-Dichloropropane	5.0 (A)	230 (X)																
cis-1,3-Dichloropropene	NC	NC																
trans-1,3-Dichloropropene	NC	NC																
1,1,2-Trichloroethane	5.0 (A)	330 (X)																
trans-1,4-Dichloro-2-butene	NC	NC																
Dibromochloromethane	80 (A,W)	ID																
1,2-Dibromoethane	NC	NC																
1,1,1,2-Tetrachloroethane	77	ID																
Isopropylbenzene	800	28																
Bromoform	80 (A,W)	ID																
1,1,2,2-Tetrachloroethane	8.5	78 (X)																
1,2,3-Trichloropropane	42	NA																
n-Propylbenzene	80	ID																
Bromobenzene	18	NA																
1,3,5-Trimethylbenzene	72 (E)	45																
tert-Butylbenzene	80	ID																
1,2,4-Trimethylbenzene	63 (E)	17																
1,2,3-Trichlorobenzene	NC	NC																
n-Butylbenzene	NC	NC																
1,4-Dioxane (EPA SIM8270)	7.2	2,800 (X)											0.13		0.025	0.025		

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID			MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	Field Dupe	Trip Blank	Field Blank	Equip Blank
Date Collected			5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18	5/29/18		5/29/18	5/29/18
PFA ANALYTE (ng/L)	DW	GSI																		
Perfluorobutane sulfonic acid (PFBS)	NC	NC			1.3												1.2			
Perfluoropentane sulfonic acid (PFPeS)	NC	NC																		
Perfluorohexane sulfonic acid (PFHxS)	NC	NC		1.4	2								1.6				2			
Perfluoroheptane sulfonic acid (PFHpS)	NC	NC			0.18												1.1			
Perfluorooctane sulfonic acid (PFOS)	CC	12 (X)		12	12								47	27			12			
Perfluorononane sulfonic acid (PFNS)	NC	NC																		
Perfluorodecane sulfonic acid (PFDS)	NC	NC																		
Perfluorobutanoic acid (PFBA)	NC	NC													41					
Perfluoropentanoic acid (PFPeA)	NC	NC			1.2										1.7					
Perfluorohexanoic acid (PFHxA)	NC	NC			1.8												2.5			
Perfluoroheptanoic acid (PFHpA)	NC	NC			1.7															
Perfluorooctanoic acid (PFOA)	CC	12,000 (X)		2	4.2								1.7	2.5			4.3			
Perfluorononanoic acid (PFNA)	NC	NC		1.1	1										1.8					
Perfluorodecanoic acid (PFDA)	NC	NC																		
Perfluoroundecanoic acid (PFUnDA)	NC	NC													0.61					
Perfluorododecanoic acid (PFDoDA)	NC	NC		0.51																
Perfluorotridecanoic acid (PFTrDA)	NC	NC		0.82										0.78	0.85				0.94	1.1
Perfluorotetradecanoic acid (PFTeDA)	NC	NC		1.4	1.2															
Perfluorooctane sulfonamide (FOSA)	NC	NC																		
N-Methyl perfluorooctane sulfonamidoacetic acid	NC	NC																		
N-Ethyl perfluorooctane sulfonamidoacetic acid	NC	NC																		
Fluorotelomer sulfonic acid (4:2 FTS)	NC	NC																		
Fluorotelomer sulfonic acid (6:2 FTS)	NC	NC																		
Fluorotelomer sulfonic acid (8:2 FTS)	NC	NC																		

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

NOTES:

DW - Drinking Water Residential Generic Criteria.

GSI - Groundwater Surface Water Interface Generic Criteria per MDEQ Surface Water Division Rule 57.

Blank cells indicate no detectable concentrations	
Exceeds DW criteria	X
Exceeds GSI criteria	X
Exceeds both DW and GSI criteria	X
Compound also found in associated method blank, suggesting a laboratory artifact.	X
Insufficient data to develop criterion/no criterion	NC
Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River	G
No Sample	NS
Filtered in lab	1
Filtered and preserved in lab	2
Not analyzed due to turbidity	NA
Combined PFOA and PFOS concentrations compared to 0.070 ppb (70 ppt) for the drinking water pathway.	CC

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	MW-114S	Field Dup (Dup-1)	Field Dup (Dup-2)	Trip Blank	Trip Blank	Field Blank	Field Blank (FB2)	Equip Blank	Equip Blank
Date Collected	9/5/18	9/5/18	8/30/18	9/5/18	9/5/18	9/5/18	9/5/18	8/30/18	8/30/18	9/5/18	8/30/18	8/30/18	9/5/18	8/30/18	9/5/18	9/5/18	9/5/18	8/30/18	9/5/18	8/30/18	9/5/18	8/30/18	9/5/18
METALS ANALYTE (ng/L)	DW	GSI														MW-104S	MW-109S						
Arsenic (dissolved)	10	10				19				4	1		52		1		3				1		1
Arsenic	10	10				53		1	1		5	3	104		2		5				1		1
Chromium (dissolved)	100	160	G		1			10	1	6			1	4	1	7	1						
Chromium (total)	100	160	G		2	6		388	62	789			1		1	9	13						
Chromium VI (dissolved)	100	160				1																	
Chromium VI	100	160										5			6								
Copper (dissolved)	1000	20	G	1	1	1		2	1	4	2	1	1	7	1	1	2	1					
Copper	1000	20	G		1	1		13	2	23	1	1	1		1	3	1						
Lead (dissolved)	4	44	G																				
Lead	4	44	G						1	1													
Selenium (dissolved)	50	5		1	4	2	3	3	8	1		2	4		5	1		1	9	2		1	1
Selenium	50	5		2	4	4	4	3	9	5		4	1	3	2	3	3	3	6	2		1	1
Zinc (dissolved)	2400	260	G	2	4	3	1	3	2	2	4	3	3	5	6	2	5	4	1	2		2	2
Zinc	2400	260	G	3	2	5	2	5	2	6	2	4	5	3	2	4	5	3	1	2		1	1
VOC ANALYTE (ug/L)	DW	GSI																					
Acetone	730	1,700			2.55	2.72	5.20	0.81	1.12	0.63	0.61		2.32		4.98	2.11	18.6		2.75	5.13	4.54	1.26	7.48
Methyl iodide	NC	NC																					
Carbon disulfide	800	NC																					
2 Butanone (MEK)	13,000	2,200				1.14								1.09								0.32	2.48
Chloromethane	260	NC																1.92					
Vinyl Chloride	2.0	13								42				5		9.5			41				
Chloroethane	430	1,100																					
trichlorofluoromethane	2,600	NA																					
1,1-Dichloroethene	7.0	130									2			0.66									
Methylene Chloride	5.0	1,500																					
trans-1,2-Dichloroethene	100	1,500								0.7								0.66					
1,1-Dichloroethane	880	740								1		0.27	0.63		3.6			1					
cis-1,2-Dichloroethene	70	620		9						0.34		68		5	2	490	0.36	65					
Tetrahydrofuran	95	11,000														16							
Chloroform	80	350					1				1											0.4	0.4
1,1,1-Trichloroethane	200	89																					
4-Methyl-2-pentanone (MIBK)	1800	ID																					
2-Hexanone	1000	ID																					
Carbon tetrachloride	5.0	38 (X)									4												
Benzene	5.0	200				0.67																	
Bromodichloromethane	80.0	NC					0.5																0.35
Trichloroethene	5.0	200		4	4	0.39				1		17		12	7	1	210		17				
Toluene	790	270																					
Tetrachloroethene	5.0	60						40										40	0.22				
Chlorobenzene	100	25																					
Styrene	100	80																					

Table 1
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RACER - Flint West # 12990

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	MW-114S	Field Dup (Dup-1)	Field Dup (Dup-2)	Trip Blank	Trip Blank	Field Blank	Field Blank (FB2)	Equip Blank	Equip Blank
Date Collected	9/5/18	9/5/18	8/30/18	9/5/18	9/5/18	9/5/18	9/5/18	8/30/18	8/30/18	9/5/18	8/30/18	8/30/18	9/5/18	8/30/18	9/5/18	9/5/18	9/5/18	8/30/18	9/5/18	8/30/18	9/5/18	8/30/18	9/5/18
VOC ANALYTE (ug/L) {cont}	DW	GSI																					
Ethylbenzene	74	18																					
Total Xylenes	280	49																					
1,2-Dichlorobenzene	600	13																					
1,3-Dichlorobenzene	6.6	28																					
Naphthalene	520	11																					
2-Methylnaphthalene	260	19															0.23						
Diethyl ether	10 (E)	ID																					
tert-Methyl butyl ether (MTBE)	40 (E)	7,100 (X)																					
Acrylonitrile	2.6	2.0 (M); 1.2																					
Dichlorodifluoromethane	1,700	ID																					
Bromomethane	10	4.2; [5(M)]																					
1,2-Dichloroethane	5.0 (A)	360 (X)																					
Trichloroethene	5.0 (A)	200 (X)																					
1,2-Dichloropropane	5.0 (A)	230 (X)																					
cis-1,3-Dichloropropene	NC	NC																					
trans-1,3-Dichloropropene	NC	NC																					
1,1,2-Trichloroethane	5.0 (A)	330 (X)																					
trans-1,4-Dichloro-2-butene	NC	NC																					
Dibromochloromethane	80 (A,W)	ID																					
1,2-Dibromoethane	NC	NC																					
1,1,1,2-Tetrachloroethane	77	ID																					
Isopropylbenzene	800	28																					
Bromoform	80 (A,W)	ID																					
1,1,1,2-Tetrachloroethane	8.5	78 (X)																					
1,2,3-Trichloropropane	42	NA																					
n-Propylbenzene	80	ID																					
Bromobenzene	18	NA																					
1,3,5-Trimethylbenzene	72 (E)	45																					
tert-Butylbenzene	80	ID																					
1,2,4-Trimethylbenzene	63 (E)	17																					
1,2,4-Trichlorobenzene	NC	NC																				0.21	
1,2,3-Trichlorobenzene	NC	NC																				0.21	
n-Butylbenzene	NC	NC																					

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

Sample ID	MW-100S	MW-101S	MW-102S	MW-103S	MW-104S	MW-105S	MW-106SR	MW-107S	MW-108S	MW-109S	MW-110S	MW-111S	MW-112S	MW-113S	MW-114S	Field Dup (Dup-1)	Field Dup (Dup-2)	Trip Blank	Trip Blank	Field Blank	Field Blank (FB2)	Equip Blank	Equip Blank
Date Collected	9/5/18	9/5/18	8/30/18	9/5/18	9/5/18	9/5/18	9/5/18	8/30/18	8/30/18	9/5/18	8/30/18	8/30/18	9/5/18	8/30/18	9/5/18	9/5/18	9/5/18	8/30/18	9/5/18	8/30/18	9/5/18	8/30/18	9/5/18
PFA ANALYTE (ng/L)	DW	GSI																					
Perfluorobutane sulfonic acid (PFBS)	NC	NC	2.5	1.4	2	2.2	1.3	1.8	4.6		1.7	2.9	3.6	2.4	1.4	5	1.7	2.3	1.7				
Perfluoropentane sulfonic acid (PFPeS)	NC	NC																					
Perfluorohexane sulfonic acid (PFHxS)	NC	NC	4	1.9	6.1		2.1	12	3.3	2.7	2.9	3.2	4.3	3.8		2.6	2.4	12	2.6				
Perfluoroheptane sulfonic acid (PFHpS)	NC	NC	1.4	1.2	2.4			2.5	1.3			2.6						2.1					
Perfluorooctane sulfonic acid (PFOS)	CC	12	20	33	11	91			7.3	18	6	27	8.5	59	10	13	26		30				
Perfluorononane sulfonic acid (PFNS)	NC	NC																					
Perfluorodecane sulfonic acid (PFDS)	NC	NC																					
Perfluorobutanoic acid (PFBA)	NC	NC		3.8	3.2			3.2	5.9		2.9	6.7		48	7.1	2.7		3.2					
Perfluoropentanoic acid (PFPeA)	NC	NC		1.2	1.4				1.1			3	1.3			3.6							
Perfluorohexanoic acid (PFHxA)	NC	NC	1	1.5	4.1		1.2	1.6	2		1.7	4.8			1	3.3	1.7			1.3		1.6	1.2
Perfluoroheptanoic acid (PFHpA)	NC	NC			2				2			3.7			1.3	3.3	2.4						
Perfluorooctanoic acid (PFOA)	CC	12,000	2	4.5	6.1	2.6	0.79	4.5	12	2.1	0.58	2.6	11	1.7	2.2	2.6	4.3	4.1	2.8				
Perfluorononanoic acid (PFNA)	NC	NC		1.2		1.1						1.2				1.3		1.1					
Perfluorodecanoic acid (PFDA)	NC	NC				0.53			0.58														
Perfluoroundecanoic acid (PFUnDA)	NC	NC																					
Perfluorododecanoic acid (PFDoDA)	NC	NC																					
Perfluorotridecanoic acid (PFTrDA)	NC	NC																					
Perfluorotetradecanoic acid (PFTeDA)	NC	NC					1.6		2.8			1.7				1.9				3.3		1.8	1.9
Perfluorooctane sulfonamide (FOSA)	NC	NC																			0.44		
N-Methyl perfluorooctane sulfonamidoacetic acid	NC	NC																					
N-Ethyl perfluorooctane sulfonamidoacetic acid	NC	NC				0.9																	
Fluorotelomer sulfonic acid (4:2 FTS)	NC	NC																					
Fluorotelomer sulfonic acid (6:2 FTS)	NC	NC																					
Fluorotelomer sulfonic acid (8:2 FTS)	NC	NC																					

Table 1
Groundwater Analytical Results
RACER - Flint West # 12990

NOTES:

DW - Drinking Water Residential Generic Criteria.

GSI - Groundwater Surface Water Interface Generic Criteria per MDEQ Surface Water Division Rule 57.

Blank cells indicate no detectable concentrations	
Exceeds DW criteria	X
Exceeds GSI criteria	X
Exceeds both DW and GSI criteria	X
Compound also found in associated method blank, suggesting a laboratory artifact.	X
Insufficient data to develop criterion/no criterion	NC
Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River	G
No Sample	NS
Filtered in lab	1
Filtered and preserved in lab	2
Not analyzed due to turbidity	NA
Combined PFOA and PFOS concentrations compared to 0.070 ppb (70 ppt) for the drinking water pathway.	CC

Table 2
Pre and Post HRC Injection Analytical Results and Natural Attenuation Parameters
Racer Flint West #12990, Flint, Michigan

Michigan Department of Environmental Quality Risk Based Screening Levels						Vinyl Chloride	Chloroethane	1,1-Dichloroethylene (1,1-DCE)	trans-1,2-Dichloroethylene (trans-1,2-DCE)	1,1-Dichloroethane (1,1-DCA)	cis-1,2-Dichloroethylene (cis-1,2-DCE)	1,1,1-Trichloroethane	1,2-Dichloroethane (1,2-DCA)	Trichloroethylene (TCE)	Tetrachloroethylene (PCE)	Chromium, VI	Chromium, VI (Dissolved)	Arsenic	Arsenic (Dissolved)	Chromium, Total	Chromium, Total (Dissolved)	Copper	Copper (Dissolved)	Iron	Iron (Dissolved)	Lead	Lead (Dissolved)	Manganese	Manganese (Dissolved)	Selenium	Selenium (Dissolved)	Zinc	Zinc (Dissolved)	Total Organic Carbon	Methane	pH (from water quality meter)	Dissolved oxygen (mg/L) (from water quality meter)	Conductivity (mS/cm) (from water quality meter)	Oxygen Reduction Potential (mV) (from water quality meter)	
Drinking Water - Res						2	430	7	100	880	70	200	5	5	5	100	100	10	10	100	100	1,000	1,000	300	300	4	4	50	50	50	50	2,400	2,400	NA	ID	NA	NA	NA	NA	
Groundwater Surface Water Interface						13	1,100	130	1,500	740	620	89	360	200	60	160	160	10	10	11	11	20	20	NA	NA	44	44	4,500	4,500	5	5	260	260	NA	ID	NA	NA	NA	NA	
Sample Location	TOC (feet)	NAPL (feet)	DTW (feet)	GW Elev (feet)	Sample Date																																			
MW-109S SI: 9-14' bgs Dist to IP: 51'	714.62	ND	11.21	703.41	06/28/18	7	<5	4	1	2	33	<1	<1	66	<1	NA	NA	0.396	0.538	<5	<5	1.36	0.483	40	30	0.111	<3	817	807	<5	<3	2.67	<5	4,100	70	7.19	0.99	0.775	-99.1	
	714.62	ND	12.84	701.78	08/08/18	14	<5	5	0.79	2	43	0.41	<1	98	0.19	<10	<10	0.572	1.179	0.151	<5	1.07	1.203	80	30	0.074	0.063	1,040	1,010	<5	<5	2.62	5	5,700	90	7.11	1.06	0.785	-42.9	
	714.62	ND	10.69	703.93	09/05/18	42	<5	2	0.70	1	68	1	<1	17	<1	<10	<10	5	4	<5	<5	1	1	NA	NA	<3	<3	NA	NA	1	4	5	3	NA	NA	NA	NA	NA	NA	
	714.62	ND	11.57	703.05	10/16/18	26	<0.34	0.74	0.62	1.00	42	<0.28	<0.30	8	<0.20	<20	<10	28	21	0.418	0.245	0.907	0.474	14,500	9,710	0.074	<0.055	459	453	<2.51	<2.51	1.62	3.76	24,100	200	7.54	3.62	NA	-165.3	
MW-111S SI: 9-14' bgs Dist to IP: 0'	719.53	ND	13.14	706.39	06/28/18	<1	<5	<1	<1	<1	<1	<1	<1	7	<1	NA	NA	<2	<2	5	5	<5	0.911	9.71	12.7	<3	<3	0.877	1.847	<5	<5	7	2.42	9,900	<1	7.18	2.86	0.810	-120.7	
	719.53	ND	14.01	705.52	08/08/18	<1	<5	<1	<1	<1	0.95	<1	<1	6	<1	<10	<10	9	4	2.754	1.11	0.674	0.527	2,830	850	0.192	0.103	385	321	<5	<5	3.67	6	19,000	<1	7.09	1.12	0.847	-47.3	
	719.53	ND	13.28	706.25	08/30/18	<1	<5	<1	<1	0.27	5	<1	<1	12	<1	<10	<10	<2	<2	5	4	1	1	NA	NA	<3	<3	NA	NA	2	5	2	6	NA	NA	7.52	0.97	0.796	8.1	
	719.53	ND	13.48	706.05	10/16/18	<0.24	<0.21	<0.27	<0.14	0.19	4	<0.27	<0.17	10	<0.13	<4	<4	<0.385	<0.385	7	6	1	1	20	15	<0.055	<0.055	11	11	<1.38	<2.51	<1.38	<1.38	7,000	1,400	7.04	3.73	NA	93.0	
MW-112S SI: 15-20' bgs Dist to IP: 83' (up gradient)	720.00	ND	14.50	705.50	05/29/18	9	<5	1	0.25	1	3	<1	<1	13	<1	<1	<1	60	23	0.296	0.431	<5	<5	NA	NA	0.062	<3	NA	NA	<5	<5	4.76	8	NA	NA	7.05	1.05	0.709	-65.7	
	720.00	ND	14.72	705.28	06/28/18	8	0.62	1	0.21	0.92	2	<1	<1	7	<1	NA	NA	52	29	0.38	0.499	<5	<5	5,150	2,320	0.181	0.083	258	263	<5	<5	<5	3.49	22,000	1,600	7.39	0.60	0.672	-116.6	
	720.00	ND	15.58	704.42	08/14/18	1	<5	<1	<1	0.57	0.82	<1	<1	1	<1	<5	<1	104	78	0.37	0.411	<5	0.453	6,490	4,730	0.084	0.097	191	185	<5	<5	2.05	5	36,000	1,300	7.33	1.35	0.725	17.1	
	720.00	ND	14.75	705.25	09/05/18	5	<5	0.66	<1	0.63	2	<1	<1	7	<1	<20	<10	104	52	<5	<5	<5	<5	NA	NA	<3	<3	NA	NA	3	1	4	2	NA	NA	NA	NA	NA	NA	
720.00	ND	15.10	704.90	10/16/18	3	<0.21	0.78	0.17	0.71	2	<0.27	<0.17	8	<0.13	<10	<10	75	39	0.938	0.48	<0.29	<0.29	5,670	3,380	0.109	0.069	250	233	<2.51	<2.51	2.21	4	35,100	<0.17	7.23	0.77	NA	-87.7		
MW-113S SI: 8-13' bgs Dist to IP: 64'	714.00	ND	12.37	701.63	06/28/18	<1	<5	<1	<1	0.31	4	<1	<1	28	<1	NA	NA	6	3	4.5	1.97	6	<5	2,290	1,220	<3	<3	58	55	<5	<5	<5	<5	4,800	19	7.05	0.67	0.918	-108.6	
	714.00	ND	12.75	701.25	08/08/18	0.39	<5	<1	<1	<1	6	<1	<1	13	<1	<10	<10	13	6	5.0	1.209	0.524	<5	3,830	790	0.207	0.061	100	108	<5	<5	6	<5	7,500	19	6.93	1.06	0.831	-55.7	
	714.00	ND	11.78	702.22	08/30/18	<1	<5	<1	<1	<1	<1	<1	<1	1	<1	<10	<10	<2	<2	1.0	1.000	1	1	NA	NA	<3	<3	NA	NA	3	<5	5	5	NA	NA	7.27	1.19	0.920	30.2	
	714.00	ND	12.73	701.27	10/16/18	1.00	<0.21	<0.27	<0.14	<0.15	8	<0.27	<0.17	21	<0.13	<10	<10	7	6	2.3	2.1	0.876	0.290	2,170	1,500	<0.055	<0.055	96	97	<2.51	<2.51	<0.138	1.95	8,400	260	6.93	3.95	NA	-215.2	
MW-114S SI: 7-12' bgs Dist to IP: 61'			9.05	-9.05	08/08/18	9	<30	<5	<5	3.1	113	2.3	<5	348	<5	0.105	0.106	<2	0.418	102	102	1.457	1.116	20	<20	0.169	<3	288	225	<5	<5	6	6	4,400	190	7.27	0.78	0.834	-36.3	
			7.95	-7.95	09/05/18	9.5	<50	<10	<10	3.6	490	<10	<10	210	<10	6	<10	2	1	9	7	3	2	NA	NA	<3	<3	NA	NA	3	1	3	4	NA	NA	NA	NA	NA	NA	
			8.78	-8.78	10/16/18	7	<1.7	<1.3	1.9	2.5	166	<1.4	<0.78	167	<1	<4	<4	23	16	0.975	0.751	2.911	2.661	620	460	0.094	0.061	2,060	1,990	<2.51	<2.51	8	2.37	5,900	190	7.23	3.58	NA	-76.4	

Results in micrograms per liter (ug/L) except where otherwise noted.

See laboratory report for additional volatile organic compound analyzed.

Dist to IP = Distance to nearest HRC injection point.

ATTACHMENT #3: GROUNDWATER ANALYTICAL LABORATORY REPORT



Analytical Laboratory Report

Report ID: S93785.01(01)
Generated on 09/13/2018

Report to

Attention: Mike Smith
Applied Ecosystems
G4300 S. Saginaw St.
Burton, MI 48529

Phone: 810-715-2525 FAX: 810-715-2526
Email: ae_mds@yahoo.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

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

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S93785.01-S93785.09
Project: 11-4317-102 Racer / Flint
Collected Date: 08/30/2018
Submitted Date/Time: 08/30/2018 16:20
Sampled by: Heather Dean
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

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.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

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



Analytical Laboratory 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



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
N/A	Not Applicable
SM3500-Cr B	Standard Method 3500 Cr B 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260B	SW 846 Method 8260B Revision 2 December 1996 / 5030C Revision 3 May 2003



Analytical Laboratory Report

Sample Summary (9 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S93785.01	MW-113	Liquid	08/30/18 09:30
S93785.02	MW-110	Liquid	08/30/18 10:30
S93785.03	MW-108	Liquid	08/30/18 11:10
S93785.04	MW-111	Liquid	08/30/18 12:10
S93785.05	MW-102	Liquid	08/30/18 13:10
S93785.06	MW-107	Liquid	08/30/18 14:00
S93785.07	FB (Field Blank)	Liquid	08/30/18 00:01
S93785.08	EB (Equip Blank)	Liquid	08/30/18 00:01
S93785.09	TB (Trip Blank)	Liquid	08/30/18 00:01



Analytical Laboratory Report

Lab Sample ID: S93785.01

Sample Tag: MW-113

Collected Date/Time: 08/30/2018 09:30

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	None	Yes	4.6	IR
1	125ml Plastic	HNO3	Yes	4.6	IR
3	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 08/30/18 18:50, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 08/30/18 17:55, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 12:15, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	0.001	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.003	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.005	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 12:17, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	0.001	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	Not detected	0.005	0.000286	mg/L	5	7782-49-2	
Zinc, Dissolved	0.005	0.005	0.0000785	mg/L	5	7440-66-6	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 16:55, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	2.11	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93785.01 (continued)

Sample Tag: MW-113

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 16:55, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	1	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	



Analytical Laboratory Report

Lab Sample ID: S93785.01 (continued)

Sample Tag: MW-113

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 16:55, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93785.02

Sample Tag: MW-110

Collected Date/Time: 08/30/2018 10:30

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	None	Yes	4.6	IR
1	125ml Plastic	HNO3	Yes	4.6	IR
3	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 08/30/18 18:55, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 08/30/18 18:05, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 12:20, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.003	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	0.001	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper	Not detected	0.005	0.0000505	mg/L	5	7440-50-8	
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.003	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.003	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 12:22, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.001	0.002	0.0000340	mg/L	5	7440-38-2	b
Chromium, Dissolved	0.001	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper, Dissolved	0.007	0.005	0.0000505	mg/L	5	7440-50-8	
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	Not detected	0.005	0.000286	mg/L	5	7782-49-2	
Zinc, Dissolved	0.005	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:14, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	Not detected	50	0.56	ug/L	1	67-64-1	
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	

b-Value detected less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93785.02 (continued)

Sample Tag: MW-110

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:14, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	



Analytical Laboratory Report

Lab Sample ID: S93785.02 (continued)

Sample Tag: MW-110

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:14, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93785.03

Sample Tag: MW-108

Collected Date/Time: 08/30/2018 11:10

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	None	Yes	4.6	IR
1	125ml Plastic	HNO3	Yes	4.6	IR
3	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 08/30/18 19:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 08/30/18 18:10, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 12:25, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.004	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.004	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 12:27, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.002	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.003	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:33, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	Not detected	50	0.56	ug/L	1	67-64-1	
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	

b-Value detected less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93785.03 (continued)

Sample Tag: MW-108

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:33, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	1	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	4	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	



Analytical Laboratory Report

Lab Sample ID: S93785.03 (continued)

Sample Tag: MW-108

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:33, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93785.04

Sample Tag: MW-111

Collected Date/Time: 08/30/2018 12:10

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	None	Yes	4.6	IR
1	125ml Plastic	HNO3	Yes	4.6	IR
3	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 08/30/18 19:05, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 08/30/18 18:25, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 12:32, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	0.005	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.002	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 12:34, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	0.004	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.005	0.005	0.000286	mg/L	5	7782-49-2	
Zinc, Dissolved	0.006	0.005	0.0000785	mg/L	5	7440-66-6	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:52, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	Not detected	50	0.56	ug/L	1	67-64-1	
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	

b-Value detected less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93785.04 (continued)

Sample Tag: MW-111

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:52, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	0.27	1	0.20	ug/L	1	75-34-3	J
cis-1,2-Dichloroethene*	5	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	12	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93785.04 (continued)

Sample Tag: MW-111

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 17:52, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93785.05

Sample Tag: MW-102

Collected Date/Time: 08/30/2018 13:10

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	None	Yes	4.6	IR
1	125ml Plastic	HNO3	Yes	4.6	IR
3	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 08/30/18 19:10, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 08/30/18 18:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 12:29, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	0.006	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.004	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.005	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 12:30, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	0.001	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.002	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.003	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 18:11, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	2.72	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93785.05 (continued)

Sample Tag: MW-102

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 18:11, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	0.39	1	0.23	ug/L	1	79-01-6	J
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93785.05 (continued)

Sample Tag: MW-102

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 18:11, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93785.06

Sample Tag: MW-107

Collected Date/Time: 08/30/2018 14:00

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	None	Yes	4.6	IR
1	125ml Plastic	HNO3	Yes	4.6	IR
3	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 08/30/18 19:15, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 08/30/18 18:35, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 12:51, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	Not detected	0.005	0.000286	mg/L	5	7782-49-2	
Zinc	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 12:53, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	0.002	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	Not detected	0.005	0.000286	mg/L	5	7782-49-2	
Zinc, Dissolved	0.004	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 18:30, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	0.61	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93785.06 (continued)

Sample Tag: MW-107

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 18:30, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	0.34	1	0.26	ug/L	1	156-59-2	J
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	1	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93785.06 (continued)

Sample Tag: MW-107

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 18:30, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93785.07

Sample Tag: FB (Field Blank)

Collected Date/Time: 08/30/2018 00:01

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	None	Yes	4.6	IR
1	125ml Plastic	HNO3	Yes	4.6	IR
3	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 08/30/18 19:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 08/30/18 18:40, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 12:44, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000136	mg/L	2	7440-38-2	
Chromium	Not detected	0.005	0.00000760	mg/L	2	7440-47-3	
Copper	Not detected	0.005	0.0000202	mg/L	2	7440-50-8	
Lead	Not detected	0.003	0.00000600	mg/L	2	7439-92-1	
Selenium	0.001	0.005	0.000114	mg/L	2	7782-49-2	b
Zinc	0.001	0.005	0.0000314	mg/L	2	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 12:46, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000136	mg/L	2	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.00000760	mg/L	2	7440-47-3	
Copper, Dissolved	Not detected	0.005	0.0000202	mg/L	2	7440-50-8	
Lead, Dissolved	Not detected	0.003	0.00000600	mg/L	2	7439-92-1	
Selenium, Dissolved	Not detected	0.005	0.000114	mg/L	2	7782-49-2	
Zinc, Dissolved	0.002	0.005	0.0000314	mg/L	2	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 15:57, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	1.26	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93785.07 (continued)

Sample Tag: FB (Field Blank)

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 15:57, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	



Analytical Laboratory Report

Lab Sample ID: S93785.07 (continued)

Sample Tag: FB (Field Blank)

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 15:57, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93785.08

Sample Tag: EB (Equip Blank)

Collected Date/Time: 08/30/2018 00:01

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	None	Yes	4.6	IR
1	125ml Plastic	HNO3	Yes	4.6	IR
3	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	
Metal Digestion	Completed	SW3015A	09/11/18 12:00	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 08/30/18 19:25, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 08/30/18 18:45, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 12:48, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000136	mg/L	2	7440-38-2	
Chromium	Not detected	0.005	0.00000760	mg/L	2	7440-47-3	
Copper	Not detected	0.005	0.0000202	mg/L	2	7440-50-8	
Lead	Not detected	0.003	0.00000600	mg/L	2	7439-92-1	
Selenium	Not detected	0.005	0.000114	mg/L	2	7782-49-2	
Zinc	0.001	0.005	0.0000314	mg/L	2	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 12:49, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000136	mg/L	2	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.00000760	mg/L	2	7440-47-3	
Copper, Dissolved	Not detected	0.005	0.0000202	mg/L	2	7440-50-8	
Lead, Dissolved	Not detected	0.003	0.00000600	mg/L	2	7439-92-1	
Selenium, Dissolved	Not detected	0.005	0.000114	mg/L	2	7782-49-2	
Zinc, Dissolved	0.001	0.005	0.0000314	mg/L	2	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 16:16, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	1.74	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93785.08 (continued)

Sample Tag: EB (Equip Blank)

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 16:16, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	2.48	25	0.26	ug/L	1	78-93-3	J
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	0.40	1	0.20	ug/L	1	67-66-3	J
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	0.35	1	0.23	ug/L	1	75-27-4	J
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93785.08 (continued)

Sample Tag: EB (Equip Blank)

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 16:16, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93785.09

Sample Tag: TB (Trip Blank)

Collected Date/Time: 08/30/2018 00:01

Matrix: Liquid

COC Reference: 102157

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/11/18 12:00	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 16:36, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	5.13	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	1.92	5	0.26	ug/L	1	74-87-3	J
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93785.09 (continued)

Sample Tag: TB (Trip Blank)

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/10/18 16:36, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	

Merit Laboratories Login Checklist

Lab Set ID:S93785

Client:APPLIED (Applied Ecosystems)

Project: 11-4317-102 Racer / Flint

Submitted:08/30/2018 16:20 Login User: MMC

Attention: Mike Smith

Address: Applied Ecosystems
G4300 S. Saginaw St.
Burton, MI 48529

Phone: 810-715-2525

FAX: 810-715-2526

Email: ae_mds@yahoo.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.6 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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 Bottle Preservation Check

Lab Set ID: S93785 Initials: MMC

Client: APPLIED (Applied Ecosystems)

Project: 11-4317-102 Racer / Flint

Submitted: 08/30/2018 16:20 Login User:

Attention: Mike Smith
 Address: Applied Ecosystems
 G4300 S. Saginaw St.
 Burton, MI 48529

Phone: 810-715-2525 FAX: 810-715-2526
 Email: ae_mds@yahoo.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S93785.01	X								X					
S93785.02	X								X					
S93785.03	X								X					
S93785.04	X								X					
S93785.05	X								X					
S93785.06	X								X					
S93785.07	X								X					
S93785.08	X								X					



REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: **Mike Smith**
 COMPANY: **Applied EcoSystems**
 ADDRESS: **4300 S. Saginaw St.**
 CITY: **Burton** STATE: **Mi** ZIP CODE: **48529**
 PHONE NO.: **810-715-2525** FAX NO.: **810-715-2526** P.O. NO.:
 E-MAIL ADDRESS: **msmith@appliedecosystems.com** QUOTE NO.:

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: **11-4317-102 Racer/Flint** SAMPLER(S) - PLEASE PRINT/STAMP NAME: **Heather Dean Heather Dean**
 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

Containers & Preservatives

Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	VOCs (B260)	Metals (Diss.)	Metals (Total)
	DATE	TIME													
938501	8.30.18	9:30	MW-113		5	✓	✓	✓					✓	✓	✓
.02	8.30.18	10:30	MW-110		5	✓	✓	✓					✓	✓	✓
.03	8.30.18	11:10	MW-108		5	✓	✓	✓					✓	✓	✓
.04	8.30.18	12:10	MW-111		5	✓	✓	✓					✓	✓	✓
.05	8.30.18	13:10	MW-102		5	✓	✓	✓					✓	✓	✓
.06	8.30.18	14:00	MW-107		5	✓	✓	✓					✓	✓	✓
.07	8.30.18		FB (Field blank)		5	✓	✓	✓					✓	✓	✓
.08	8.30.18		EB (equip blank)		5	✓	✓	✓					✓	✓	✓
.09	8.30.18		TB (trip blank)		1	✓							✓		

RELINQUISHED BY: **Heather Dean** Sampler DATE: **8.30.18** TIME: **15:00**
 RECEIVED BY: **John J. Miller** DATE: **8/30/18** TIME: **15:10**
 RELINQUISHED BY: **John J. Miller** DATE: **8/30/18** TIME: **16:20**
 RECEIVED BY: **M. Chilcote** DATE: **8/30/18** TIME: **16:20**

RELINQUISHED BY: DATE: TIME:
 SIGNATURE/ORGANIZATION:
 RECEIVED BY: DATE: TIME:
 SIGNATURE/ORGANIZATION:
 SEAL NO. SEAL INTACT YES NO INITIALS NOTES: TEMP. ON ARRIVAL **4.6**
 SEAL NO. SEAL INTACT YES NO INITIALS



Analytical Laboratory Report

Report ID: S93925.01(01)
Generated on 09/20/2018

Report to

Attention: Mike Smith
Applied Ecosystems
G4300 S. Saginaw St.
Burton, MI 48529

Phone: 810-715-2525 FAX: 810-715-2526
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Report produced by

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Report Summary

Lab Sample ID(s): S93925.01-S93925.14
Project: 11-4317-102 Racer Flint
Collected Date: 09/05/2018
Submitted Date/Time: 09/05/2018 16:10
Sampled by: Heather Dean
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

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.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

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



Analytical Laboratory 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



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
N/A	Not Applicable
SM3500-Cr B	Standard Method 3500 Cr B 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260B	SW 846 Method 8260B Revision 2 December 1996 / 5030C Revision 3 May 2003



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Sample Summary (14 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S93925.01	MW-104S	Liquid	09/05/18 08:50
S93925.02	MW-105S	Liquid	09/05/18 09:35
S93925.03	MW-106S	Liquid	09/05/18 10:30
S93925.04	MW-100S	Liquid	09/05/18 11:05
S93925.05	MW-101S	Liquid	09/05/18 11:30
S93925.06	MW-112S	Liquid	09/05/18 11:58
S93925.07	MW-103S	Liquid	09/05/18 12:40
S93925.08	MW-114S	Liquid	09/05/18 13:25
S93925.09	MW-109S	Liquid	09/05/18 13:50
S93925.10	Dupe 1	Liquid	09/05/18 08:50
S93925.11	Dupe 2	Liquid	09/05/18 08:50
S93925.12	Field Blk (FB2)	Liquid	09/05/18 08:50
S93925.13	Equip Blk	Liquid	09/05/18 08:50
S93925.14	Trip Blk	Liquid	09/05/18 08:50



Analytical Laboratory Report

Lab Sample ID: S93925.01

Sample Tag: MW-104S

Collected Date/Time: 09/05/2018 08:50

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 18:35, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 16:50, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.02	0.008	mg/L	2.5	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:18, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	0.388	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.013	0.005	0.0000505	mg/L	5	7440-50-8	
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.003	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.005	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 13:20, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	0.010	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	0.002	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.003	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.003	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:04, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	0.81	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.01 (continued)

Sample Tag: MW-104S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:04, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	1	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	0.50	1	0.23	ug/L	1	75-27-4	J
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93925.01 (continued)

Sample Tag: MW-104S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:04, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.02

Sample Tag: MW-105S

Collected Date/Time: 09/05/2018 09:35

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 17:45, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:21, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.001	0.002	0.0000340	mg/L	5	7440-38-2	b
Chromium	0.062	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.002	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	0.001	0.003	0.0000150	mg/L	5	7439-92-1	b
Selenium	0.009	0.005	0.000286	mg/L	5	7782-49-2	
Zinc	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 13:23, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	0.001	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.008	0.005	0.000286	mg/L	5	7782-49-2	
Zinc, Dissolved	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:23, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	1.12	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.02 (continued)

Sample Tag: MW-105S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:23, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	40	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	



Analytical Laboratory Report

Lab Sample ID: S93925.02 (continued)

Sample Tag: MW-105S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:23, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.03

Sample Tag: MW-106S

Collected Date/Time: 09/05/2018 10:30

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 18:50, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:15, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.02	0.008	mg/L	2.5	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:25, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.001	0.002	0.0000340	mg/L	5	7440-38-2	b
Chromium	0.789	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.023	0.005	0.0000505	mg/L	5	7440-50-8	
Lead	0.001	0.003	0.0000150	mg/L	5	7439-92-1	b
Selenium	0.005	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.006	0.005	0.0000785	mg/L	5	7440-66-6	

Method: E200.8, Run Date: 09/07/18 13:27, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	0.006	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	0.004	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.001	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:42, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	0.63	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.03 (continued)

Sample Tag: MW-106S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:42, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	



Analytical Laboratory Report

Lab Sample ID: S93925.03 (continued)

Sample Tag: MW-106S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 15:42, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.04

Sample Tag: MW-100S

Collected Date/Time: 09/05/2018 11:05

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 18:55, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:28, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	Not detected	0.005	0.0000505	mg/L	5	7440-50-8	
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.002	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.003	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 13:30, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.001	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:02, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	Not detected	50	0.56	ug/L	1	67-64-1	
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	

b-Value detected less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93925.04 (continued)

Sample Tag: MW-100S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:02, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	9	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	4	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	



Analytical Laboratory Report

Lab Sample ID: S93925.04 (continued)

Sample Tag: MW-100S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:02, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.05

Sample Tag: MW-101S

Collected Date/Time: 09/05/2018 11:30

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:10, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:25, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:32, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	0.002	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.004	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 13:33, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	0.001	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.004	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.004	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:21, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	2.55	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.05 (continued)

Sample Tag: MW-101S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:21, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	4	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	



Analytical Laboratory Report

Lab Sample ID: S93925.05 (continued)

Sample Tag: MW-101S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:21, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.06

Sample Tag: MW-112S

Collected Date/Time: 09/05/2018 11:58

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:15, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.02	0.008	mg/L	2.5	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:46, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.104	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	Not detected	0.005	0.0000505	mg/L	5	7440-50-8	
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.003	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.004	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 13:48, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.052	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005	0.0000505	mg/L	5	7440-50-8	
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.001	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:40, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	4.98	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.06 (continued)

Sample Tag: MW-112S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:40, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	1.09	25	0.26	ug/L	1	78-93-3	JB
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	5	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	0.66	1	0.27	ug/L	1	75-35-4	J
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	0.63	1	0.20	ug/L	1	75-34-3	J
cis-1,2-Dichloroethene*	2	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	7	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.06 (continued)

Sample Tag: MW-112S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:40, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.07

Sample Tag: MW-103S

Collected Date/Time: 09/05/2018 12:40

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:35, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.05	0.015	mg/L	5	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:49, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.053	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	Not detected	0.005	0.0000505	mg/L	5	7440-50-8	
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.004	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 13:51, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.019	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005	0.0000505	mg/L	5	7440-50-8	
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.003	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.001	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:59, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	5.20	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.07 (continued)

Sample Tag: MW-103S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:59, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	1.14	25	0.26	ug/L	1	78-93-3	JB
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	0.67	1	0.20	ug/L	1	71-43-2	J
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.07 (continued)

Sample Tag: MW-103S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 16:59, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.08

Sample Tag: MW-114S

Collected Date/Time: 09/05/2018 13:25

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:25, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:40, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	0.006	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:53, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.002	0.002	0.0000340	mg/L	5	7440-38-2	b
Chromium	0.009	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.003	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.003	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.003	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 13:54, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.001	0.002	0.0000340	mg/L	5	7440-38-2	b
Chromium, Dissolved	0.007	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	0.002	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.001	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.004	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/19/18 00:39, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	100	5.0	ug/L	10	60-29-7	Y
Acetone*	18.6	500	5.6	ug/L	10	67-64-1	JBY

b-Value detected less than reporting limit, but greater than MDL

Y-Elevated reporting limit due to high target concentration

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.08 (continued)

Sample Tag: MW-114S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/19/18 00:39, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Methyl iodide*	Not detected	10	2.5	ug/L	10	74-88-4	Y
Carbon disulfide*	Not detected	50	2.4	ug/L	10	75-15-0	Y
tert-Methyl butyl ether (MTBE)*	Not detected	50	1.9	ug/L	10	1634-04-4	Y
Acrylonitrile*	Not detected	20	5.7	ug/L	10	107-13-1	Y
2-Butanone (MEK)*	Not detected	250	2.6	ug/L	10	78-93-3	Y
Dichlorodifluoromethane*	Not detected	50	5.0	ug/L	10	75-71-8	Y
Chloromethane*	Not detected	50	2.6	ug/L	10	74-87-3	Y
Vinyl chloride*	9.5	10	3.1	ug/L	10	75-01-4	JY
Bromomethane*	Not detected	50	3.2	ug/L	10	74-83-9	Y
Chloroethane*	Not detected	50	3.4	ug/L	10	75-00-3	Y
Trichlorofluoromethane*	Not detected	10	3.3	ug/L	10	75-69-4	Y
1,1-Dichloroethene*	Not detected	10	2.7	ug/L	10	75-35-4	Y
Methylene chloride*	Not detected	50	2.9	ug/L	10	75-09-2	Y
trans-1,2-Dichloroethene*	Not detected	10	2.0	ug/L	10	156-60-5	Y
1,1-Dichloroethane*	3.6	10	2.0	ug/L	10	75-34-3	JY
cis-1,2-Dichloroethene*	490	10	2.6	ug/L	10	156-59-2	Y
Tetrahydrofuran*	16	900	13	ug/L	10	109-99-9	JBY
Chloroform*	Not detected	10	2.0	ug/L	10	67-66-3	Y
Bromochloromethane*	Not detected	10	3.8	ug/L	10	74-97-5	Y
1,1,1-Trichloroethane*	Not detected	10	2.8	ug/L	10	71-55-6	Y
4-Methyl-2-pentanone (MIBK)*	Not detected	500	1.4	ug/L	10	108-10-1	Y
2-Hexanone*	Not detected	500	2.9	ug/L	10	591-78-6	Y
Carbon tetrachloride*	Not detected	10	2.0	ug/L	10	56-23-5	Y
Benzene*	Not detected	10	2.0	ug/L	10	71-43-2	Y
1,2-Dichloroethane*	Not detected	10	1.6	ug/L	10	107-06-2	Y
Trichloroethene*	210	10	2.3	ug/L	10	79-01-6	Y
1,2-Dichloropropane*	Not detected	10	2.0	ug/L	10	78-87-5	Y
Bromodichloromethane*	Not detected	10	2.3	ug/L	10	75-27-4	Y
Dibromomethane*	Not detected	50	2.0	ug/L	10	74-95-3	Y
cis-1,3-Dichloropropene*	Not detected	10	1.9	ug/L	10	10061-01-5	Y
Toluene*	Not detected	10	2.5	ug/L	10	108-88-3	Y
trans-1,3-Dichloropropene*	Not detected	10	2.5	ug/L	10	10061-02-6	Y
1,1,2-Trichloroethane*	Not detected	10	2.8	ug/L	10	79-00-5	Y
Tetrachloroethene*	Not detected	10	2.0	ug/L	10	127-18-4	Y
trans-1,4-Dichloro-2-butene*	Not detected	10	2.0	ug/L	10	110-57-6	Y
Dibromochloromethane*	Not detected	50	2.4	ug/L	10	124-48-1	Y
1,2-Dibromoethane*	Not detected	10	3.0	ug/L	10	106-93-4	Y
Chlorobenzene*	Not detected	10	1.7	ug/L	10	108-90-7	Y
1,1,1,2-Tetrachloroethane*	Not detected	10	2.4	ug/L	10	630-20-6	Y
Ethylbenzene*	Not detected	10	2.6	ug/L	10	100-41-4	Y
p,m-Xylene*	Not detected	20	4.1	ug/L	10		Y
o-Xylene*	Not detected	10	2.5	ug/L	10	95-47-6	Y
Styrene*	Not detected	10	1.8	ug/L	10	100-42-5	Y
Isopropylbenzene*	Not detected	50	2.5	ug/L	10	98-82-8	Y
Bromoform*	Not detected	10	2.2	ug/L	10	75-25-2	Y
1,1,2,2-Tetrachloroethane*	Not detected	10	1.8	ug/L	10	79-34-5	Y
1,2,3-Trichloropropane*	Not detected	10	3.3	ug/L	10	96-18-4	Y

Y-Elevated reporting limit due to high target concentration
 J-Estimated value less than reporting limit, but greater than MDL
 B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.08 (continued)

Sample Tag: MW-114S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/19/18 00:39, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
n-Propylbenzene*	Not detected	10	2.3	ug/L	10	103-65-1	Y
Bromobenzene*	Not detected	10	2.7	ug/L	10	108-86-1	Y
1,3,5-Trimethylbenzene*	Not detected	10	2.6	ug/L	10	108-67-8	Y
tert-Butylbenzene*	Not detected	10	1.8	ug/L	10	98-06-6	Y
1,2,4-Trimethylbenzene*	Not detected	10	2.2	ug/L	10	95-63-6	Y
sec-Butylbenzene*	Not detected	10	2.5	ug/L	10	135-98-8	Y
p-Isopropyltoluene*	Not detected	50	2.1	ug/L	10	99-87-6	Y
1,3-Dichlorobenzene*	Not detected	10	2.4	ug/L	10	541-73-1	Y
1,4-Dichlorobenzene*	Not detected	10	2.3	ug/L	10	106-46-7	Y
1,2-Dichlorobenzene*	Not detected	10	2.8	ug/L	10	95-50-1	Y
1,2,3-Trimethylbenzene*	Not detected	10	0.61	ug/L	10	526-73-8	Y
n-Butylbenzene*	Not detected	10	2.2	ug/L	10	104-51-8	Y
Hexachloroethane*	Not detected	50	2.1	ug/L	10	67-72-1	Y
1,2-Dibromo-3-chloropropane*	Not detected	50	4.7	ug/L	10	96-12-8	Y
1,2,4-Trichlorobenzene*	Not detected	50	1.9	ug/L	10	120-82-1	Y
1,2,3-Trichlorobenzene*	Not detected	50	2.0	ug/L	10	87-61-6	Y
Naphthalene*	Not detected	50	2.1	ug/L	10	91-20-3	Y
2-Methylnaphthalene*	Not detected	50	1.6	ug/L	10	91-57-6	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S93925.09

Sample Tag: MW-109S

Collected Date/Time: 09/05/2018 13:50

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:45, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 13:56, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.005	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.001	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.005	0.005	0.0000785	mg/L	5	7440-66-6	

Method: E200.8, Run Date: 09/07/18 13:58, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.004	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.004	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.003	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 17:37, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	2.32	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.09 (continued)

Sample Tag: MW-109S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 17:37, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	42	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	2	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	0.70	1	0.20	ug/L	1	156-60-5	J
1,1-Dichloroethane*	1	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	68	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	17	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93925.09 (continued)

Sample Tag: MW-109S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 17:37, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.10

Sample Tag: Dupe 1

Collected Date/Time: 09/05/2018 08:50

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:35, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:50, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 14:39, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	0.013	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.006	0.005	0.000286	mg/L	5	7782-49-2	
Zinc	0.001	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 14:41, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	0.001	0.005	0.0000190	mg/L	5	7440-47-3	b
Copper, Dissolved	0.001	0.005	0.0000505	mg/L	5	7440-50-8	b
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.009	0.005	0.000286	mg/L	5	7782-49-2	
Zinc, Dissolved	0.001	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 17:56, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	Not detected	50	0.56	ug/L	1	67-64-1	
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	

b-Value detected less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93925.10 (continued)

Sample Tag: Dupe 1

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 17:56, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	0.36	1	0.26	ug/L	1	156-59-2	J
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	40	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93925.10 (continued)

Sample Tag: Dupe 1

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 17:56, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.11

Sample Tag: Dupe 2

Collected Date/Time: 09/05/2018 08:50

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:40, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 17:55, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 14:35, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.005	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper	Not detected	0.005	0.0000505	mg/L	5	7440-50-8	
Lead	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium	0.002	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 14:37, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.003	0.002	0.0000340	mg/L	5	7440-38-2	
Chromium, Dissolved	Not detected	0.005	0.0000190	mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005	0.0000505	mg/L	5	7440-50-8	
Lead, Dissolved	Not detected	0.003	0.0000150	mg/L	5	7439-92-1	
Selenium, Dissolved	0.002	0.005	0.000286	mg/L	5	7782-49-2	b
Zinc, Dissolved	0.002	0.005	0.0000785	mg/L	5	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 18:15, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	2.75	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.11 (continued)

Sample Tag: Dupe 2

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 18:15, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	41	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	2	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	0.66	1	0.20	ug/L	1	156-60-5	J
1,1-Dichloroethane*	1	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	65	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	17	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	0.22	1	0.20	ug/L	1	127-18-4	J
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93925.11 (continued)

Sample Tag: Dupe 2

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 18:15, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.12

Sample Tag: Field Blk (FB2)

Collected Date/Time: 09/05/2018 08:50

Matrix: Liquid

COC Reference: 111771

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:45, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 18:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 14:27, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.001	0.002	0.0000136	mg/L	2	7440-38-2	b
Chromium	Not detected	0.005	0.00000760	mg/L	2	7440-47-3	
Copper	Not detected	0.005	0.0000202	mg/L	2	7440-50-8	
Lead	Not detected	0.003	0.00000600	mg/L	2	7439-92-1	
Selenium	0.001	0.005	0.000114	mg/L	2	7782-49-2	b
Zinc	0.001	0.005	0.0000314	mg/L	2	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 14:29, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.001	0.002	0.0000136	mg/L	2	7440-38-2	b
Chromium, Dissolved	Not detected	0.005	0.00000760	mg/L	2	7440-47-3	
Copper, Dissolved	Not detected	0.005	0.0000202	mg/L	2	7440-50-8	
Lead, Dissolved	Not detected	0.003	0.00000600	mg/L	2	7439-92-1	
Selenium, Dissolved	0.001	0.005	0.000114	mg/L	2	7782-49-2	b
Zinc, Dissolved	0.002	0.005	0.0000314	mg/L	2	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 14:07, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	7.48	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.12 (continued)

Sample Tag: Field Blk (FB2)

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 14:07, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	0.32	25	0.26	ug/L	1	78-93-3	JB
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	0.40	1	0.20	ug/L	1	67-66-3	J
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.12 (continued)

Sample Tag: Field Blk (FB2)

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 14:07, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	0.21	5	0.19	ug/L	1	120-82-1	J
1,2,3-Trichlorobenzene*	0.21	5	0.20	ug/L	1	87-61-6	J
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	0.23	5	0.16	ug/L	1	91-57-6	J

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93925.13

Sample Tag: Equip Blk

Collected Date/Time: 09/05/2018 08:50

Matrix: Liquid

COC Reference: 111772

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	
Metal Digestion	Completed	SW3015A	09/17/18 11:55	JRH	

Inorganics

Method: SM3500-Cr B, Run Date: 09/05/18 19:50, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 09/05/18 18:05, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.003	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 09/07/18 14:30, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.001	0.002	0.0000136	mg/L	2	7440-38-2	b
Chromium	Not detected	0.005	0.00000760	mg/L	2	7440-47-3	
Copper	Not detected	0.005	0.0000202	mg/L	2	7440-50-8	
Lead	Not detected	0.003	0.00000600	mg/L	2	7439-92-1	
Selenium	0.001	0.005	0.000114	mg/L	2	7782-49-2	b
Zinc	0.001	0.005	0.0000314	mg/L	2	7440-66-6	b

Method: E200.8, Run Date: 09/07/18 14:32, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.001	0.002	0.0000136	mg/L	2	7440-38-2	b
Chromium, Dissolved	Not detected	0.005	0.00000760	mg/L	2	7440-47-3	
Copper, Dissolved	Not detected	0.005	0.0000202	mg/L	2	7440-50-8	
Lead, Dissolved	Not detected	0.003	0.00000600	mg/L	2	7439-92-1	
Selenium, Dissolved	0.001	0.005	0.000114	mg/L	2	7782-49-2	b
Zinc, Dissolved	0.001	0.005	0.0000314	mg/L	2	7440-66-6	b

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 14:26, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	7.35	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.13 (continued)

Sample Tag: Equip Blk

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 14:26, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	0.30	1	0.20	ug/L	1	67-66-3	J
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S93925.13 (continued)

Sample Tag: Equip Blk

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 14:26, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S93925.14

Sample Tag: Trip Blk

Collected Date/Time: 09/05/2018 08:50

Matrix: Liquid

COC Reference: 111772

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/17/18 11:55	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 14:45, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	4.54	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	0.26	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.20	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S93925.14 (continued)

Sample Tag: Trip Blk

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 09/13/18 14:45, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.16	ug/L	1	91-57-6	

Merit Laboratories Login Checklist

Lab Set ID:S93925

Client:APPLIED (Applied Ecosystems)

Project: 11-4317-102 Racer Flint

Submitted:09/05/2018 16:10 Login User: SRS

Attention: Mike Smith

Address: Applied Ecosystems
G4300 S. Saginaw St.
Burton, MI 48529

Phone: 810-715-2525

FAX: 810-715-2526

Email: ae_mds@yahoo.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 4.3
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out Missing collection times for .10-.14. Analyses not checked .10-.12
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration Metals and Cr IV need to be filtered and preserved in-lab
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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 Bottle Preservation Check

Lab Set ID: S93925 Initials: SRS

Attention: Mike Smith
 Address: Applied Ecosystems
 G4300 S. Saginaw St.
 Burton, MI 48529

Client: APPLIED (Applied Ecosystems)

Project: 11-4317-102 Racer Flint

Submitted: 09/05/2018 16:10 Login User:

Phone: 810-715-2525 FAX: 810-715-2526
 Email: ae_mds@yahoo.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S93925.01	X								X					
S93925.02	X								X					
S93925.03	X								X					
S93925.04	X								X					
S93925.05	X								X					
S93925.06	X								X					
S93925.07	X								X					
S93925.08	X								X					
S93925.09	X								X					
S93925.10	X								X					
S93925.11	X								X					
S93925.12	X								X					
S93925.13	X								X					



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 2

111771

REPORT TO **CHAIN OF CUSTODY RECORD** **INVOICE TO**

CONTACT NAME Mike Smith
 COMPANY Applied EcoSystems
 ADDRESS G-4300 S. Saginaw St
 CITY Burton STATE MI ZIP CODE 48529
 PHONE NO. 810-280-715 FAX NO. 810-715-2526 P.O. NO. _____
 E-MAIL ADDRESS msmith@appliedecosystems.com QUOTE NO. _____

CONTACT NAME SAME SAME
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP CODE _____
 PHONE NO. _____ E-MAIL ADDRESS _____

PROJECT NO./NAME 11-4317-102 / Racer/Flint SAMPLER(S) - PLEASE PRINT/SIGN NAME Heather Dean
 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=WIFE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives								VOCs 8260	Diss. Metals	Total Metals	Certifications	Project Locations	Special Instructions
	DATE	TIME				NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER							
93925.01	9.5.18	8:50	MW-104S		5	✓	✓							✓	✓	✓	Certifications <input type="checkbox"/> OHIO VAP <input type="checkbox"/> Drinking Water <input type="checkbox"/> DoD <input type="checkbox"/> NPDES Project Locations <input type="checkbox"/> Detroit <input type="checkbox"/> New York <input type="checkbox"/> Other _____ Special Instructions <u>Diss Metals:</u> <u>+ Total Metals:</u> <u>↓</u> <u>(Ar, Cr-Total,</u> <u>Cr-Hex, Cu,</u> <u>Pb, Se, Zn)</u>		
.02	9.5.18	9:35	MW-105S		5	✓	✓							✓	✓	✓			
.03	9.5.18	10:30	MW-106S		5	✓	✓							✓	✓	✓			
.04	9.5.18	11:05	MW-100S		5	✓	✓	✓						✓	✓	✓			
.05	9.5.18	11:30	MW-101S		5	✓	✓	✓						✓	✓	✓			
.06	9.5.18	11:58	MW-112S		5	✓	✓	✓						✓	✓	✓			
.07	9.5.18	12:40	MW-103S		5	✓	✓	✓						✓	✓	✓			
.08	9.5.18	13:25	MW-114S		5	✓	✓	✓						✓	✓	✓			
.09	9.5.18	13:50	MW-109S		5	✓	✓	✓						✓	✓	✓			
.10	9.5.18		Dupe 1																
.11	9.5.18		Dupe 2																
.12	9.5.18		Field Blk (FB2)																

RELINQUISHED BY: Heather Dean Sampler DATE 9-5-18 TIME 15:00
 RECEIVED BY: Dugan DATE 9/5/18 TIME 15:00
 RELINQUISHED BY: Dugan DATE 9/5/18 TIME 16:10
 RECEIVED BY: Samson DATE 9/5/18 TIME 16:10

RELINQUISHED BY: _____ DATE _____ TIME _____
 RECEIVED BY: _____ DATE _____ TIME _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 NOTES: 4.3 TEMP. ON ARRIVAL _____

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



ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

October 22, 2018

Analytical Report for Service Request No: K1808314

Mike Smith
Applied EcoSystems, Inc.
G-4300 South Saginaw Street
Burton, MI 48529

RE: RACER Flint West / 11-4317-102

Dear Mike,

Enclosed are the results of the sample(s) submitted to our laboratory August 31, 2018
For your reference, these analyses have been assigned our service request number **K1808314**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3275. You may also contact me via email at Chris.Leaf@ALSGlobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Chris Leaf
Project Manager



ALS Environmental
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Acronyms

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Chain of Custody

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLCMS

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
 - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client: Applied EcoSystems, Inc.
Project: RACER Flint West
Sample Matrix: Water

Service Request: K1808314
Date Received: 08/31/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier III deliverables including summary forms for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

Nine water samples were received for analysis at ALS Environmental on 08/31/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Organic LC:

Method PFC/537M, 09/20/2018: The upper control criterion was exceeded for 4:2 Fluorotelomer sulfonic acid (4:2 FTS) in Lab Control Sample (LCS) KQ1812487-01 and for Perfluoropentane sulfonic acid (PFPeS) and 4:2 Fluorotelomer sulfonic acid (4:2 FTS) in Duplicate Lab Control Sample (DLCS) KQ1812487-02. The analytes in question were not detected above the Method Reporting Limit (MRL) in the associated field samples. The error associated with elevated recovery indicated a high bias. The sample data was not significantly affected. No further corrective action was appropriate.

Method PFC/537M, 09/20/2018: The upper control criterion was exceeded for Perfluoroheptane sulfonic acid (PFHpS) in Continuing Calibration Verification (CCV) 091918_082. The analyte in question was not detected above the Method Reporting Limit (MRL) in the associated field samples. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

Method PFC/537M, 09/20/2018: The surrogate recovery of 13C2-4:2 FTS in samples FB and TRIP BLANK was outside the control limits listed in the results summary. The limits are default values temporarily in use until sufficient data points are generated to calculate statistical control limits. Based on the method and historic data, the recoveries observed were in the range expected for this procedure. No further corrective action was taken.

Approved by



Date

10/22/2018



Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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CHAIN OF CUSTODY

92639

001

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068

www.alsglobal.com

SR# K1808314
 COC Set 1 of 1
 COC# _____

Project Name: <u>Racer Flint West</u>		Project Number: <u>11-4317-102</u>	
Project Manager: <u>Mike Smith</u>			
Company: <u>Applied Ecosystems</u>			
Address: <u>64300 S. Sarginaw, Burton, MI</u>			
Phone: <u>810-715-2525</u>		email: <u>Msmith@appliedecosystems.com</u>	
Sampler Signature: <u>Heather Dean</u>		Sampler Printed Name: <u>Heather Dean</u>	
NUMBER OF CONTAINERS			
PFC/637M / PFOA			
Remarks			

CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix						
1. MW-102 S		8-30-18	13:10	W	2	X				
2. MW-110 S		8-30-18	10:30	W	2	X				
3. MW-111 S		8-30-18	12:10	W	2	X				
4. MW-113 S		8-30-18	9:30	W	2	X				
5. EB		8-30-18	14:30	W	2	X				
6. PB		8-30-18	9:00	N	2	X				
7. TRIP Blank				N	1	X				
8. MW-107 S		8-30-18	14:00	W	2	X				
9. MW-108 S		8-30-18	11:10	W	2	X				
10.										

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# <u>11-4317-102</u> Bill To: <u>Applied Ecosystems</u>	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
	Turnaround Requirements <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input checked="" type="checkbox"/> 5 Day Standard	Special Instructions/Comments: _____	*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)
	Requested Report Date: _____		

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: <u>Heather Dean</u>	Signature: <u>[Signature]</u>	Signature:	Signature:	Signature:	Signature:
Printed Name: <u>Heather Dean</u>	Printed Name: <u>ALS-K</u>	Printed Name:	Printed Name:	Printed Name:	Printed Name:
Firm:	Firm: <u>08-31-18 0920</u>	Firm:	Firm:	Firm:	Firm:
Date/Time:	Date/Time:	Date/Time:	Date/Time:	Date/Time:	Date/Time:



PC EV

Cooler Receipt and Preservation Form

Client APPLIED ECO SYSTEMS Service Request K18 08314
 Received: 8-31-18 Opened: 8-31-18 By: ASP Unloaded: 8-31-18 By: ASP

- Samples were received via? USPS ^{8/31/18} Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA Y N If yes, how many and where? 2 TOA FRONT
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
<u>0.0</u>	<u>0.2</u>	<u>56</u>	<u>58</u>	<u>10.2</u>	<u>298</u>	<u>42639</u>	<u>J458 088 2333</u>	

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
- Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: COC STATES SAMPLE "FB" HAS 2 CONTAINERS; RECEIVED 1.



Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 13:10
Date Received: 08/31/18 09:20

Sample Name: MW-102S
Lab Code: K1808314-001

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	2.0 J	4.2	0.90	1	09/20/18 10:20	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 10:20	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	6.1	4.2	0.94	1	09/20/18 10:20	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	2.4 J	4.2	0.88	1	09/20/18 10:20	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	11	4.2	1.0	1	09/20/18 10:20	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 10:20	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.2	1.3	1	09/20/18 10:20	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	3.2 J	8.5	2.7	1	09/20/18 10:20	9/10/18	
Perfluoropentanoic acid (PFPeA)	1.4 J	4.2	1.1	1	09/20/18 10:20	9/10/18	
Perfluorohexanoic acid (PFHxA)	4.1 J	4.2	0.92	1	09/20/18 10:20	9/10/18	
Perfluoroheptanoic acid (PFHpA)	2.0 J	4.2	1.2	1	09/20/18 10:20	9/10/18	
Perfluorooctanoic acid (PFOA)	6.1	1.7	0.46	1	09/20/18 10:20	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.2	0.94	1	09/20/18 10:20	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.2	0.52	1	09/20/18 10:20	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.2	0.31	1	09/20/18 10:20	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.2	0.46	1	09/20/18 10:20	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.2	0.75	1	09/20/18 10:20	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.2	1.2	1	09/20/18 10:20	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.2	0.35	1	09/20/18 10:20	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 10:20	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.2	0.83	1	09/20/18 10:20	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.2	0.65	1	09/20/18 10:20	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.2	1.2	1	09/20/18 10:20	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.2	0.65	1	09/20/18 10:20	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 13:10
Date Received: 08/31/18 09:20

Sample Name: MW-102S
Lab Code: K1808314-001

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	72	10 - 122	09/20/18 10:20	
18O2-PFHxS	72	26 - 144	09/20/18 10:20	
13C4-PFOS	74	27 - 142	09/20/18 10:20	
13C4-PFBA	75	37 - 151	09/20/18 10:20	
13C5-PFPeA	86	23 - 154	09/20/18 10:20	
13C2-PFHxA	86	27 - 155	09/20/18 10:20	
13C4-PFHpA	79	20 - 153	09/20/18 10:20	
13C4-PFOA	77	31 - 142	09/20/18 10:20	
13C5-PFNA	73	27 - 146	09/20/18 10:20	
13C2-PFDA	67	22 - 155	09/20/18 10:20	
13C2-PFUnDA	72	26 - 138	09/20/18 10:20	
13C2-PFDoDA	68	24 - 131	09/20/18 10:20	
13C2-PFTeDA	70	16 - 136	09/20/18 10:20	
13C8-FOSA	73	19 - 123	09/20/18 10:20	
D3-MeFOSAA	77	18 - 129	09/20/18 10:20	
D5-EtFOSAA	67	19 - 128	09/20/18 10:20	
13C2-4:2 FTS	88	50 - 150	09/20/18 10:20	
13C2-6:2 FTS	83	10 - 173	09/20/18 10:20	
13C2-8:2 FTS	62	10 - 190	09/20/18 10:20	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 10:30
Date Received: 08/31/18 09:20

Sample Name: MW-110S
Lab Code: K1808314-002

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	3.6 J	4.1	0.90	1	09/20/18 10:30	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 10:30	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	4.3	4.1	0.94	1	09/20/18 10:30	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.1	0.88	1	09/20/18 10:30	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	8.5	4.1	1.0	1	09/20/18 10:30	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 10:30	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.1	1.3	1	09/20/18 10:30	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	6.7 J	8.2	2.7	1	09/20/18 10:30	9/10/18	
Perfluoropentanoic acid (PFPeA)	3.0 J	4.1	1.1	1	09/20/18 10:30	9/10/18	
Perfluorohexanoic acid (PFHxA)	4.8	4.1	0.92	1	09/20/18 10:30	9/10/18	
Perfluoroheptanoic acid (PFHpA)	3.7 J	4.1	1.2	1	09/20/18 10:30	9/10/18	
Perfluorooctanoic acid (PFOA)	11	1.6	0.46	1	09/20/18 10:30	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.1	0.94	1	09/20/18 10:30	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.1	0.52	1	09/20/18 10:30	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.1	0.31	1	09/20/18 10:30	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.1	0.46	1	09/20/18 10:30	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.1	0.75	1	09/20/18 10:30	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.1	1.2	1	09/20/18 10:30	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.1	0.35	1	09/20/18 10:30	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 10:30	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.1	0.83	1	09/20/18 10:30	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.1	0.65	1	09/20/18 10:30	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.1	1.2	1	09/20/18 10:30	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.1	0.65	1	09/20/18 10:30	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 10:30
Date Received: 08/31/18 09:20

Sample Name: MW-110S
Lab Code: K1808314-002

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	65	10 - 122	09/20/18 10:30	
18O2-PFHxS	74	26 - 144	09/20/18 10:30	
13C4-PFOS	63	27 - 142	09/20/18 10:30	
13C4-PFBA	75	37 - 151	09/20/18 10:30	
13C5-PFPeA	77	23 - 154	09/20/18 10:30	
13C2-PFHxA	82	27 - 155	09/20/18 10:30	
13C4-PFHpA	84	20 - 153	09/20/18 10:30	
13C4-PFOA	77	31 - 142	09/20/18 10:30	
13C5-PFNA	68	27 - 146	09/20/18 10:30	
13C2-PFDA	62	22 - 155	09/20/18 10:30	
13C2-PFUnDA	61	26 - 138	09/20/18 10:30	
13C2-PFDoDA	51	24 - 131	09/20/18 10:30	
13C2-PFTeDA	56	16 - 136	09/20/18 10:30	
13C8-FOSA	53	19 - 123	09/20/18 10:30	
D3-MeFOSAA	58	18 - 129	09/20/18 10:30	
D5-EtFOSAA	55	19 - 128	09/20/18 10:30	
13C2-4:2 FTS	120	50 - 150	09/20/18 10:30	
13C2-6:2 FTS	105	10 - 173	09/20/18 10:30	
13C2-8:2 FTS	65	10 - 190	09/20/18 10:30	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 12:10
Date Received: 08/31/18 09:20

Sample Name: MW-111S
Lab Code: K1808314-003

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	2.4 J	4.0	0.90	1	09/20/18 10:41	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 10:41	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	3.8 J	4.0	0.94	1	09/20/18 10:41	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.0	0.88	1	09/20/18 10:41	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	59	4.0	1.0	1	09/20/18 10:41	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 10:41	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.0	1.3	1	09/20/18 10:41	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.0	2.7	1	09/20/18 10:41	9/10/18	
Perfluoropentanoic acid (PFPeA)	1.3 J	4.0	1.1	1	09/20/18 10:41	9/10/18	
Perfluorohexanoic acid (PFHxA)	ND U	4.0	0.92	1	09/20/18 10:41	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.0	1.2	1	09/20/18 10:41	9/10/18	
Perfluorooctanoic acid (PFOA)	1.7	1.6	0.46	1	09/20/18 10:41	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.0	0.94	1	09/20/18 10:41	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.0	0.52	1	09/20/18 10:41	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.0	0.31	1	09/20/18 10:41	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.0	0.46	1	09/20/18 10:41	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.0	0.75	1	09/20/18 10:41	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.0	1.2	1	09/20/18 10:41	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.0	0.35	1	09/20/18 10:41	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 10:41	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.0	0.83	1	09/20/18 10:41	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.0	0.65	1	09/20/18 10:41	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.0	1.2	1	09/20/18 10:41	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.0	0.65	1	09/20/18 10:41	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 12:10
Date Received: 08/31/18 09:20

Sample Name: MW-111S
Lab Code: K1808314-003

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	67	10 - 122	09/20/18 10:41	
18O2-PFHxS	83	26 - 144	09/20/18 10:41	
13C4-PFOS	70	27 - 142	09/20/18 10:41	
13C4-PFBA	73	37 - 151	09/20/18 10:41	
13C5-PFPeA	67	23 - 154	09/20/18 10:41	
13C2-PFHxA	72	27 - 155	09/20/18 10:41	
13C4-PFHpA	74	20 - 153	09/20/18 10:41	
13C4-PFOA	86	31 - 142	09/20/18 10:41	
13C5-PFNA	80	27 - 146	09/20/18 10:41	
13C2-PFDA	79	22 - 155	09/20/18 10:41	
13C2-PFUnDA	69	26 - 138	09/20/18 10:41	
13C2-PFDoDA	54	24 - 131	09/20/18 10:41	
13C2-PFTeDA	49	16 - 136	09/20/18 10:41	
13C8-FOSA	46	19 - 123	09/20/18 10:41	
D3-MeFOSAA	55	18 - 129	09/20/18 10:41	
D5-EtFOSAA	50	19 - 128	09/20/18 10:41	
13C2-4:2 FTS	139	50 - 150	09/20/18 10:41	
13C2-6:2 FTS	162	10 - 173	09/20/18 10:41	
13C2-8:2 FTS	127	10 - 190	09/20/18 10:41	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 09:30
Date Received: 08/31/18 09:20

Sample Name: MW-113S
Lab Code: K1808314-004

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	5.0	4.1	0.90	1	09/20/18 10:51	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 10:51	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	2.6 J	4.1	0.94	1	09/20/18 10:51	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.1	0.88	1	09/20/18 10:51	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	13	4.1	1.0	1	09/20/18 10:51	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 10:51	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.1	1.3	1	09/20/18 10:51	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	7.1 J	8.2	2.7	1	09/20/18 10:51	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.1	1.1	1	09/20/18 10:51	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.0 J	4.1	0.92	1	09/20/18 10:51	9/10/18	
Perfluoroheptanoic acid (PFHpA)	1.3 J	4.1	1.2	1	09/20/18 10:51	9/10/18	
Perfluorooctanoic acid (PFOA)	2.6	1.6	0.46	1	09/20/18 10:51	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.1	0.94	1	09/20/18 10:51	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.1	0.52	1	09/20/18 10:51	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.1	0.31	1	09/20/18 10:51	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.1	0.46	1	09/20/18 10:51	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.1	0.75	1	09/20/18 10:51	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.1	1.2	1	09/20/18 10:51	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.1	0.35	1	09/20/18 10:51	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 10:51	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.1	0.83	1	09/20/18 10:51	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.1	0.65	1	09/20/18 10:51	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.1	1.2	1	09/20/18 10:51	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.1	0.65	1	09/20/18 10:51	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 09:30
Date Received: 08/31/18 09:20

Sample Name: MW-113S
Lab Code: K1808314-004

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	63	10 - 122	09/20/18 10:51	
18O2-PFHxS	83	26 - 144	09/20/18 10:51	
13C4-PFOS	73	27 - 142	09/20/18 10:51	
13C4-PFBA	77	37 - 151	09/20/18 10:51	
13C5-PFPeA	69	23 - 154	09/20/18 10:51	
13C2-PFHxA	80	27 - 155	09/20/18 10:51	
13C4-PFHpA	75	20 - 153	09/20/18 10:51	
13C4-PFOA	90	31 - 142	09/20/18 10:51	
13C5-PFNA	81	27 - 146	09/20/18 10:51	
13C2-PFDA	85	22 - 155	09/20/18 10:51	
13C2-PFUnDA	77	26 - 138	09/20/18 10:51	
13C2-PFDoDA	57	24 - 131	09/20/18 10:51	
13C2-PFTeDA	60	16 - 136	09/20/18 10:51	
13C8-FOSA	60	19 - 123	09/20/18 10:51	
D3-MeFOSAA	66	18 - 129	09/20/18 10:51	
D5-EtFOSAA	59	19 - 128	09/20/18 10:51	
13C2-4:2 FTS	119	50 - 150	09/20/18 10:51	
13C2-6:2 FTS	136	10 - 173	09/20/18 10:51	
13C2-8:2 FTS	94	10 - 190	09/20/18 10:51	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 14:30
Date Received: 08/31/18 09:20

Sample Name: EB
Lab Code: K1808314-005

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	3.9	0.90	1	09/20/18 11:02	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 11:02	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	ND U	3.9	0.94	1	09/20/18 11:02	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	3.9	0.88	1	09/20/18 11:02	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	ND U	3.9	1.0	1	09/20/18 11:02	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 11:02	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.0	1.3	1	09/20/18 11:02	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.0	2.7	1	09/20/18 11:02	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.0	1.1	1	09/20/18 11:02	9/10/18	
Perfluorohexanoic acid (PFHxA)	ND U	3.9	0.92	1	09/20/18 11:02	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.0	1.2	1	09/20/18 11:02	9/10/18	
Perfluorooctanoic acid (PFOA)	ND U	1.6	0.46	1	09/20/18 11:02	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	3.9	0.94	1	09/20/18 11:02	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	3.9	0.52	1	09/20/18 11:02	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	3.9	0.31	1	09/20/18 11:02	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	3.9	0.46	1	09/20/18 11:02	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	3.9	0.75	1	09/20/18 11:02	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	1.9 J	4.0	1.2	1	09/20/18 11:02	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	3.9	0.35	1	09/20/18 11:02	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 11:02	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	3.9	0.83	1	09/20/18 11:02	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	3.9	0.65	1	09/20/18 11:02	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.0	1.2	1	09/20/18 11:02	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	3.9	0.65	1	09/20/18 11:02	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 14:30
Date Received: 08/31/18 09:20

Sample Name: EB
Lab Code: K1808314-005

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	59	10 - 122	09/20/18 11:02	
18O2-PFHxS	62	26 - 144	09/20/18 11:02	
13C4-PFOS	75	27 - 142	09/20/18 11:02	
13C4-PFBA	68	37 - 151	09/20/18 11:02	
13C5-PFPeA	75	23 - 154	09/20/18 11:02	
13C2-PFHxA	82	27 - 155	09/20/18 11:02	
13C4-PFHpA	71	20 - 153	09/20/18 11:02	
13C4-PFOA	70	31 - 142	09/20/18 11:02	
13C5-PFNA	91	27 - 146	09/20/18 11:02	
13C2-PFDA	66	22 - 155	09/20/18 11:02	
13C2-PFUnDA	68	26 - 138	09/20/18 11:02	
13C2-PFDoDA	50	24 - 131	09/20/18 11:02	
13C2-PFTeDA	54	16 - 136	09/20/18 11:02	
13C8-FOSA	51	19 - 123	09/20/18 11:02	
D3-MeFOSAA	60	18 - 129	09/20/18 11:02	
D5-EtFOSAA	58	19 - 128	09/20/18 11:02	
13C2-4:2 FTS	52	50 - 150	09/20/18 11:02	
13C2-6:2 FTS	68	10 - 173	09/20/18 11:02	
13C2-8:2 FTS	62	10 - 190	09/20/18 11:02	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 09:00
Date Received: 08/31/18 09:20

Sample Name: FB
Lab Code: K1808314-006

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	4.4	0.90	1	09/20/18 11:12	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 11:12	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	ND U	4.4	0.94	1	09/20/18 11:12	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.4	0.88	1	09/20/18 11:12	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	ND U	4.4	1.0	1	09/20/18 11:12	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 11:12	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.4	1.3	1	09/20/18 11:12	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.8	2.7	1	09/20/18 11:12	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.4	1.1	1	09/20/18 11:12	9/10/18	
Perfluorohexanoic acid (PFHxA)	ND U	4.4	0.92	1	09/20/18 11:12	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.4	1.2	1	09/20/18 11:12	9/10/18	
Perfluorooctanoic acid (PFOA)	ND U	1.8	0.46	1	09/20/18 11:12	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.4	0.94	1	09/20/18 11:12	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.4	0.52	1	09/20/18 11:12	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.4	0.31	1	09/20/18 11:12	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.4	0.46	1	09/20/18 11:12	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.4	0.75	1	09/20/18 11:12	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.4	1.2	1	09/20/18 11:12	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.4	0.35	1	09/20/18 11:12	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 11:12	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.4	0.83	1	09/20/18 11:12	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.4	0.65	1	09/20/18 11:12	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.4	1.2	1	09/20/18 11:12	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.4	0.65	1	09/20/18 11:12	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 09:00
Date Received: 08/31/18 09:20

Sample Name: FB
Lab Code: K1808314-006

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	55	10 - 122	09/20/18 11:12	
18O2-PFHxS	62	26 - 144	09/20/18 11:12	
13C4-PFOS	61	27 - 142	09/20/18 11:12	
13C4-PFBA	67	37 - 151	09/20/18 11:12	
13C5-PFPeA	70	23 - 154	09/20/18 11:12	
13C2-PFHxA	73	27 - 155	09/20/18 11:12	
13C4-PFHpA	62	20 - 153	09/20/18 11:12	
13C4-PFOA	65	31 - 142	09/20/18 11:12	
13C5-PFNA	60	27 - 146	09/20/18 11:12	
13C2-PFDA	64	22 - 155	09/20/18 11:12	
13C2-PFUnDA	62	26 - 138	09/20/18 11:12	
13C2-PFDoDA	53	24 - 131	09/20/18 11:12	
13C2-PFTeDA	57	16 - 136	09/20/18 11:12	
13C8-FOSA	55	19 - 123	09/20/18 11:12	
D3-MeFOSAA	64	18 - 129	09/20/18 11:12	
D5-EtFOSAA	56	19 - 128	09/20/18 11:12	
13C2-4:2 FTS	45	50 - 150	09/20/18 11:12	*
13C2-6:2 FTS	60	10 - 173	09/20/18 11:12	
13C2-8:2 FTS	57	10 - 190	09/20/18 11:12	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18
Date Received: 08/31/18 09:20

Sample Name: TRIP BLANK
Lab Code: K1808314-007

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	4.2	0.90	1	09/20/18 11:23	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 11:23	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	ND U	4.2	0.94	1	09/20/18 11:23	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.2	0.88	1	09/20/18 11:23	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	ND U	4.2	1.0	1	09/20/18 11:23	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 11:23	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.2	1.3	1	09/20/18 11:23	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.5	2.7	1	09/20/18 11:23	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.2	1.1	1	09/20/18 11:23	9/10/18	
Perfluorohexanoic acid (PFHxA)	ND U	4.2	0.92	1	09/20/18 11:23	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.2	1.2	1	09/20/18 11:23	9/10/18	
Perfluorooctanoic acid (PFOA)	ND U	1.7	0.46	1	09/20/18 11:23	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.2	0.94	1	09/20/18 11:23	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.2	0.52	1	09/20/18 11:23	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.2	0.31	1	09/20/18 11:23	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.2	0.46	1	09/20/18 11:23	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.2	0.75	1	09/20/18 11:23	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.2	1.2	1	09/20/18 11:23	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.2	0.35	1	09/20/18 11:23	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 11:23	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.2	0.83	1	09/20/18 11:23	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.2	0.65	1	09/20/18 11:23	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.2	1.2	1	09/20/18 11:23	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.2	0.65	1	09/20/18 11:23	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18
Date Received: 08/31/18 09:20

Sample Name: TRIP BLANK
Lab Code: K1808314-007

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	61	10 - 122	09/20/18 11:23	
18O2-PFHxS	62	26 - 144	09/20/18 11:23	
13C4-PFOS	69	27 - 142	09/20/18 11:23	
13C4-PFBA	71	37 - 151	09/20/18 11:23	
13C5-PFPeA	77	23 - 154	09/20/18 11:23	
13C2-PFHxA	81	27 - 155	09/20/18 11:23	
13C4-PFHpA	74	20 - 153	09/20/18 11:23	
13C4-PFOA	68	31 - 142	09/20/18 11:23	
13C5-PFNA	70	27 - 146	09/20/18 11:23	
13C2-PFDA	66	22 - 155	09/20/18 11:23	
13C2-PFUnDA	73	26 - 138	09/20/18 11:23	
13C2-PFDoDA	61	24 - 131	09/20/18 11:23	
13C2-PFTeDA	59	16 - 136	09/20/18 11:23	
13C8-FOSA	57	19 - 123	09/20/18 11:23	
D3-MeFOSAA	66	18 - 129	09/20/18 11:23	
D5-EtFOSAA	60	19 - 128	09/20/18 11:23	
13C2-4:2 FTS	49	50 - 150	09/20/18 11:23	*
13C2-6:2 FTS	62	10 - 173	09/20/18 11:23	
13C2-8:2 FTS	65	10 - 190	09/20/18 11:23	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 14:00
Date Received: 08/31/18 09:20

Sample Name: MW-107S
Lab Code: K1808314-008

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	4.2	0.90	1	09/20/18 11:33	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 11:33	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	2.7 J	4.2	0.94	1	09/20/18 11:33	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.2	0.88	1	09/20/18 11:33	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	18	4.2	1.0	1	09/20/18 11:33	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 11:33	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.2	1.3	1	09/20/18 11:33	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.5	2.7	1	09/20/18 11:33	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.2	1.1	1	09/20/18 11:33	9/10/18	
Perfluorohexanoic acid (PFHxA)	ND U	4.2	0.92	1	09/20/18 11:33	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.2	1.2	1	09/20/18 11:33	9/10/18	
Perfluorooctanoic acid (PFOA)	2.1	1.7	0.46	1	09/20/18 11:33	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.2	0.94	1	09/20/18 11:33	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.2	0.52	1	09/20/18 11:33	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.2	0.31	1	09/20/18 11:33	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.2	0.46	1	09/20/18 11:33	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.2	0.75	1	09/20/18 11:33	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.2	1.2	1	09/20/18 11:33	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.2	0.35	1	09/20/18 11:33	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 11:33	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.2	0.83	1	09/20/18 11:33	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.2	0.65	1	09/20/18 11:33	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.2	1.2	1	09/20/18 11:33	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.2	0.65	1	09/20/18 11:33	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 14:00
Date Received: 08/31/18 09:20

Sample Name: MW-107S
Lab Code: K1808314-008

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	58	10 - 122	09/20/18 11:33	
18O2-PFHxS	67	26 - 144	09/20/18 11:33	
13C4-PFOS	81	27 - 142	09/20/18 11:33	
13C4-PFBA	69	37 - 151	09/20/18 11:33	
13C5-PFPeA	57	23 - 154	09/20/18 11:33	
13C2-PFHxA	58	27 - 155	09/20/18 11:33	
13C4-PFHpA	53	20 - 153	09/20/18 11:33	
13C4-PFOA	62	31 - 142	09/20/18 11:33	
13C5-PFNA	77	27 - 146	09/20/18 11:33	
13C2-PFDA	93	22 - 155	09/20/18 11:33	
13C2-PFUnDA	95	26 - 138	09/20/18 11:33	
13C2-PFDoDA	86	24 - 131	09/20/18 11:33	
13C2-PFTeDA	76	16 - 136	09/20/18 11:33	
13C8-FOSA	59	19 - 123	09/20/18 11:33	
D3-MeFOSAA	87	18 - 129	09/20/18 11:33	
D5-EtFOSAA	93	19 - 128	09/20/18 11:33	
13C2-4:2 FTS	133	50 - 150	09/20/18 11:33	
13C2-6:2 FTS	154	10 - 173	09/20/18 11:33	
13C2-8:2 FTS	170	10 - 190	09/20/18 11:33	

ALS Group USA, Corp.
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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 11:10
Date Received: 08/31/18 09:20

Sample Name: MW-108S
Lab Code: K1808314-009

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	1.7 J	4.2	0.90	1	09/20/18 11:44	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 11:44	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	2.9 J	4.2	0.94	1	09/20/18 11:44	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.2	0.88	1	09/20/18 11:44	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	6.0	4.2	1.0	1	09/20/18 11:44	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 11:44	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.2	1.3	1	09/20/18 11:44	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.5	2.7	1	09/20/18 11:44	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.2	1.1	1	09/20/18 11:44	9/10/18	
Perfluorohexanoic acid (PFHxA)	ND U	4.2	0.92	1	09/20/18 11:44	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.2	1.2	1	09/20/18 11:44	9/10/18	
Perfluorooctanoic acid (PFOA)	0.58 J	1.7	0.46	1	09/20/18 11:44	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.2	0.94	1	09/20/18 11:44	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.2	0.52	1	09/20/18 11:44	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.2	0.31	1	09/20/18 11:44	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.2	0.46	1	09/20/18 11:44	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.2	0.75	1	09/20/18 11:44	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.2	1.2	1	09/20/18 11:44	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.2	0.35	1	09/20/18 11:44	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 11:44	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.2	0.83	1	09/20/18 11:44	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.2	0.65	1	09/20/18 11:44	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.2	1.2	1	09/20/18 11:44	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.2	0.65	1	09/20/18 11:44	9/10/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: 08/30/18 11:10
Date Received: 08/31/18 09:20

Sample Name: MW-108S
Lab Code: K1808314-009

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	64	10 - 122	09/20/18 11:44	
18O2-PFHxS	85	26 - 144	09/20/18 11:44	
13C4-PFOS	80	27 - 142	09/20/18 11:44	
13C4-PFBA	77	37 - 151	09/20/18 11:44	
13C5-PFPeA	77	23 - 154	09/20/18 11:44	
13C2-PFHxA	79	27 - 155	09/20/18 11:44	
13C4-PFHpA	85	20 - 153	09/20/18 11:44	
13C4-PFOA	91	31 - 142	09/20/18 11:44	
13C5-PFNA	84	27 - 146	09/20/18 11:44	
13C2-PFDA	86	22 - 155	09/20/18 11:44	
13C2-PFUnDA	76	26 - 138	09/20/18 11:44	
13C2-PFDoDA	70	24 - 131	09/20/18 11:44	
13C2-PFTeDA	66	16 - 136	09/20/18 11:44	
13C8-FOSA	63	19 - 123	09/20/18 11:44	
D3-MeFOSAA	72	18 - 129	09/20/18 11:44	
D5-EtFOSAA	60	19 - 128	09/20/18 11:44	
13C2-4:2 FTS	115	50 - 150	09/20/18 11:44	
13C2-6:2 FTS	130	10 - 173	09/20/18 11:44	
13C2-8:2 FTS	92	10 - 190	09/20/18 11:44	

ALS Group USA, Corp.
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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ1812487-03

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	5.0	0.90	1	09/20/18 09:48	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 09:48	9/10/18	
Perfluorohexane sulfonic acid (PFHxS)	ND U	5.0	0.94	1	09/20/18 09:48	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	5.0	0.88	1	09/20/18 09:48	9/10/18	
Perfluorooctane sulfonic acid (PFOS)	ND U	5.0	1.0	1	09/20/18 09:48	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 09:48	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	5.0	1.3	1	09/20/18 09:48	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	10	2.7	1	09/20/18 09:48	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	5.0	1.1	1	09/20/18 09:48	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.5 J	5.0	0.92	1	09/20/18 09:48	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	5.0	1.2	1	09/20/18 09:48	9/10/18	
Perfluorooctanoic acid (PFOA)	ND U	2.0	0.46	1	09/20/18 09:48	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	5.0	0.94	1	09/20/18 09:48	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	5.0	0.52	1	09/20/18 09:48	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	5.0	0.31	1	09/20/18 09:48	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	5.0	0.46	1	09/20/18 09:48	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	5.0	0.75	1	09/20/18 09:48	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	2.1 J	5.0	1.2	1	09/20/18 09:48	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	5.0	0.35	1	09/20/18 09:48	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 09:48	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	5.0	0.83	1	09/20/18 09:48	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	5.0	0.65	1	09/20/18 09:48	9/10/18	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	5.0	1.2	1	09/20/18 09:48	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	5.0	0.65	1	09/20/18 09:48	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ1812487-03

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	76	10 - 122	09/20/18 09:48	
18O2-PFHxS	84	26 - 144	09/20/18 09:48	
13C4-PFOS	86	27 - 142	09/20/18 09:48	
13C4-PFBA	88	37 - 151	09/20/18 09:48	
13C5-PFPeA	100	23 - 154	09/20/18 09:48	
13C2-PFHxA	92	27 - 155	09/20/18 09:48	
13C4-PFHpA	92	20 - 153	09/20/18 09:48	
13C4-PFOA	94	31 - 142	09/20/18 09:48	
13C5-PFNA	91	27 - 146	09/20/18 09:48	
13C2-PFDA	84	22 - 155	09/20/18 09:48	
13C2-PFUnDA	87	26 - 138	09/20/18 09:48	
13C2-PFDoDA	86	24 - 131	09/20/18 09:48	
13C2-PFTeDA	85	16 - 136	09/20/18 09:48	
13C8-FOSA	80	19 - 123	09/20/18 09:48	
D3-MeFOSAA	91	18 - 129	09/20/18 09:48	
D5-EtFOSAA	82	19 - 128	09/20/18 09:48	
13C2-4:2 FTS	70	50 - 150	09/20/18 09:48	
13C2-6:2 FTS	87	10 - 173	09/20/18 09:48	
13C2-8:2 FTS	82	10 - 190	09/20/18 09:48	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	MW-102S	MW-110S	MW-111S
		K1808314-001	K1808314-002	K1808314-003
13C3-PFBS	10-122	72	65	67
18O2-PFHxS	26-144	72	74	83
13C4-PFOS	27-142	74	63	70
13C4-PFBA	37-151	75	75	73
13C5-PFPeA	23-154	86	77	67
13C2-PFHxA	27-155	86	82	72
13C4-PFHpA	20-153	79	84	74
13C4-PFOA	31-142	77	77	86
13C5-PFNA	27-146	73	68	80
13C2-PFDA	22-155	67	62	79
13C2-PFUnDA	26-138	72	61	69
13C2-PFDoDA	24-131	68	51	54
13C2-PFTeDA	16-136	70	56	49
13C8-FOSA	19-123	73	53	46
D3-MeFOSAA	18-129	77	58	55
D5-EtFOSAA	19-128	67	55	50
13C2-4:2 FTS	50-150	88	120	139
13C2-6:2 FTS	10-173	83	105	162
13C2-8:2 FTS	10-190	62	65	127

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	MW-113S	EB	FB
		K1808314-004	K1808314-005	K1808314-006
13C3-PFBS	10-122	63	59	55
18O2-PFHxS	26-144	83	62	62
13C4-PFOS	27-142	73	75	61
13C4-PFBA	37-151	77	68	67
13C5-PFPeA	23-154	69	75	70
13C2-PFHxA	27-155	80	82	73
13C4-PFHpA	20-153	75	71	62
13C4-PFOA	31-142	90	70	65
13C5-PFNA	27-146	81	91	60
13C2-PFDA	22-155	85	66	64
13C2-PFUnDA	26-138	77	68	62
13C2-PFDoDA	24-131	57	50	53
13C2-PFTeDA	16-136	60	54	57
13C8-FOSA	19-123	60	51	55
D3-MeFOSAA	18-129	66	60	64
D5-EtFOSAA	19-128	59	58	56
13C2-4:2 FTS	50-150	119	52	45*
13C2-6:2 FTS	10-173	136	68	60
13C2-8:2 FTS	10-190	94	62	57

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	TRIP BLANK	MW-107S	MW-108S
		K1808314-007	K1808314-008	K1808314-009
13C3-PFBS	10-122	61	58	64
18O2-PFHxS	26-144	62	67	85
13C4-PFOS	27-142	69	81	80
13C4-PFBA	37-151	71	69	77
13C5-PFPeA	23-154	77	57	77
13C2-PFHxA	27-155	81	58	79
13C4-PFHpA	20-153	74	53	85
13C4-PFOA	31-142	68	62	91
13C5-PFNA	27-146	70	77	84
13C2-PFDA	22-155	66	93	86
13C2-PFUnDA	26-138	73	95	76
13C2-PFDoDA	24-131	61	86	70
13C2-PFTeDA	16-136	59	76	66
13C8-FOSA	19-123	57	59	63
D3-MeFOSAA	18-129	66	87	72
D5-EtFOSAA	19-128	60	93	60
13C2-4:2 FTS	50-150	49*	133	115
13C2-6:2 FTS	10-173	62	154	130
13C2-8:2 FTS	10-190	65	170	92

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	Method Blank	Lab Control Sample	Duplicate Lab Control Sample
		KQ1812487-03	KQ1812487-01	KQ1812487-02
13C3-PFBS	10-122	76	76	72
18O2-PFHxS	26-144	84	82	78
13C4-PFOS	27-142	86	79	86
13C4-PFBA	37-151	88	86	89
13C5-PFPeA	23-154	100	97	92
13C2-PFHxA	27-155	92	92	102
13C4-PFHpA	20-153	92	87	87
13C4-PFOA	31-142	94	88	87
13C5-PFNA	27-146	91	85	86
13C2-PFDA	22-155	84	80	88
13C2-PFUnDA	26-138	87	85	92
13C2-PFDoDA	24-131	86	77	84
13C2-PFTeDA	16-136	85	77	75
13C8-FOSA	19-123	80	75	68
D3-MeFOSAA	18-129	91	83	87
D5-EtFOSAA	19-128	82	75	79
13C2-4:2 FTS	50-150	70	67	68
13C2-6:2 FTS	10-173	87	79	74
13C2-8:2 FTS	10-190	82	66	81

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

ALS Group USA, Corp.
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QA/QC Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102

Service Request: K1808314
Date Analyzed: 09/20/18 09:27

Internal Standard Area and RT SUMMARY
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

File ID: J:\LCMS06\Data\091918_b7\091918_082
Instrument ID: K-LCMS-06
Analysis Method: PFC/537M

Lab Code: KQ1814114-01
Analysis Lot: 607276
Signal ID: 1

	D3-MeFOSA	
	Area	RT
Result ==>	455,079	5.623
Upper Limit ==>	910,158	6.62
Lower Limit ==>	227,540	4.62

Associated Analyses

Continuing Calibration Blank	KQ1814114-02	487049	5.622
Method Blank	KQ1812487-03	480905	5.624
Lab Control Sample	KQ1812487-01	481058	5.624
Duplicate Lab Control Sample	KQ1812487-02	450931	5.627
MW-102S	K1808314-001	509862	5.617
MW-110S	K1808314-002	555585	5.620
MW-111S	K1808314-003	518426	5.622
MW-113S	K1808314-004	512612	5.616
EB	K1808314-005	594506	5.618
FB	K1808314-006	592458	5.617
TRIP BLANK	K1808314-007	580771	5.619
MW-107S	K1808314-008	559567	5.627
MW-108S	K1808314-009	570274	5.623

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Analyzed: 09/20/18
Date Extracted: 09/10/18

Duplicate Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Units: ng/L
Basis: NA
Analysis Lot: 607276

Analyte Name	Lab Control Sample KQ1812487-01			Duplicate Lab Control Sample KQ1812487-02			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	174	150	116 *	190	150	127 *	11-81	9	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	155	152	102	166	152	109	39-161	7	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	192	154	125	171	154	111	39-144	12	30
N-Ethyl perfluorooctane sulfonamidoacetic acid	187	160	117	177	160	111	40-166	6	30
N-Methyl perfluorooctane sulfonamidoacetic acid	179	160	112	179	160	112	48-162	<1	30
Perfluorobutane sulfonic acid (PFBS)	159	142	112	175	142	123	48-164	10	30
Perfluorobutanoic acid (PFBA)	157	160	98	156	160	98	47-147	<1	30
Perfluorodecane sulfonic acid (PFDS)	166	154	107	172	154	112	35-155	4	30
Perfluorodecanoic acid (PFDA)	155	160	97	147	160	92	54-139	5	30
Perfluorododecanoic acid (PFDoDA)	164	160	103	163	160	102	51-155	<1	30
Perfluoroheptane sulfonic acid (PFHpS)	186	153	122	184	153	121	47-156	<1	30
Perfluoroheptanoic acid (PFHpA)	150	160	94	168	160	105	46-153	11	30
Perfluorohexane sulfonic acid (PFHxS)	171	146	117	173	146	118	46-145	<1	30
Perfluorohexanoic acid (PFHxA)	151	160	95	141	160	88	44-148	7	30
Perfluorononane sulfonic acid (PFNS)	160	154	104	159	154	103	70-130	<1	30
Perfluorononanoic acid (PFNA)	170	160	106	161	160	101	47-155	5	30
Perfluorooctane sulfonamide (FOSA)	164	160	103	187	160	117	35-146	13	30
Perfluorooctane sulfonic acid (PFOS)	156	149	105	151	149	102	29-162	3	30
Perfluorooctanoic acid (PFOA)	157	160	98	171	160	107	52-147	9	30
Perfluoropentane sulfonic acid (PFPeS)	168	151	111	217	151	144 *	70-130	25	30
Perfluoropentanoic acid (PFPeA)	147	160	92	161	160	100	42-160	9	30
Perfluorotetradecanoic acid (PFTeDA)	156	160	97	153	160	96	47-169	2	30
Perfluorotridecanoic acid (PFTrDA)	161	160	101	174	160	109	45-160	8	30
Perfluoroundecanoic acid (PFUnDA)	155	160	97	153	160	96	53-141	<1	30

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Analyzed: 09/20/18 09:48
Date Extracted: 09/10/18

Method Blank Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name: Method Blank **Instrument ID:** K-LCMS-06
Lab Code: KQ1812487-03 **File ID:** J:\LCMS06\Data\091918_b7\091918_084
Analysis Method: PFC/537M **Analysis Lot:** 607276
Prep Method: EPA 3535A **Extraction Lot:** 321523

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	KQ1812487-01	J:\LCMS06\Data\091918_b7\091918_085	09/20/18 09:59
Duplicate Lab Control Sample	KQ1812487-02	J:\LCMS06\Data\091918_b7\091918_086	09/20/18 10:09
MW-102S	K1808314-001	J:\LCMS06\Data\091918_b7\091918_087	09/20/18 10:20
MW-110S	K1808314-002	J:\LCMS06\Data\091918_b7\091918_088	09/20/18 10:30
MW-111S	K1808314-003	J:\LCMS06\Data\091918_b7\091918_089	09/20/18 10:41
MW-113S	K1808314-004	J:\LCMS06\Data\091918_b7\091918_090	09/20/18 10:51
EB	K1808314-005	J:\LCMS06\Data\091918_b7\091918_091	09/20/18 11:02
FB	K1808314-006	J:\LCMS06\Data\091918_b7\091918_092	09/20/18 11:12
TRIP BLANK	K1808314-007	J:\LCMS06\Data\091918_b7\091918_093	09/20/18 11:23
MW-107S	K1808314-008	J:\LCMS06\Data\091918_b7\091918_094	09/20/18 11:33
MW-108S	K1808314-009	J:\LCMS06\Data\091918_b7\091918_095	09/20/18 11:44

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request: K1808314
Date Analyzed: 09/20/18 09:59
Date Extracted: 09/10/18

Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name: Lab Control Sample **Instrument ID:** K-LCMS-06
Lab Code: KQ1812487-01 **File ID:** J:\LCMS06\Data\091918_b7\091918_085
Analysis Method: PFC/537M **Analysis Lot:** 607276
Prep Method: EPA 3535A **Extraction Lot:** 321523

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	KQ1812487-03	J:\LCMS06\Data\091918_b7\091918_084	09/20/18 09:48
Duplicate Lab Control Sample	KQ1812487-02	J:\LCMS06\Data\091918_b7\091918_086	09/20/18 10:09
MW-102S	K1808314-001	J:\LCMS06\Data\091918_b7\091918_087	09/20/18 10:20
MW-110S	K1808314-002	J:\LCMS06\Data\091918_b7\091918_088	09/20/18 10:30
MW-111S	K1808314-003	J:\LCMS06\Data\091918_b7\091918_089	09/20/18 10:41
MW-113S	K1808314-004	J:\LCMS06\Data\091918_b7\091918_090	09/20/18 10:51
EB	K1808314-005	J:\LCMS06\Data\091918_b7\091918_091	09/20/18 11:02
FB	K1808314-006	J:\LCMS06\Data\091918_b7\091918_092	09/20/18 11:12
TRIP BLANK	K1808314-007	J:\LCMS06\Data\091918_b7\091918_093	09/20/18 11:23
MW-107S	K1808314-008	J:\LCMS06\Data\091918_b7\091918_094	09/20/18 11:33
MW-108S	K1808314-009	J:\LCMS06\Data\091918_b7\091918_095	09/20/18 11:44

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

Service Request: K1808314
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

#	Lab Code	Sample Name	File Location	Acquisition Date
01	KC1800443-01	0.05 PPB ICAL	091918_007	09/19/2018 20:23
02	KC1800443-02	0.10 PPB ICAL	091918_008	09/19/2018 20:34
03	KC1800443-03	0.50 PPB ICAL	091918_009	09/19/2018 20:44
04	KC1800443-04	1.0 PPB ICAL	091918_010	09/19/2018 20:54
05	KC1800443-05	5.0 PPB ICAL	091918_011	09/19/2018 21:05
06	KC1800443-06	10.0 PPB ICAL	091918_012	09/19/2018 21:15
07	KC1800443-07	15.0 PPB ICAL	091918_013	09/19/2018 21:26

Analyte

13C2-4:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.404	02	5	1.325	03	5	1.251	04	5	1.314
05	5	1.224	06	5	1.221	07	5	1.184			

13C2-6:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.9795	02	5	1.105	03	5	1.081	04	5	1.064
05	5	0.9616	06	5	0.8949	07	5	0.8593			

13C2-8:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.5926	02	5	0.5665	03	5	0.5512	04	5	0.5897
05	5	0.5406	06	5	0.4981	07	5	0.4732			

13C2-PFDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	5.734	02	5	5.215	03	5	5.144	04	5	5.174
05	5	5.057	06	5	4.889	07	5	4.883			

13C2-PFDoDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	8.064	02	5	8.058	03	5	7.915	04	5	8.016
05	5	7.627	06	5	7.62	07	5	7.34			

13C2-PFHxA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	6.611	02	5	6.159	03	5	5.974	04	5	6.02
05	5	5.658	06	5	5.591	07	5	5.539			

13C2-PFTeDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	5.848	02	5	5.531	03	5	5.521	04	5	5.59
05	5	5.411	06	5	5.23	07	5	5.28			

13C2-PFUnDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	5.683	02	5	5.57	03	5	5.677	04	5	5.723

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

Service Request: K1808314
Calibration Date: 9/19/2018

Initial Calibration Summary
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Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

13C2-PFUnDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
05	5	5.33	06	5	5.21	07	5	5.199			

13C3-PFBS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.511	02	5	1.482	03	5	1.478	04	5	1.537
05	5	1.501	06	5	1.515	07	5	1.523			

13C4-PFBA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	4.682	02	5	4.525	03	5	4.485	04	5	4.589
05	5	4.46	06	5	4.609	07	5	4.629			

13C4-PFHpA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	6.54	02	5	6.379	03	5	6.448	04	5	6.735
05	5	5.969	06	5	6.772	07	5	6.036			

13C4-PFOA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	8.502	02	5	8.326	03	5	8.357	04	5	8.374
05	5	8.268	06	5	8.343	07	5	7.959			

13C4-PFOS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.895	02	5	0.9432	03	5	0.9044	04	5	0.9627
05	5	0.8615	06	5	0.879	07	5	0.8482			

13C5-PFNA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	6.576	02	5	6.356	03	5	6.441	04	5	6.332
05	5	6.316	06	5	6.268	07	5	5.995			

13C5-PFPeA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	2.705	02	5	2.62	03	5	2.595	04	5	2.621
05	5	2.557	06	5	2.6	07	5	2.553			

13C8-FOSA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	2.142	02	5	1.947	03	5	2.061	04	5	2.119
05	5	2.023	06	5	2.038	07	5	2			

18O2-PFHxS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.8837	02	5	0.9515	03	5	0.9554	04	5	0.9791
05	5	0.9016	06	5	0.9438	07	5	0.8945			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

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Calibration Date: 9/19/2018

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Calibration ID: KC1800443
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Analyte

4:2 Fluorotelomer sulfonic acid (4:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.046861	0.7716	02	0.0937218	0.7314	03	0.468609	0.7263	04	0.937218	0.7508
05	4.68609	0.7064	06	9.37218	0.6933	07	14.0583	0.7013			

6:2 Fluorotelomer sulfonic acid (6:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.047558	0.9373	02	0.0951168	0.6621	03	0.475584	0.7317	04	0.951168	0.7249
05	4.75584	0.6821	06	9.51168	0.7012	07	14.26755	0.6605			

8:2 Fluorotelomer sulfonic acid (8:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.048002	0.9607	02	0.0960045	0.9423	03	0.480022	0.9882	04	0.960045	0.9575
05	4.80022	0.847	06	9.60045	0.8777	07	14.40067	0.8536			

D3-MeFOSAA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.097	02	5	1.052	03	5	1.095	04	5	1.122
05	5	1.078	06	5	1.149	07	5	1.084			

D5-EtFOSAA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.349	02	5	1.223	03	5	1.25	04	5	1.319
05	5	1.234	06	5	1.212	07	5	1.235			

N-Ethyl perfluorooctane sulfonamidoacetic acid

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	0.4311	03	0.5	0.2852	04	1	0.4261	05	5	0.4209
06	10	0.4113	07	15	0.3989						

N-Methyl perfluorooctane sulfonamidoacetic acid

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	0.5618	03	0.5	0.6078	04	1	0.614	05	5	0.6049
06	10	0.5433	07	15	0.598						

Perfluorobutane sulfonic acid (PFBS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.044368	0.5957	02	0.088737	0.6959	03	0.443685	0.6389	04	0.88737	0.6284
05	4.43685	0.6407	06	8.8737	0.6392	07	13.31055	0.6462			

Perfluorobutanoic acid (PFBA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.13	02	0.1	1.045	03	0.5	0.9469	04	1	1.024
05	5	0.9575	06	10	0.9595	07	15	0.9773			

Perfluorodecane sulfonic acid (PFDS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.048233	0.663	02	0.0964667	0.8939	03	0.482333	0.6665	04	0.964667	0.8157
05	4.82333	0.7468	06	9.64667	0.7642	07	14.46998	0.7458			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

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Analyte

Perfluorodecanoic acid (PFDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.8514	02	0.1	0.7247	03	0.5	0.7116	04	1	0.7144
05	5	0.6429	06	10	0.6598	07	15	0.6674			

Perfluorododecanoic acid (PFDoDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.5214	02	0.1	0.5339	03	0.5	0.5012	04	1	0.4882
05	5	0.4756	06	10	0.4746	07	15	0.493			

Perfluoroheptane sulfonic acid (PFHpS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.0953438	0.701	03	0.476719	0.4354	04	0.953438	0.7176	05	4.76719	0.551
06	9.53438	0.6204	07	14.3016	0.6467						

Perfluoroheptanoic acid (PFHpA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.396	02	0.1	1.117	03	0.5	1.067	04	1	1.08
05	5	1.064	06	10	1.042	07	15	1.099			

Perfluorohexane sulfonic acid (PFHxS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.045654	0.8691	02	0.0913075	0.7568	03	0.456538	0.8344	04	0.913075	0.7213
05	4.56538	0.8048	06	9.13075	0.7731	07	13.69613	0.8318			

Perfluorohexanoic acid (PFHxA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.504	02	0.1	1.436	03	0.5	1.228	04	1	1.168
05	5	1.096	06	10	1.107	07	15	1.124			

Perfluorononane sulfonic acid (PFNS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.048079	0.7088	02	0.096158	0.8651	03	0.480789	0.7265	04	0.961578	0.6779
05	4.807891	0.6687	06	9.615782	0.6694	07	14.42367	0.6875			

Perfluorononanoic acid (PFNA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.6214	02	0.1	0.6325	03	0.5	0.7305	04	1	0.7182
05	5	0.6518	06	10	0.6704	07	15	0.6932			

Perfluorooctane sulfonamide (FOSA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.539	02	0.1	1.637	03	0.5	1.534	04	1	1.547
05	5	1.457	06	10	1.47	07	15	1.501			

Perfluorooctane sulfonic acid (PFOS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.046461	0.6347	02	0.0929229	0.5664	03	0.464615	0.6553	04	0.929229	0.587
05	4.64615	0.6231	06	9.29229	0.6149	07	13.93845	0.6237			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

Service Request: K1808314
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

Perfluorooctanoic acid (PFOA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.9468	02	0.1	0.8556	03	0.5	0.6976	04	1	0.7165
05	5	0.6503	06	10	0.6683	07	15	0.6649			

Perfluoropentane sulfonic acid (PFPeS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.047046	0.4755	02	0.094092	0.6335	03	0.470462	0.504	04	0.940923	0.5015
05	4.704616	0.4551	06	9.409233	0.4896	07	14.11384	0.4666			

Perfluoropentanoic acid (PFPeA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	7.578	02	0.1	4.662	03	0.5	2.769	04	1	2.534
05	5	2.207	06	10	2.202	07	15	2.28			

Perfluorotetradecanoic acid (PFTeDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	0.5042	03	0.5	0.2862	04	1	0.2626	05	5	0.2184
06	10	0.2233	07	15	0.2094						

Perfluorotridecanoic acid (PFTrDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.6853	02	0.1	0.6988	03	0.5	0.7306	04	1	0.6826
05	5	0.638	06	10	0.6871	07	15	0.6553			

Perfluoroundecanoic acid (PFUnDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.9864	02	0.1	0.9707	03	0.5	0.7819	04	1	0.8185
05	5	0.7122	06	10	0.7587	07	15	0.7624			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

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Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
13C2-4:2 FTS	SURR	Average RF	% RSD	6.0	20	1.275	
13C2-6:2 FTS	SURR	Average RF	% RSD	9.6	20	0.9922	
13C2-8:2 FTS	SURR	Average RF	% RSD	8.3	20	0.5446	
13C2-PFDA	SURR	Average RF	% RSD	5.6	20	5.157	
13C2-PFDoDA	SURR	Average RF	% RSD	3.6	20	7.806	
13C2-PFHxA	SURR	Average RF	% RSD	6.4	20	5.936	
13C2-PFTeDA	SURR	Average RF	% RSD	3.8	20	5.487	
13C2-PFUnDA	SURR	Average RF	% RSD	4.2	20	5.485	
13C3-PFBS	SURR	Average RF	% RSD	1.4	20	1.507	
13C4-PFBA	SURR	Average RF	% RSD	1.8	20	4.568	
13C4-PFHpA	SURR	Average RF	% RSD	4.9	20	6.411	
13C4-PFOA	SURR	Average RF	% RSD	2.0	20	8.304	
13C4-PFOS	SURR	Average RF	% RSD	4.6	20	0.8991	
13C5-PFNA	SURR	Average RF	% RSD	2.8	20	6.326	
13C5-PFPeA	SURR	Average RF	% RSD	2.0	20	2.607	
13C8-FOSA	SURR	Average RF	% RSD	3.3	20	2.047	
18O2-PFHxS	SURR	Average RF	% RSD	3.9	20	0.9299	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	TRG	Average RF	% RSD	3.9	20	0.7259	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	TRG	Average RF	% RSD	13.2	20	0.7286	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	TRG	Average RF	% RSD	6.2	20	0.9181	
D3-MeFOSAA	SURR	Average RF	% RSD	2.9	20	1.097	
D5-EtFOSAA	SURR	Average RF	% RSD	4.2	20	1.26	
N-Ethyl perfluorooctane sulfonamidoacetic acid	TRG	Average RF	% RSD	14.0	20	0.3956	
N-Methyl perfluorooctane sulfonamidoacetic acid	TRG	Average RF	% RSD	4.9	20	0.5883	
Perfluorobutane sulfonic acid (PFBS)	TRG	Average RF	% RSD	4.6	20	0.6407	
Perfluorobutanoic acid (PFBA)	TRG	Average RF	% RSD	6.5	20	1.006	
Perfluorodecane sulfonic acid (PFDS)	TRG	Average RF	% RSD	10.7	20	0.7566	
Perfluorodecanoic acid (PFDA)	TRG	Average RF	% RSD	9.8	20	0.7103	
Perfluorododecanoic acid (PFDoDA)	TRG	Linear	R2	0.9990	0.99	0.4982	
Perfluoroheptane sulfonic acid (PFHpS)	TRG	Average RF	% RSD	17.2	20	0.612	
Perfluoroheptanoic acid (PFHpA)	TRG	Linear	R2	0.9994	0.99	1.124	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

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Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
Perfluorohexane sulfonic acid (PFHxS)	TRG	Average RF	% RSD	6.4	20	0.7987	
Perfluorohexanoic acid (PFHxA)	TRG	Linear	R2	0.9974	0.99	1.237	
Perfluorononane sulfonic acid (PFNS)	TRG	Average RF	% RSD	9.7	20	0.7148	
Perfluorononanoic acid (PFNA)	TRG	Linear	R2	0.9992	0.99	0.674	
Perfluorooctane sulfonamide (FOSA)	TRG	Average RF	% RSD	3.9	20	1.526	
Perfluorooctane sulfonic acid (PFOS)	TRG	Average RF	% RSD	4.8	20	0.615	
Perfluorooctanoic acid (PFOA)	TRG	Linear	R2	0.9999	0.99	0.7429	
Perfluoropentane sulfonic acid (PFPeS)	TRG	Average RF	% RSD	11.9	20	0.5037	
Perfluoropentanoic acid (PFPeA)	TRG	Linear	R2	0.9995	0.99	3.462	
Perfluorotetradecanoic acid (PFTeDA)	TRG	Linear	R2	0.9977	0.99	0.284	
Perfluorotridecanoic acid (PFTrDA)	TRG	Linear	R2	0.9977	0.99	0.6825	
Perfluoroundecanoic acid (PFUnDA)	TRG	Linear	R2	0.9957	0.99	0.8273	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

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Initial Calibration Verification Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

#	Lab Code	Sample Name	File Location	Acquisition Date
08	KC1800443-08	1.0 PPB ICV	091918_015	09/19/2018 21:47

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
Perfluorobutane sulfonic acid (PFBS)	0.887	1.06	6.407E-1	7.625E-1	19.01	±30	Average RF
Perfluoropentane sulfonic acid (PFPeS)	0.941	1.08	5.037E-1	5.787E-1	14.88	±30	Average RF
Perfluorohexane sulfonic acid (PFHxS)	0.913	1.07	7.987E-1	9.329E-1	16.79	±30	Average RF
Perfluoroheptane sulfonic acid (PFHpS)	0.953	1.11	6.12E-1	7.112E-1	16.21	±30	Average RF
Perfluorooctane sulfonic acid (PFOS)	0.929	0.944	6.15E-1	6.245E-1	1.54	±30	Average RF
Perfluorononane sulfonic acid (PFNS)	0.962	1.11	7.148E-1	8.239E-1	15.26	±30	Average RF
Perfluorodecane sulfonic acid (PFDS)	0.965	1.16	7.566E-1	9.071E-1	19.90	±30	Average RF
Perfluorobutanoic acid (PFBA)	1.00	1.01	1.006E0	1.011E0	0.511	±30	Average RF
Perfluoropentanoic acid (PFPeA)	1.00	1.05	3.462E0	2.593E0	5.24	±30	Linear
Perfluorohexanoic acid (PFHxA)	1.00	0.913	1.237E0	1.06E0	-8.704	±30	Linear
Perfluoroheptanoic acid (PFHpA)	1.00	1.00	1.124E0	1.083E0	0.102	±30	Linear
Perfluorooctanoic acid (PFOA)	1.00	1.11	7.429E-1	7.51E-1	11.01	±30	Linear
Perfluorononanoic acid (PFNA)	1.00	1.15	6.74E-1	7.793E-1	14.68	±30	Linear
Perfluorodecanoic acid (PFDA)	1.00	1.01	7.103E-1	7.199E-1	1.35	±30	Average RF
Perfluoroundecanoic acid (PFUnDA)	1.00	1.05	8.273E-1	8.136E-1	4.60	±30	Linear
Perfluorododecanoic acid (PFDoDA)	1.00	1.07	4.982E-1	5.258E-1	7.47	±30	Linear
Perfluorotridecanoic acid (PFTrDA)	1.00	1.04	6.825E-1	7.033E-1	3.56	±30	Linear
Perfluorotetradecanoic acid (PFTeDA)	1.00	0.950	2.84E-1	2.378E-1	-4.993	±30	Linear
Perfluorooctane sulfonamide (FOSA)	1.00	1.07	1.526E0	1.632E0	6.90	±30	Average RF
N-Methyl perfluorooctane sulfonamidoacetic acid	1.00	1.21	5.883E-1	7.117E-1	20.98	±30	Average RF
N-Ethyl perfluorooctane sulfonamidoacetic acid	1.00	1.23	3.956E-1	4.847E-1	22.52	±30	Average RF
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.937	0.994	7.259E-1	7.696E-1	6.03	±30	Average RF
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.951	1.09	7.286E-1	8.331E-1	14.35	±30	Average RF
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.960	1.09	9.181E-1	1.047E0	13.99	±30	Average RF

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
13C3-PFBS	5.00	4.95	1.507E0	1.491E0	-1.033	±30	Average RF
18O2-PFHxS	5.00	4.39	9.299E-1	8.16E-1	-12.249	±30	Average RF
13C4-PFOS	5.00	4.71	8.991E-1	8.474E-1	-5.756	±30	Average RF
13C4-PFBA	5.00	4.78	4.568E0	4.371E0	-4.307	±30	Average RF
13C5-PFPeA	5.00	4.93	2.607E0	2.57E0	-1.411	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West

Service Request: K1808314
Calibration Date: 9/19/2018

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Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
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Signal ID: 1

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
13C2-PFHxA	5.00	5.12	5.936E0	6.083E0	2.48	±30	Average RF
13C4-PFHpA	5.00	4.96	6.411E0	6.358E0	-0.835	±30	Average RF
13C4-PFOA	5.00	4.82	8.304E0	8.014E0	-3.500	±30	Average RF
13C5-PFNA	5.00	4.71	6.326E0	5.964E0	-5.728	±30	Average RF
13C2-PFDA	5.00	5.20	5.157E0	5.361E0	3.95	±30	Average RF
13C2-PFUnDA	5.00	4.92	5.485E0	5.4E0	-1.550	±30	Average RF
13C2-PFDoDA	5.00	5.09	7.806E0	7.944E0	1.77	±30	Average RF
13C2-PFTeDA	5.00	5.00	5.487E0	5.486E0	-0.023	±30	Average RF
13C8-FOSA	5.00	4.97	2.047E0	2.037E0	-0.502	±30	Average RF
D3-MeFOSAA	5.00	5.02	1.097E0	1.102E0	0.444	±30	Average RF
D5-EtFOSAA	5.00	5.25	1.26E0	1.324E0	5.03	±30	Average RF
13C2-4:2 FTS	5.00	5.63	1.275E0	1.435E0	12.61	±30	Average RF
13C2-6:2 FTS	5.00	4.80	9.922E-1	9.52E-1	-4.047	±30	Average RF
13C2-8:2 FTS	5.00	5.32	5.446E-1	5.794E-1	6.40	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102

Service Request: K1808314
Date Analyzed: 09/20/18 09:27

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: J:\LCMS06\Data\091918_b7\091918_082
Signal ID: 1

Calibration Date: 9/19/2018
Calibration ID: KC1800443
Analysis Lot: 607276
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	Rec.	% Drift	Criteria	Curve Fit
Perfluorobutane sulfonic acid (PFBS)	0.887	0.936	0.6407	0.6761	106	NA	±30	Average RF
Perfluoropentane sulfonic acid (PFPeS)	0.941	0.882	0.5037	0.4719	93.7	NA	±30	Average RF
Perfluorohexane sulfonic acid (PFHxS)	0.913	0.969	0.7987	0.8474	106	NA	±30	Average RF
Perfluoroheptane sulfonic acid (PFHpS)	0.953	1.25	0.612	0.8029	131*	NA	±30	Average RF
Perfluorooctane sulfonic acid (PFOS)	0.929	0.955	0.615	0.6318	103	NA	±30	Average RF
Perfluorononane sulfonic acid (PFNS)	0.962	0.910	0.7148	0.6766	94.6	NA	±30	Average RF
Perfluorodecane sulfonic acid (PFDS)	0.965	1.09	0.7566	0.8515	113	NA	±30	Average RF
Perfluorobutanoic acid (PFBA)	1.00	0.985	1.0058	0.991	98.5	NA	±30	Average RF
Perfluoropentanoic acid (PFPeA)	1.00	1.04	3.4617	2.5552	104	3.6	±30	Linear
Perfluorohexanoic acid (PFHxA)	1.00	0.905	1.2375	1.0507	90.5	-9.5	±30	Linear
Perfluoroheptanoic acid (PFHpA)	1.00	1.04	1.1236	1.1218	104	3.7	±30	Linear
Perfluorooctanoic acid (PFOA)	1.00	1.06	0.7429	0.7174	106	6.0	±30	Linear
Perfluorononanoic acid (PFNA)	1.00	1.11	0.674	0.7528	111	10.8	±30	Linear
Perfluorodecanoic acid (PFDA)	1.00	1.01	0.7103	0.7156	101	NA	±30	Average RF
Perfluoroundecanoic acid (PFUnDA)	1.00	0.976	0.8273	0.7599	97.6	-2.4	±30	Linear
Perfluorododecanoic acid (PFDoDA)	1.00	0.962	0.4982	0.4711	96.2	-3.8	±30	Linear
Perfluorotridecanoic acid (PFTrDA)	1.00	1.11	0.6825	0.7541	111	11.0	±30	Linear
Perfluorotetradecanoic acid (PFTeDA)	1.00	1.07	0.284	0.2647	107	7.2	±30	Linear
Perfluorooctane sulfonamide (FOSA)	1.00	1.01	1.5264	1.5403	101	NA	±30	Average RF
N-Methyl perfluorooctane sulfonamidoacetic acid	1.00	1.14	0.5883	0.6715	114	NA	±30	Average RF
N-Ethyl perfluorooctane sulfonamidoacetic acid	1.00	1.03	0.3956	0.4079	103	NA	±30	Average RF
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.937	1.01	0.7259	0.7799	107	NA	±30	Average RF
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.951	1.01	0.7286	0.7727	106	NA	±30	Average RF
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.960	0.966	0.9181	0.9242	101	NA	±30	Average RF

Analyte Name	Expected	Result	Average RF	CCV RF	Rec.	% Drift	Criteria	Curve Fit
13C3-PFBS	5.00	5.37	1.5068	1.6187	107	NA	±30	Average RF
18O2-PFHxS	5.00	4.74	0.9299	0.8815	94.8	NA	±30	Average RF
13C4-PFOS	5.00	4.86	0.8991	0.8742	97.2	NA	±30	Average RF
13C4-PFBA	5.00	5.20	4.5683	4.7467	104	NA	±30	Average RF
13C5-PFPeA	5.00	5.30	2.6072	2.7622	106	NA	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102

Service Request: K1808314
Date Analyzed: 09/20/18 09:27

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: J:\LCMS06\Data\091918_b7\091918_082
Signal ID: 1

Calibration Date: 9/19/2018
Calibration ID: KC1800443
Analysis Lot: 607276
Units: ng/mL

13C2-PFHxA	5.00	5.63	5.9359	6.6873	113	NA	±30	Average RF
13C4-PFHpA	5.00	4.89	6.4112	6.2681	97.8	NA	±30	Average RF
13C4-PFOA	5.00	4.73	8.3043	7.8617	94.7	NA	±30	Average RF
13C5-PFNA	5.00	4.71	6.3265	5.9631	94.3	NA	±30	Average RF
13C2-PFDA	5.00	5.14	5.1568	5.3012	103	NA	±30	Average RF
13C2-PFUnDA	5.00	5.07	5.4847	5.5623	101	NA	±30	Average RF
13C2-PFDoDA	5.00	5.11	7.8058	7.9698	102	NA	±30	Average RF
13C2-PFTeDA	5.00	4.75	5.4874	5.2132	95.0	NA	±30	Average RF
13C8-FOSA	5.00	5.16	2.0471	2.1124	103	NA	±30	Average RF
D3-MeFOSAA	5.00	4.98	1.0968	1.0923	99.6	NA	±30	Average RF
D5-EtFOSAA	5.00	5.18	1.2603	1.3052	104	NA	±30	Average RF
13C2-4:2 FTS	5.00	5.03	1.2747	1.2825	101	NA	±30	Average RF
13C2-6:2 FTS	5.00	4.71	0.9922	0.9348	94.2	NA	±30	Average RF
13C2-8:2 FTS	5.00	5.12	0.5446	0.5579	102	NA	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102

Service Request: K1808314

Analysis Run Log
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M

Analysis Lot: 607276

Instrument ID: K-LCMS-06

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
J:\LCMS06\Data\091918_b7\091918_082	Continuing Calibration Verification	KQ1814114-01	9/20/2018	09:27	
J:\LCMS06\Data\091918_b7\091918_083	Continuing Calibration Blank	KQ1814114-02	9/20/2018	09:38	
J:\LCMS06\Data\091918_b7\091918_084	Method Blank	KQ1812487-03	9/20/2018	09:48	
J:\LCMS06\Data\091918_b7\091918_085	Lab Control Sample	KQ1812487-01	9/20/2018	09:59	
J:\LCMS06\Data\091918_b7\091918_086	Duplicate Lab Control Sample	KQ1812487-02	9/20/2018	10:09	
J:\LCMS06\Data\091918_b7\091918_087	MW-102S	K1808314-001	9/20/2018	10:20	
J:\LCMS06\Data\091918_b7\091918_088	MW-110S	K1808314-002	9/20/2018	10:30	
J:\LCMS06\Data\091918_b7\091918_089	MW-111S	K1808314-003	9/20/2018	10:41	
J:\LCMS06\Data\091918_b7\091918_090	MW-113S	K1808314-004	9/20/2018	10:51	
J:\LCMS06\Data\091918_b7\091918_091	EB	K1808314-005	9/20/2018	11:02	
J:\LCMS06\Data\091918_b7\091918_092	FB	K1808314-006	9/20/2018	11:12	
J:\LCMS06\Data\091918_b7\091918_093	TRIP BLANK	K1808314-007	9/20/2018	11:23	
J:\LCMS06\Data\091918_b7\091918_094	MW-107S	K1808314-008	9/20/2018	11:33	
J:\LCMS06\Data\091918_b7\091918_095	MW-108S	K1808314-009	9/20/2018	11:44	
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J:\LCMS06\Data\091918_b7\091918_104	ZZZZZZZ	ZZZZZZZ	9/20/2018	13:18	
J:\LCMS06\Data\091918_b7\091918_105	ZZZZZZZ	ZZZZZZZ	9/20/2018	13:28	
J:\LCMS06\Data\091918_b7\091918_106	ZZZZZZZ	ZZZZZZZ	9/20/2018	13:39	

ALS Group USA, Corp.
dba ALS Environmental

Prep Summary Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West/11-4317-102
Sample Matrix: Water

Service Request:K1808314

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Prep Method: EPA 3535A

Extraction Lot: 321523

Analytical Method: PFC/537M

Extraction Date: 09/10/18 08:16

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
MW-102S	K1808314-001	8/30/18	8/31/18	295.0000 mL	8 mL	
MW-110S	K1808314-002	8/30/18	8/31/18	305.0000 mL	8 mL	
MW-111S	K1808314-003	8/30/18	8/31/18	315.0000 mL	8 mL	
MW-113S	K1808314-004	8/30/18	8/31/18	305.0000 mL	8 mL	
EB	K1808314-005	8/30/18	8/31/18	320.0000 mL	8 mL	
FB	K1808314-006	8/30/18	8/31/18	285.0000 mL	8 mL	
TRIP BLANK	K1808314-007	8/30/18	8/31/18	295.0000 mL	8 mL	
MW-107S	K1808314-008	8/30/18	8/31/18	295.0000 mL	8 mL	
MW-108S	K1808314-009	8/30/18	8/31/18	295.0000 mL	8 mL	
Lab Control Sample	KQ1812487-01LCS	NA	NA	250 mL	8 mL	
Duplicate Lab Control Sample	KQ1812487-02DLCS	NA	NA	250 mL	8 mL	
Method Blank	KQ1812487-03MB	NA	NA	250 mL	8 mL	



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October 22, 2018

Analytical Report for Service Request No: K1808431

Mike Smith
Applied EcoSystems, Inc.
G-4300 South Saginaw Street
Burton, MI 48529

RE: RACER Flint West #12994 / 11-4317-102

Dear Mike,

Enclosed are the results of the sample(s) submitted to our laboratory September 06, 2018
For your reference, these analyses have been assigned our service request number **K1808431**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3275. You may also contact me via email at Chris.Leaf@ALSGlobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Chris Leaf
Project Manager



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Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLCMS

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
 - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
 - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdwlabservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994
Sample Matrix: Water

Service Request: K1808431
Date Received: 09/06/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier III deliverables including summary forms for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

Fourteen water samples were received for analysis at ALS Environmental on 09/06/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Organic LC:

Method PFC/537M, 09/12/2018: The upper control criterion was exceeded for 4:2 Fluorotelomer sulfonic acid (4:2 FTS) in Lab Control Sample (LCS) KQ1812573-01/Duplicate Lab Control Sample (DLCS) KQ1812573-02. The analyte in question was not detected above the Method Reporting Limit (MRL) in the associated field samples. The error associated with elevated recovery indicated a high bias. The sample data was not significantly affected. No further corrective action was appropriate.

Method PFC/537M, 09/12/2018: The upper control criterion was exceeded for N-Methyl perfluorooctane sulfonamidoacetic acid in the Initial Calibration Verification (ICV) associated with calibration KC1800430. The analyte in question was not detected above the Method Reporting Limit (MRL) in the associated field samples. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

Method PFC/537M, 09/12/2018: The upper control criterion was exceeded for N-Methyl perfluorooctane sulfonamidoacetic acid in Continuing Calibration Verification (CCV) 091118_033. The analyte in question was not detected above the Method Reporting Limit (MRL) in the associated field samples. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

Method PFC/537M, 09/12/2018: The surrogate recovery of 13C2-4:2 FTS in samples FB and Trip Blank was outside the control limits listed in the results summary. The limits are default values temporarily in use until sufficient data points are generated to calculate statistical control limits. Based on the method and historic data, the recoveries observed were in the range expected for this procedure. No further corrective action was taken.

Method PFC/537M, 09/20/2018: The upper control criterion was exceeded for 4:2 Fluorotelomer sulfonic acid (4:2 FTS) in Lab Control Sample (LCS) KQ1812487-01 and for Perfluoropentane sulfonic acid (PFPeS) and 4:2 Fluorotelomer sulfonic acid (4:2 FTS) in Duplicate Lab Control Sample (DLCS) KQ1812487-02. The analytes in question were not detected above the Method Reporting Limit (MRL) in the associated field samples. The error associated with elevated recovery indicated a high bias. The sample data was not significantly affected. No further corrective action was appropriate.

Method PFC/537M, 09/20/2018: The upper control criterion was exceeded for Perfluoroheptane sulfonic acid (PFHpS) in Continuing Calibration Verification (CCV) 091918_082. The analyte in question was not detected above the Method Reporting Limit (MRL) in the associated field samples. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

Method PFC/537M, 09/20/2018: The upper control criterion was exceeded for multiple surrogates in samples MW-103S, MW-109S, MW-112S, and MW-114S. The associated native analytes were not detected above the Method Reporting Limit (MRL) in these samples. Assuming the native analytes performed similar to the labeled analogs, the effect on the reported results was minimal. The quality of the sample data was not significantly affected. No further corrective action was appropriate.

Approved by  _____

Date 10/22/2018



Chain of Custody

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SR# K108931
 COC Set 1 of 2
 COC# _____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
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Page 1 of 2

Project Name Racer Flint West #12994		Project Number: 11-4317-102		NUMBER OF CONTAINERS 7D 14D PFC/637M / PFOA								Remarks	
Project Manager Mike Smith													
Company Applied EcoSystems, Inc.													
Address G-4300 South Saginaw St, Burton, Michigan													
Phone # 810-715-2525		email msmith@appliedecosystems.com											
Sampler Signature <i>Heather Dean</i>		Sampler Printed Name Heather Dean											
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix									
1. MW-100S		9/5/18	11:05	W	2	X							
2. MW-101S		9/5/18	11:30	W	2	X							
3. MW-103S		9/5/18	12:40	W	2	X							
4. MW-104S		9/5/18	08:50	W	2	X							
5. MW-105S		9/5/18	09:35	W	2	X							
6. MW-106SR		9/5/18	10:30	W	2	X							
7. MW-109S		9/5/18	13:50	W	2	X							
8. MW-112S		9/5/18	11:58	W	2	X							
9. MW-114S		9/5/18	13:25	W	2	X							
10. DUP-1		9/5/18		W	2	X							

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# <u>11-4317-102</u> Bill To: <u>Applied EcoSystems, Inc.</u>	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
	Turnaround Requirements <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input checked="" type="checkbox"/> 5 Day Standard	Special Instructions/Comments: _____ *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)	
	Requested Report Date _____		

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <i>Heather Dean</i>	Signature <i>[Signature]</i>	Signature	Signature	Signature	Signature
Printed Name Heather Dean	Printed Name ALS-K	Printed Name	Printed Name	Printed Name	Printed Name
Firm Applied EcoSystems, Inc.	Firm 9-6-18 0830	Firm	Firm	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time



89832

CHAIN OF CUSTODY

89832

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SR# R1800437

COC Set 2 of 2

COC# _____

Page 2 of 2

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1066
www.alsglobal.com

Project Name Racer Flint West #12994		Project Number: 11-4317-102		NUMBER OF CONTAINERS	7D	14D											Remarks							
Project Manager Mike Smith					PFC/637M / PFOA																			
Company Applied EcoSystems, Inc.																								
Address G-4300 South Saginaw St, Burton, Michigan																								
Phone # 810-715-2525		email msmith@appliedecosystems.com																						
Sampler Signature <i>Heather Dean</i>				Sampler Printed Name Heather Dean																				
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix																				
1. DUP-2		9/5/18		W	2	X																		
2. FB		9/5/18		W	1	X																		
3. Equip Blk		9/5/18		W	2	X																		
4. Trip Blank		9/5/18		W	1	X																		
5.																								
6.																								
7.																								
8.																								
9.																								
10.																								

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# <u>11-4317-102</u> Bill To: <u>Applied EcoSystems, Inc.</u>	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr TI Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr TI Sn V Zn Hg			
	Turnaround Requirements <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input checked="" type="checkbox"/> 5 Day Standard	Special Instructions/Comments: <u>*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)</u>			
	Requested Report Date				
Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <i>Heather Dean</i>	Signature <i>Diana Huber</i>	Signature	Signature	Signature	Signature
Printed Name Heather Dean	Printed Name HLS-K	Printed Name	Printed Name	Printed Name	Printed Name
Firm Applied EcoSystems, Inc.	Firm 9-6-18 0820	Firm	Firm	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time



PC CL

Cooler Receipt and Preservation Form

Client Applied Eco Systems Inc. Service Request K18 08431
 Received: 9-6-18 Opened: 9-6-18 By: ASP Unloaded: 9-6-18 By: ASP

1. Samples were received via? **USPS** **Fed Ex** UPS **DHL** **PDX** **Courier** **Hand Delivered**
 2. Samples were received in: (circle) Cooler **Box** **Envelope** **Other** NA
 3. Were custody seals on coolers? **NA** Y **N** If yes, how many and where? 2 Top Front
 If present, were custody seals intact? Y **N** If present, were they signed and dated? Y **N**

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	NA	Filed
3.1	3.1	4.5	4.5	0.0	365	89812	12 2R4 3A6 15 W35 8528			

4. Packing material: **Inserts** Baggies Bubble Wrap **Gel Packs** Wet Ice **Dry Ice** **Sleeves**
 5. Were custody papers properly filled out (ink, signed, etc.)? **NA** Y **N**
 6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* **NA** Y **N**
 If applicable, tissue samples were received: **Frozen** **Partially Thawed** **Thawed**
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? **NA** Y **N**
 8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* **NA** Y **N**
 9. Were appropriate bottles/containers and volumes received for the tests indicated? **NA** Y **N**
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA **Y** **N**
 11. Were VOA vials received without headspace? *Indicate in the table below.* NA **Y** **N**
 12. Was C12/Res negative? NA **Y** **N**

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions:



Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 11:05
Date Received: 09/06/18 08:20

Sample Name: MW-100S
Lab Code: K1808431-001

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	2.5 J	4.4	0.90	1	09/20/18 11:54	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 11:54	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	4.0 J	4.4	0.94	1	09/20/18 11:54	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	1.4 J	4.4	0.88	1	09/20/18 11:54	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	20	4.4	1.0	1	09/20/18 11:54	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 11:54	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.4	1.3	1	09/20/18 11:54	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.8	2.7	1	09/20/18 11:54	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.4	1.1	1	09/20/18 11:54	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.0 J	4.4	0.92	1	09/20/18 11:54	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.4	1.2	1	09/20/18 11:54	9/10/18	
Perfluorooctanoic acid (PFOA)	2.0	1.8	0.46	1	09/20/18 11:54	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.4	0.94	1	09/20/18 11:54	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.4	0.52	1	09/20/18 11:54	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.4	0.31	1	09/20/18 11:54	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.4	0.46	1	09/20/18 11:54	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.4	0.75	1	09/20/18 11:54	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.4	1.2	1	09/20/18 11:54	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.4	0.35	1	09/20/18 11:54	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 11:54	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.4	0.83	1	09/20/18 11:54	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.4	0.65	1	09/20/18 11:54	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.4	1.2	1	09/20/18 11:54	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.4	0.65	1	09/20/18 11:54	9/10/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 11:05
Date Received: 09/06/18 08:20

Sample Name: MW-100S
Lab Code: K1808431-001

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	64	10 - 122	09/20/18 11:54	
18O2-PFHxS	74	26 - 144	09/20/18 11:54	
13C4-PFOS	92	27 - 142	09/20/18 11:54	
13C4-PFBA	80	37 - 151	09/20/18 11:54	
13C5-PFPeA	76	23 - 154	09/20/18 11:54	
13C2-PFHxA	91	27 - 155	09/20/18 11:54	
13C4-PFHpA	77	20 - 153	09/20/18 11:54	
13C4-PFOA	86	31 - 142	09/20/18 11:54	
13C5-PFNA	95	27 - 146	09/20/18 11:54	
13C2-PFDA	93	22 - 155	09/20/18 11:54	
13C2-PFUnDA	90	26 - 138	09/20/18 11:54	
13C2-PFDoDA	76	24 - 131	09/20/18 11:54	
13C2-PFTeDA	66	16 - 136	09/20/18 11:54	
13C8-FOSA	60	19 - 123	09/20/18 11:54	
D3-MeFOSAA	77	18 - 129	09/20/18 11:54	
D5-EtFOSAA	69	19 - 128	09/20/18 11:54	
13C2-4:2 FTS	126	50 - 150	09/20/18 11:54	
13C2-6:2 FTS	156	10 - 173	09/20/18 11:54	
13C2-8:2 FTS	117	10 - 190	09/20/18 11:54	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 11:30
Date Received: 09/06/18 08:20

Sample Name: MW-101S
Lab Code: K1808431-002

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	1.4 J	4.2	0.90	1	09/20/18 12:05	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 12:05	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	1.9 J	4.2	0.94	1	09/20/18 12:05	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	1.2 J	4.2	0.88	1	09/20/18 12:05	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	33	4.2	1.0	1	09/20/18 12:05	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 12:05	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.2	1.3	1	09/20/18 12:05	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	3.8 J	8.5	2.7	1	09/20/18 12:05	9/10/18	
Perfluoropentanoic acid (PFPeA)	1.2 J	4.2	1.1	1	09/20/18 12:05	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.5 J	4.2	0.92	1	09/20/18 12:05	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.2	1.2	1	09/20/18 12:05	9/10/18	
Perfluorooctanoic acid (PFOA)	4.5	1.7	0.46	1	09/20/18 12:05	9/10/18	
Perfluorononanoic acid (PFNA)	1.2 J	4.2	0.94	1	09/20/18 12:05	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.2	0.52	1	09/20/18 12:05	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.2	0.31	1	09/20/18 12:05	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.2	0.46	1	09/20/18 12:05	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.2	0.75	1	09/20/18 12:05	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.2	1.2	1	09/20/18 12:05	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.2	0.35	1	09/20/18 12:05	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 12:05	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.2	0.83	1	09/20/18 12:05	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.2	0.65	1	09/20/18 12:05	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.2	1.2	1	09/20/18 12:05	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.2	0.65	1	09/20/18 12:05	9/10/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 11:30
Date Received: 09/06/18 08:20

Sample Name: MW-101S
Lab Code: K1808431-002

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	62	10 - 122	09/20/18 12:05	
18O2-PFHxS	84	26 - 144	09/20/18 12:05	
13C4-PFOS	71	27 - 142	09/20/18 12:05	
13C4-PFBA	75	37 - 151	09/20/18 12:05	
13C5-PFPeA	75	23 - 154	09/20/18 12:05	
13C2-PFHxA	79	27 - 155	09/20/18 12:05	
13C4-PFHpA	78	20 - 153	09/20/18 12:05	
13C4-PFOA	80	31 - 142	09/20/18 12:05	
13C5-PFNA	71	27 - 146	09/20/18 12:05	
13C2-PFDA	67	22 - 155	09/20/18 12:05	
13C2-PFUnDA	68	26 - 138	09/20/18 12:05	
13C2-PFDoDA	63	24 - 131	09/20/18 12:05	
13C2-PFTeDA	63	16 - 136	09/20/18 12:05	
13C8-FOSA	55	19 - 123	09/20/18 12:05	
D3-MeFOSAA	62	18 - 129	09/20/18 12:05	
D5-EtFOSAA	53	19 - 128	09/20/18 12:05	
13C2-4:2 FTS	66	50 - 150	09/20/18 12:05	
13C2-6:2 FTS	71	10 - 173	09/20/18 12:05	
13C2-8:2 FTS	60	10 - 190	09/20/18 12:05	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 12:40
Date Received: 09/06/18 08:20

Sample Name: MW-103S
Lab Code: K1808431-003

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	2.2 J	4.4	0.90	1	09/20/18 12:15	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 12:15	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	ND U	4.4	0.94	1	09/20/18 12:15	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.4	0.88	1	09/20/18 12:15	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	91	4.4	1.0	1	09/20/18 12:15	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 12:15	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.4	1.3	1	09/20/18 12:15	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.8	2.7	1	09/20/18 12:15	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.4	1.1	1	09/20/18 12:15	9/10/18	
Perfluorohexanoic acid (PFHxA)	ND U	4.4	0.92	1	09/20/18 12:15	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.4	1.2	1	09/20/18 12:15	9/10/18	
Perfluorooctanoic acid (PFOA)	2.6	1.8	0.46	1	09/20/18 12:15	9/10/18	
Perfluorononanoic acid (PFNA)	1.1 J	4.4	0.94	1	09/20/18 12:15	9/10/18	
Perfluorodecanoic acid (PFDA)	0.53 J	4.4	0.52	1	09/20/18 12:15	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.4	0.31	1	09/20/18 12:15	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.4	0.46	1	09/20/18 12:15	9/10/18	
Perfluorotridecanoic acid (PFTTrDA)	ND U	4.4	0.75	1	09/20/18 12:15	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.4	1.2	1	09/20/18 12:15	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.4	0.35	1	09/20/18 12:15	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 12:15	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	0.90 J	4.4	0.83	1	09/20/18 12:15	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.4	0.65	1	09/20/18 12:15	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.4	1.2	1	09/20/18 12:15	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.4	0.65	1	09/20/18 12:15	9/10/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 12:40
Date Received: 09/06/18 08:20

Sample Name: MW-103S
Lab Code: K1808431-003

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	67	10 - 122	09/20/18 12:15	
18O2-PFHxS	87	26 - 144	09/20/18 12:15	
13C4-PFOS	98	27 - 142	09/20/18 12:15	
13C4-PFBA	93	37 - 151	09/20/18 12:15	
13C5-PFPeA	74	23 - 154	09/20/18 12:15	
13C2-PFHxA	76	27 - 155	09/20/18 12:15	
13C4-PFHpA	69	20 - 153	09/20/18 12:15	
13C4-PFOA	92	31 - 142	09/20/18 12:15	
13C5-PFNA	87	27 - 146	09/20/18 12:15	
13C2-PFDA	86	22 - 155	09/20/18 12:15	
13C2-PFUnDA	104	26 - 138	09/20/18 12:15	
13C2-PFDoDA	90	24 - 131	09/20/18 12:15	
13C2-PFTeDA	90	16 - 136	09/20/18 12:15	
13C8-FOSA	55	19 - 123	09/20/18 12:15	
D3-MeFOSAA	111	18 - 129	09/20/18 12:15	
D5-EtFOSAA	115	19 - 128	09/20/18 12:15	
13C2-4:2 FTS	216	50 - 150	09/20/18 12:15	*
13C2-6:2 FTS	344	10 - 173	09/20/18 12:15	*
13C2-8:2 FTS	322	10 - 190	09/20/18 12:15	*

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 08:50
Date Received: 09/06/18 08:20

Sample Name: MW-104S
Lab Code: K1808431-004

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	1.3 J	4.0	0.90	1	09/20/18 12:26	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 12:26	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	2.1 J	4.0	0.94	1	09/20/18 12:26	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.0	0.88	1	09/20/18 12:26	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	ND U	4.0	1.0	1	09/20/18 12:26	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 12:26	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.0	1.3	1	09/20/18 12:26	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.0	2.7	1	09/20/18 12:26	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.0	1.1	1	09/20/18 12:26	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.2 J	4.0	0.92	1	09/20/18 12:26	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.0	1.2	1	09/20/18 12:26	9/10/18	
Perfluorooctanoic acid (PFOA)	0.79 J	1.6	0.46	1	09/20/18 12:26	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.0	0.94	1	09/20/18 12:26	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.0	0.52	1	09/20/18 12:26	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.0	0.31	1	09/20/18 12:26	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.0	0.46	1	09/20/18 12:26	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.0	0.75	1	09/20/18 12:26	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	1.6 J	4.0	1.2	1	09/20/18 12:26	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.0	0.35	1	09/20/18 12:26	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 12:26	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.0	0.83	1	09/20/18 12:26	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.0	0.65	1	09/20/18 12:26	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.0	1.2	1	09/20/18 12:26	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.0	0.65	1	09/20/18 12:26	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 08:50
Date Received: 09/06/18 08:20

Sample Name: MW-104S
Lab Code: K1808431-004

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	72	10 - 122	09/20/18 12:26	
18O2-PFHxS	75	26 - 144	09/20/18 12:26	
13C4-PFOS	73	27 - 142	09/20/18 12:26	
13C4-PFBA	87	37 - 151	09/20/18 12:26	
13C5-PFPeA	90	23 - 154	09/20/18 12:26	
13C2-PFHxA	103	27 - 155	09/20/18 12:26	
13C4-PFHpA	85	20 - 153	09/20/18 12:26	
13C4-PFOA	80	31 - 142	09/20/18 12:26	
13C5-PFNA	72	27 - 146	09/20/18 12:26	
13C2-PFDA	74	22 - 155	09/20/18 12:26	
13C2-PFUnDA	73	26 - 138	09/20/18 12:26	
13C2-PFDoDA	71	24 - 131	09/20/18 12:26	
13C2-PFTeDA	71	16 - 136	09/20/18 12:26	
13C8-FOSA	62	19 - 123	09/20/18 12:26	
D3-MeFOSAA	67	18 - 129	09/20/18 12:26	
D5-EtFOSAA	63	19 - 128	09/20/18 12:26	
13C2-4:2 FTS	65	50 - 150	09/20/18 12:26	
13C2-6:2 FTS	66	10 - 173	09/20/18 12:26	
13C2-8:2 FTS	67	10 - 190	09/20/18 12:26	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 09:35
Date Received: 09/06/18 08:20

Sample Name: MW-105S
Lab Code: K1808431-005

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	1.8 J	4.4	0.90	1	09/20/18 12:36	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 12:36	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	12	4.4	0.94	1	09/20/18 12:36	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	2.5 J	4.4	0.88	1	09/20/18 12:36	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	ND U	4.4	1.0	1	09/20/18 12:36	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 12:36	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.4	1.3	1	09/20/18 12:36	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	3.2 J	8.8	2.7	1	09/20/18 12:36	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.4	1.1	1	09/20/18 12:36	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.6 J	4.4	0.92	1	09/20/18 12:36	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.4	1.2	1	09/20/18 12:36	9/10/18	
Perfluorooctanoic acid (PFOA)	4.5	1.8	0.46	1	09/20/18 12:36	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.4	0.94	1	09/20/18 12:36	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.4	0.52	1	09/20/18 12:36	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.4	0.31	1	09/20/18 12:36	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.4	0.46	1	09/20/18 12:36	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.4	0.75	1	09/20/18 12:36	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.4	1.2	1	09/20/18 12:36	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.4	0.35	1	09/20/18 12:36	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 12:36	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.4	0.83	1	09/20/18 12:36	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.4	0.65	1	09/20/18 12:36	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.4	1.2	1	09/20/18 12:36	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.4	0.65	1	09/20/18 12:36	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 09:35
Date Received: 09/06/18 08:20

Sample Name: MW-105S
Lab Code: K1808431-005

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	80	10 - 122	09/20/18 12:36	
18O2-PFHxS	86	26 - 144	09/20/18 12:36	
13C4-PFOS	78	27 - 142	09/20/18 12:36	
13C4-PFBA	90	37 - 151	09/20/18 12:36	
13C5-PFPeA	97	23 - 154	09/20/18 12:36	
13C2-PFHxA	91	27 - 155	09/20/18 12:36	
13C4-PFHpA	106	20 - 153	09/20/18 12:36	
13C4-PFOA	89	31 - 142	09/20/18 12:36	
13C5-PFNA	78	27 - 146	09/20/18 12:36	
13C2-PFDA	86	22 - 155	09/20/18 12:36	
13C2-PFUnDA	82	26 - 138	09/20/18 12:36	
13C2-PFDoDA	80	24 - 131	09/20/18 12:36	
13C2-PFTeDA	84	16 - 136	09/20/18 12:36	
13C8-FOSA	77	19 - 123	09/20/18 12:36	
D3-MeFOSAA	93	18 - 129	09/20/18 12:36	
D5-EtFOSAA	80	19 - 128	09/20/18 12:36	
13C2-4:2 FTS	109	50 - 150	09/20/18 12:36	
13C2-6:2 FTS	77	10 - 173	09/20/18 12:36	
13C2-8:2 FTS	86	10 - 190	09/20/18 12:36	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 10:30
Date Received: 09/06/18 08:20

Sample Name: MW-106SR
Lab Code: K1808431-006

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	4.6	4.4	0.90	1	09/20/18 12:47	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 12:47	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	3.3 J	4.4	0.94	1	09/20/18 12:47	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	1.3 J	4.4	0.88	1	09/20/18 12:47	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	7.3	4.4	1.0	1	09/20/18 12:47	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 12:47	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.4	1.3	1	09/20/18 12:47	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	5.9 J	8.8	2.7	1	09/20/18 12:47	9/10/18	
Perfluoropentanoic acid (PFPeA)	1.1 J	4.4	1.1	1	09/20/18 12:47	9/10/18	
Perfluorohexanoic acid (PFHxA)	2.0 J	4.4	0.92	1	09/20/18 12:47	9/10/18	
Perfluoroheptanoic acid (PFHpA)	2.0 J	4.4	1.2	1	09/20/18 12:47	9/10/18	
Perfluorooctanoic acid (PFOA)	12	1.8	0.46	1	09/20/18 12:47	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.4	0.94	1	09/20/18 12:47	9/10/18	
Perfluorodecanoic acid (PFDA)	0.58 J	4.4	0.52	1	09/20/18 12:47	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.4	0.31	1	09/20/18 12:47	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.4	0.46	1	09/20/18 12:47	9/10/18	
Perfluorotridecanoic acid (PFTTrDA)	ND U	4.4	0.75	1	09/20/18 12:47	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	2.8 J	4.4	1.2	1	09/20/18 12:47	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.4	0.35	1	09/20/18 12:47	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 12:47	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.4	0.83	1	09/20/18 12:47	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.4	0.65	1	09/20/18 12:47	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.4	1.2	1	09/20/18 12:47	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.4	0.65	1	09/20/18 12:47	9/10/18	

ALS Group USA, Corp.
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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 10:30
Date Received: 09/06/18 08:20

Sample Name: MW-106SR
Lab Code: K1808431-006

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	71	10 - 122	09/20/18 12:47	
18O2-PFHxS	81	26 - 144	09/20/18 12:47	
13C4-PFOS	82	27 - 142	09/20/18 12:47	
13C4-PFBA	82	37 - 151	09/20/18 12:47	
13C5-PFPeA	85	23 - 154	09/20/18 12:47	
13C2-PFHxA	92	27 - 155	09/20/18 12:47	
13C4-PFHpA	88	20 - 153	09/20/18 12:47	
13C4-PFOA	87	31 - 142	09/20/18 12:47	
13C5-PFNA	83	27 - 146	09/20/18 12:47	
13C2-PFDA	72	22 - 155	09/20/18 12:47	
13C2-PFUnDA	80	26 - 138	09/20/18 12:47	
13C2-PFDoDA	72	24 - 131	09/20/18 12:47	
13C2-PFTeDA	71	16 - 136	09/20/18 12:47	
13C8-FOSA	63	19 - 123	09/20/18 12:47	
D3-MeFOSAA	69	18 - 129	09/20/18 12:47	
D5-EtFOSAA	64	19 - 128	09/20/18 12:47	
13C2-4:2 FTS	112	50 - 150	09/20/18 12:47	
13C2-6:2 FTS	113	10 - 173	09/20/18 12:47	
13C2-8:2 FTS	80	10 - 190	09/20/18 12:47	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 13:50
Date Received: 09/06/18 08:20

Sample Name: MW-109S
Lab Code: K1808431-007

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	2.9 J	4.2	0.90	1	09/20/18 12:57	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 12:57	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	3.2 J	4.2	0.94	1	09/20/18 12:57	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	2.6 J	4.2	0.88	1	09/20/18 12:57	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	27	4.2	1.0	1	09/20/18 12:57	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 12:57	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.2	1.3	1	09/20/18 12:57	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	2.9 J	8.5	2.7	1	09/20/18 12:57	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.2	1.1	1	09/20/18 12:57	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.7 J	4.2	0.92	1	09/20/18 12:57	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.2	1.2	1	09/20/18 12:57	9/10/18	
Perfluorooctanoic acid (PFOA)	2.6	1.7	0.46	1	09/20/18 12:57	9/10/18	
Perfluorononanoic acid (PFNA)	1.2 J	4.2	0.94	1	09/20/18 12:57	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.2	0.52	1	09/20/18 12:57	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.2	0.31	1	09/20/18 12:57	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.2	0.46	1	09/20/18 12:57	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.2	0.75	1	09/20/18 12:57	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	1.7 J	4.2	1.2	1	09/20/18 12:57	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.2	0.35	1	09/20/18 12:57	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 12:57	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.2	0.83	1	09/20/18 12:57	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.2	0.65	1	09/20/18 12:57	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.2	1.2	1	09/20/18 12:57	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.2	0.65	1	09/20/18 12:57	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 13:50
Date Received: 09/06/18 08:20

Sample Name: MW-109S
Lab Code: K1808431-007

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	71	10 - 122	09/20/18 12:57	
18O2-PFHxS	75	26 - 144	09/20/18 12:57	
13C4-PFOS	93	27 - 142	09/20/18 12:57	
13C4-PFBA	82	37 - 151	09/20/18 12:57	
13C5-PFPeA	85	23 - 154	09/20/18 12:57	
13C2-PFHxA	90	27 - 155	09/20/18 12:57	
13C4-PFHpA	80	20 - 153	09/20/18 12:57	
13C4-PFOA	85	31 - 142	09/20/18 12:57	
13C5-PFNA	95	27 - 146	09/20/18 12:57	
13C2-PFDA	90	22 - 155	09/20/18 12:57	
13C2-PFUnDA	106	26 - 138	09/20/18 12:57	
13C2-PFDoDA	96	24 - 131	09/20/18 12:57	
13C2-PFTeDA	78	16 - 136	09/20/18 12:57	
13C8-FOSA	68	19 - 123	09/20/18 12:57	
D3-MeFOSAA	86	18 - 129	09/20/18 12:57	
D5-EtFOSAA	90	19 - 128	09/20/18 12:57	
13C2-4:2 FTS	151	50 - 150	09/20/18 12:57	*
13C2-6:2 FTS	182	10 - 173	09/20/18 12:57	*
13C2-8:2 FTS	151	10 - 190	09/20/18 12:57	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 11:58
Date Received: 09/06/18 08:20

Sample Name: MW-112S
Lab Code: K1808431-008

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	1.4 J	4.4	0.90	1	09/20/18 13:07	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 13:07	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	ND U	4.4	0.94	1	09/20/18 13:07	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.4	0.88	1	09/20/18 13:07	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	10	4.4	1.0	1	09/20/18 13:07	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 13:07	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.4	1.3	1	09/20/18 13:07	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	48	8.8	2.7	1	09/20/18 13:07	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.4	1.1	1	09/20/18 13:07	9/10/18	
Perfluorohexanoic acid (PFHxA)	ND U	4.4	0.92	1	09/20/18 13:07	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.4	1.2	1	09/20/18 13:07	9/10/18	
Perfluorooctanoic acid (PFOA)	2.2	1.8	0.46	1	09/20/18 13:07	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.4	0.94	1	09/20/18 13:07	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.4	0.52	1	09/20/18 13:07	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.4	0.31	1	09/20/18 13:07	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.4	0.46	1	09/20/18 13:07	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.4	0.75	1	09/20/18 13:07	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.4	1.2	1	09/20/18 13:07	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.4	0.35	1	09/20/18 13:07	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 13:07	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.4	0.83	1	09/20/18 13:07	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.4	0.65	1	09/20/18 13:07	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.4	1.2	1	09/20/18 13:07	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.4	0.65	1	09/20/18 13:07	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 11:58
Date Received: 09/06/18 08:20

Sample Name: MW-112S
Lab Code: K1808431-008

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	76	10 - 122	09/20/18 13:07	
18O2-PFHxS	80	26 - 144	09/20/18 13:07	
13C4-PFOS	90	27 - 142	09/20/18 13:07	
13C4-PFBA	96	37 - 151	09/20/18 13:07	
13C5-PFPeA	98	23 - 154	09/20/18 13:07	
13C2-PFHxA	104	27 - 155	09/20/18 13:07	
13C4-PFHpA	95	20 - 153	09/20/18 13:07	
13C4-PFOA	86	31 - 142	09/20/18 13:07	
13C5-PFNA	101	27 - 146	09/20/18 13:07	
13C2-PFDA	87	22 - 155	09/20/18 13:07	
13C2-PFUnDA	79	26 - 138	09/20/18 13:07	
13C2-PFDoDA	90	24 - 131	09/20/18 13:07	
13C2-PFTeDA	88	16 - 136	09/20/18 13:07	
13C8-FOSA	60	19 - 123	09/20/18 13:07	
D3-MeFOSAA	224	18 - 129	09/20/18 13:07	*
D5-EtFOSAA	136	19 - 128	09/20/18 13:07	*
13C2-4:2 FTS	246	50 - 150	09/20/18 13:07	*
13C2-6:2 FTS	255	10 - 173	09/20/18 13:07	*
13C2-8:2 FTS	373	10 - 190	09/20/18 13:07	*

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 13:25
Date Received: 09/06/18 08:20

Sample Name: MW-114S
Lab Code: K1808431-009

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	1.7 J	4.4	0.90	1	09/20/18 13:18	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 13:18	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	2.4 J	4.4	0.94	1	09/20/18 13:18	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.4	0.88	1	09/20/18 13:18	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	26	4.4	1.0	1	09/20/18 13:18	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 13:18	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.4	1.3	1	09/20/18 13:18	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	2.7 J	8.8	2.7	1	09/20/18 13:18	9/10/18	
Perfluoropentanoic acid (PFPeA)	3.6 J	4.4	1.1	1	09/20/18 13:18	9/10/18	
Perfluorohexanoic acid (PFHxA)	3.3 J	4.4	0.92	1	09/20/18 13:18	9/10/18	
Perfluoroheptanoic acid (PFHpA)	2.2 J	4.4	1.2	1	09/20/18 13:18	9/10/18	
Perfluorooctanoic acid (PFOA)	4.3	1.8	0.46	1	09/20/18 13:18	9/10/18	
Perfluorononanoic acid (PFNA)	1.3 J	4.4	0.94	1	09/20/18 13:18	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.4	0.52	1	09/20/18 13:18	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.4	0.31	1	09/20/18 13:18	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.4	0.46	1	09/20/18 13:18	9/10/18	
Perfluorotridecanoic acid (PFTTrDA)	ND U	4.4	0.75	1	09/20/18 13:18	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	1.9 J	4.4	1.2	1	09/20/18 13:18	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.4	0.35	1	09/20/18 13:18	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 13:18	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.4	0.83	1	09/20/18 13:18	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.4	0.65	1	09/20/18 13:18	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.4	1.2	1	09/20/18 13:18	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.4	0.65	1	09/20/18 13:18	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18 13:25
Date Received: 09/06/18 08:20

Sample Name: MW-114S
Lab Code: K1808431-009

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	78	10 - 122	09/20/18 13:18	
18O2-PFHxS	85	26 - 144	09/20/18 13:18	
13C4-PFOS	93	27 - 142	09/20/18 13:18	
13C4-PFBA	104	37 - 151	09/20/18 13:18	
13C5-PFPeA	98	23 - 154	09/20/18 13:18	
13C2-PFHxA	104	27 - 155	09/20/18 13:18	
13C4-PFHpA	99	20 - 153	09/20/18 13:18	
13C4-PFOA	96	31 - 142	09/20/18 13:18	
13C5-PFNA	100	27 - 146	09/20/18 13:18	
13C2-PFDA	123	22 - 155	09/20/18 13:18	
13C2-PFUnDA	116	26 - 138	09/20/18 13:18	
13C2-PFDoDA	94	24 - 131	09/20/18 13:18	
13C2-PFTeDA	77	16 - 136	09/20/18 13:18	
13C8-FOSA	78	19 - 123	09/20/18 13:18	
D3-MeFOSAA	113	18 - 129	09/20/18 13:18	
D5-EtFOSAA	115	19 - 128	09/20/18 13:18	
13C2-4:2 FTS	166	50 - 150	09/20/18 13:18	*
13C2-6:2 FTS	165	10 - 173	09/20/18 13:18	
13C2-8:2 FTS	215	10 - 190	09/20/18 13:18	*

ALS Group USA, Corp.
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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: DUP-1
Lab Code: K1808431-010

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	2.3 J	4.5	0.90	1	09/20/18 13:28	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 13:28	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	12	4.5	0.94	1	09/20/18 13:28	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	2.1 J	4.5	0.88	1	09/20/18 13:28	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	ND U	4.5	1.0	1	09/20/18 13:28	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 13:28	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.5	1.3	1	09/20/18 13:28	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	9.1	2.7	1	09/20/18 13:28	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.5	1.1	1	09/20/18 13:28	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.7 J	4.5	0.92	1	09/20/18 13:28	9/10/18	
Perfluoroheptanoic acid (PFHpA)	2.4 J	4.5	1.2	1	09/20/18 13:28	9/10/18	
Perfluorooctanoic acid (PFOA)	4.1	1.8	0.46	1	09/20/18 13:28	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	4.5	0.94	1	09/20/18 13:28	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.5	0.52	1	09/20/18 13:28	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.5	0.31	1	09/20/18 13:28	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.5	0.46	1	09/20/18 13:28	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.5	0.75	1	09/20/18 13:28	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.5	1.2	1	09/20/18 13:28	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.5	0.35	1	09/20/18 13:28	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 13:28	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.5	0.83	1	09/20/18 13:28	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.5	0.65	1	09/20/18 13:28	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.5	1.2	1	09/20/18 13:28	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.5	0.65	1	09/20/18 13:28	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: DUP-1
Lab Code: K1808431-010

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	76	10 - 122	09/20/18 13:28	
18O2-PFHxS	91	26 - 144	09/20/18 13:28	
13C4-PFOS	96	27 - 142	09/20/18 13:28	
13C4-PFBA	95	37 - 151	09/20/18 13:28	
13C5-PFPeA	95	23 - 154	09/20/18 13:28	
13C2-PFHxA	107	27 - 155	09/20/18 13:28	
13C4-PFHpA	93	20 - 153	09/20/18 13:28	
13C4-PFOA	92	31 - 142	09/20/18 13:28	
13C5-PFNA	91	27 - 146	09/20/18 13:28	
13C2-PFDA	85	22 - 155	09/20/18 13:28	
13C2-PFUnDA	97	26 - 138	09/20/18 13:28	
13C2-PFDoDA	92	24 - 131	09/20/18 13:28	
13C2-PFTeDA	96	16 - 136	09/20/18 13:28	
13C8-FOSA	74	19 - 123	09/20/18 13:28	
D3-MeFOSAA	84	18 - 129	09/20/18 13:28	
D5-EtFOSAA	82	19 - 128	09/20/18 13:28	
13C2-4:2 FTS	99	50 - 150	09/20/18 13:28	
13C2-6:2 FTS	85	10 - 173	09/20/18 13:28	
13C2-8:2 FTS	85	10 - 190	09/20/18 13:28	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: DUP-2
Lab Code: K1808431-011

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	1.7 J	4.1	0.90	1	09/20/18 13:39	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 13:39	9/10/18	*
Perfluorohexane sulfonic acid (PFHxS)	2.6 J	4.1	0.94	1	09/20/18 13:39	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.1	0.88	1	09/20/18 13:39	9/10/18	*
Perfluorooctane sulfonic acid (PFOS)	30	4.1	1.0	1	09/20/18 13:39	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 13:39	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.1	1.3	1	09/20/18 13:39	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	3.2 J	8.2	2.7	1	09/20/18 13:39	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.1	1.1	1	09/20/18 13:39	9/10/18	
Perfluorohexanoic acid (PFHxA)	3.0 J	4.1	0.92	1	09/20/18 13:39	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.1	1.2	1	09/20/18 13:39	9/10/18	
Perfluorooctanoic acid (PFOA)	2.8	1.6	0.46	1	09/20/18 13:39	9/10/18	
Perfluorononanoic acid (PFNA)	1.1 J	4.1	0.94	1	09/20/18 13:39	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	4.1	0.52	1	09/20/18 13:39	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.1	0.31	1	09/20/18 13:39	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.1	0.46	1	09/20/18 13:39	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.1	0.75	1	09/20/18 13:39	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	4.1	1.2	1	09/20/18 13:39	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.1	0.35	1	09/20/18 13:39	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 13:39	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.1	0.83	1	09/20/18 13:39	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.1	0.65	1	09/20/18 13:39	9/10/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.1	1.2	1	09/20/18 13:39	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.1	0.65	1	09/20/18 13:39	9/10/18	

ALS Group USA, Corp.
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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: DUP-2
Lab Code: K1808431-011

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	63	10 - 122	09/20/18 13:39	
18O2-PFHxS	68	26 - 144	09/20/18 13:39	
13C4-PFOS	75	27 - 142	09/20/18 13:39	
13C4-PFBA	75	37 - 151	09/20/18 13:39	
13C5-PFPeA	76	23 - 154	09/20/18 13:39	
13C2-PFHxA	78	27 - 155	09/20/18 13:39	
13C4-PFHpA	71	20 - 153	09/20/18 13:39	
13C4-PFOA	77	31 - 142	09/20/18 13:39	
13C5-PFNA	81	27 - 146	09/20/18 13:39	
13C2-PFDA	71	22 - 155	09/20/18 13:39	
13C2-PFUnDA	87	26 - 138	09/20/18 13:39	
13C2-PFDoDA	78	24 - 131	09/20/18 13:39	
13C2-PFTeDA	70	16 - 136	09/20/18 13:39	
13C8-FOSA	52	19 - 123	09/20/18 13:39	
D3-MeFOSAA	75	18 - 129	09/20/18 13:39	
D5-EtFOSAA	77	19 - 128	09/20/18 13:39	
13C2-4:2 FTS	127	50 - 150	09/20/18 13:39	
13C2-6:2 FTS	163	10 - 173	09/20/18 13:39	
13C2-8:2 FTS	129	10 - 190	09/20/18 13:39	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: FB
Lab Code: K1808431-012

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	4.3	0.90	1	09/12/18 02:36	9/11/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/12/18 02:36	9/11/18	
Perfluorohexane sulfonic acid (PFHxS)	ND U	4.3	0.94	1	09/12/18 02:36	9/11/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.3	0.88	1	09/12/18 02:36	9/11/18	
Perfluorooctane sulfonic acid (PFOS)	ND U	4.3	1.0	1	09/12/18 02:36	9/11/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/12/18 02:36	9/11/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.3	1.3	1	09/12/18 02:36	9/11/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.6	2.7	1	09/12/18 02:36	9/11/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.3	1.1	1	09/12/18 02:36	9/11/18	
Perfluorohexanoic acid (PFHxA)	1.6 J	4.3	0.92	1	09/12/18 02:36	9/11/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.3	1.2	1	09/12/18 02:36	9/11/18	
Perfluorooctanoic acid (PFOA)	ND U	1.7	0.46	1	09/12/18 02:36	9/11/18	
Perfluorononanoic acid (PFNA)	ND U	4.3	0.94	1	09/12/18 02:36	9/11/18	
Perfluorodecanoic acid (PFDA)	ND U	4.3	0.52	1	09/12/18 02:36	9/11/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.3	0.31	1	09/12/18 02:36	9/11/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.3	0.46	1	09/12/18 02:36	9/11/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.3	0.75	1	09/12/18 02:36	9/11/18	
Perfluorotetradecanoic acid (PFTeDA)	1.8 J	4.3	1.2	1	09/12/18 02:36	9/11/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	0.44 J	4.3	0.35	1	09/12/18 02:36	9/11/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/12/18 02:36	9/11/18	*
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.3	0.83	1	09/12/18 02:36	9/11/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.3	0.65	1	09/12/18 02:36	9/11/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.3	1.2	1	09/12/18 02:36	9/11/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.3	0.65	1	09/12/18 02:36	9/11/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: FB
Lab Code: K1808431-012

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	60	10 - 122	09/12/18 02:36	
18O2-PFHxS	53	26 - 144	09/12/18 02:36	
13C4-PFOS	55	27 - 142	09/12/18 02:36	
13C4-PFBA	58	37 - 151	09/12/18 02:36	
13C5-PFPeA	69	23 - 154	09/12/18 02:36	
13C2-PFHxA	68	27 - 155	09/12/18 02:36	
13C4-PFHpA	79	20 - 153	09/12/18 02:36	
13C4-PFOA	55	31 - 142	09/12/18 02:36	
13C5-PFNA	51	27 - 146	09/12/18 02:36	
13C2-PFDA	50	22 - 155	09/12/18 02:36	
13C2-PFUnDA	56	26 - 138	09/12/18 02:36	
13C2-PFDoDA	44	24 - 131	09/12/18 02:36	
13C2-PFTeDA	54	16 - 136	09/12/18 02:36	
13C8-FOSA	59	19 - 123	09/12/18 02:36	
D3-MeFOSAA	58	18 - 129	09/12/18 02:36	
D5-EtFOSAA	57	19 - 128	09/12/18 02:36	
13C2-4:2 FTS	48	50 - 150	09/12/18 02:36	*
13C2-6:2 FTS	67	10 - 173	09/12/18 02:36	
13C2-8:2 FTS	66	10 - 190	09/12/18 02:36	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: Equip Blk
Lab Code: K1808431-013

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	4.2	0.90	1	09/12/18 02:47	9/11/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/12/18 02:47	9/11/18	
Perfluorohexane sulfonic acid (PFHxS)	ND U	4.2	0.94	1	09/12/18 02:47	9/11/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.2	0.88	1	09/12/18 02:47	9/11/18	
Perfluorooctane sulfonic acid (PFOS)	ND U	4.2	1.0	1	09/12/18 02:47	9/11/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/12/18 02:47	9/11/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.2	1.3	1	09/12/18 02:47	9/11/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.3	2.7	1	09/12/18 02:47	9/11/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.2	1.1	1	09/12/18 02:47	9/11/18	
Perfluorohexanoic acid (PFHxA)	1.2 J	4.2	0.92	1	09/12/18 02:47	9/11/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.2	1.2	1	09/12/18 02:47	9/11/18	
Perfluorooctanoic acid (PFOA)	ND U	1.7	0.46	1	09/12/18 02:47	9/11/18	
Perfluorononanoic acid (PFNA)	ND U	4.2	0.94	1	09/12/18 02:47	9/11/18	
Perfluorodecanoic acid (PFDA)	ND U	4.2	0.52	1	09/12/18 02:47	9/11/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.2	0.31	1	09/12/18 02:47	9/11/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.2	0.46	1	09/12/18 02:47	9/11/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.2	0.75	1	09/12/18 02:47	9/11/18	
Perfluorotetradecanoic acid (PFTeDA)	1.7 J	4.2	1.2	1	09/12/18 02:47	9/11/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.2	0.35	1	09/12/18 02:47	9/11/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/12/18 02:47	9/11/18	*
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.2	0.83	1	09/12/18 02:47	9/11/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.2	0.65	1	09/12/18 02:47	9/11/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.2	1.2	1	09/12/18 02:47	9/11/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.2	0.65	1	09/12/18 02:47	9/11/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: Equip Blk
Lab Code: K1808431-013

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	64	10 - 122	09/12/18 02:47	
18O2-PFHxS	55	26 - 144	09/12/18 02:47	
13C4-PFOS	58	27 - 142	09/12/18 02:47	
13C4-PFBA	63	37 - 151	09/12/18 02:47	
13C5-PFPeA	72	23 - 154	09/12/18 02:47	
13C2-PFHxA	73	27 - 155	09/12/18 02:47	
13C4-PFHpA	82	20 - 153	09/12/18 02:47	
13C4-PFOA	59	31 - 142	09/12/18 02:47	
13C5-PFNA	55	27 - 146	09/12/18 02:47	
13C2-PFDA	53	22 - 155	09/12/18 02:47	
13C2-PFUnDA	57	26 - 138	09/12/18 02:47	
13C2-PFDoDA	48	24 - 131	09/12/18 02:47	
13C2-PFTeDA	55	16 - 136	09/12/18 02:47	
13C8-FOSA	60	19 - 123	09/12/18 02:47	
D3-MeFOSAA	60	18 - 129	09/12/18 02:47	
D5-EtFOSAA	62	19 - 128	09/12/18 02:47	
13C2-4:2 FTS	50	50 - 150	09/12/18 02:47	
13C2-6:2 FTS	76	10 - 173	09/12/18 02:47	
13C2-8:2 FTS	67	10 - 190	09/12/18 02:47	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: Trip Blank
Lab Code: K1808431-014

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	4.3	0.90	1	09/12/18 02:57	9/11/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/12/18 02:57	9/11/18	
Perfluorohexane sulfonic acid (PFHxS)	ND U	4.3	0.94	1	09/12/18 02:57	9/11/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	4.3	0.88	1	09/12/18 02:57	9/11/18	
Perfluorooctane sulfonic acid (PFOS)	ND U	4.3	1.0	1	09/12/18 02:57	9/11/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/12/18 02:57	9/11/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	4.3	1.3	1	09/12/18 02:57	9/11/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	8.6	2.7	1	09/12/18 02:57	9/11/18	
Perfluoropentanoic acid (PFPeA)	ND U	4.3	1.1	1	09/12/18 02:57	9/11/18	
Perfluorohexanoic acid (PFHxA)	1.3 J	4.3	0.92	1	09/12/18 02:57	9/11/18	
Perfluoroheptanoic acid (PFHpA)	ND U	4.3	1.2	1	09/12/18 02:57	9/11/18	
Perfluorooctanoic acid (PFOA)	ND U	1.7	0.46	1	09/12/18 02:57	9/11/18	
Perfluorononanoic acid (PFNA)	ND U	4.3	0.94	1	09/12/18 02:57	9/11/18	
Perfluorodecanoic acid (PFDA)	ND U	4.3	0.52	1	09/12/18 02:57	9/11/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	4.3	0.31	1	09/12/18 02:57	9/11/18	
Perfluorododecanoic acid (PFDoDA)	ND U	4.3	0.46	1	09/12/18 02:57	9/11/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	4.3	0.75	1	09/12/18 02:57	9/11/18	
Perfluorotetradecanoic acid (PFTeDA)	3.3 J	4.3	1.2	1	09/12/18 02:57	9/11/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	4.3	0.35	1	09/12/18 02:57	9/11/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/12/18 02:57	9/11/18	*
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	4.3	0.83	1	09/12/18 02:57	9/11/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	4.3	0.65	1	09/12/18 02:57	9/11/18	*
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	4.3	1.2	1	09/12/18 02:57	9/11/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	4.3	0.65	1	09/12/18 02:57	9/11/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: 09/05/18
Date Received: 09/06/18 08:20

Sample Name: Trip Blank
Lab Code: K1808431-014

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	63	10 - 122	09/12/18 02:57	
18O2-PFHxS	57	26 - 144	09/12/18 02:57	
13C4-PFOS	58	27 - 142	09/12/18 02:57	
13C4-PFBA	61	37 - 151	09/12/18 02:57	
13C5-PFPeA	71	23 - 154	09/12/18 02:57	
13C2-PFHxA	63	27 - 155	09/12/18 02:57	
13C4-PFHpA	73	20 - 153	09/12/18 02:57	
13C4-PFOA	58	31 - 142	09/12/18 02:57	
13C5-PFNA	57	27 - 146	09/12/18 02:57	
13C2-PFDA	51	22 - 155	09/12/18 02:57	
13C2-PFUnDA	52	26 - 138	09/12/18 02:57	
13C2-PFDoDA	45	24 - 131	09/12/18 02:57	
13C2-PFTeDA	53	16 - 136	09/12/18 02:57	
13C8-FOSA	57	19 - 123	09/12/18 02:57	
D3-MeFOSAA	62	18 - 129	09/12/18 02:57	
D5-EtFOSAA	61	19 - 128	09/12/18 02:57	
13C2-4:2 FTS	45	50 - 150	09/12/18 02:57	*
13C2-6:2 FTS	77	10 - 173	09/12/18 02:57	
13C2-8:2 FTS	61	10 - 190	09/12/18 02:57	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ1812487-03

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	5.0	0.90	1	09/20/18 09:48	9/10/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/20/18 09:48	9/10/18	
Perfluorohexane sulfonic acid (PFHxS)	ND U	5.0	0.94	1	09/20/18 09:48	9/10/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	5.0	0.88	1	09/20/18 09:48	9/10/18	
Perfluorooctane sulfonic acid (PFOS)	ND U	5.0	1.0	1	09/20/18 09:48	9/10/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/20/18 09:48	9/10/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	5.0	1.3	1	09/20/18 09:48	9/10/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	10	2.7	1	09/20/18 09:48	9/10/18	
Perfluoropentanoic acid (PFPeA)	ND U	5.0	1.1	1	09/20/18 09:48	9/10/18	
Perfluorohexanoic acid (PFHxA)	1.5 J	5.0	0.92	1	09/20/18 09:48	9/10/18	
Perfluoroheptanoic acid (PFHpA)	ND U	5.0	1.2	1	09/20/18 09:48	9/10/18	
Perfluorooctanoic acid (PFOA)	ND U	2.0	0.46	1	09/20/18 09:48	9/10/18	
Perfluorononanoic acid (PFNA)	ND U	5.0	0.94	1	09/20/18 09:48	9/10/18	
Perfluorodecanoic acid (PFDA)	ND U	5.0	0.52	1	09/20/18 09:48	9/10/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	5.0	0.31	1	09/20/18 09:48	9/10/18	
Perfluorododecanoic acid (PFDoDA)	ND U	5.0	0.46	1	09/20/18 09:48	9/10/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	5.0	0.75	1	09/20/18 09:48	9/10/18	
Perfluorotetradecanoic acid (PFTeDA)	2.1 J	5.0	1.2	1	09/20/18 09:48	9/10/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	5.0	0.35	1	09/20/18 09:48	9/10/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/20/18 09:48	9/10/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	5.0	0.83	1	09/20/18 09:48	9/10/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	5.0	0.65	1	09/20/18 09:48	9/10/18	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	5.0	1.2	1	09/20/18 09:48	9/10/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	5.0	0.65	1	09/20/18 09:48	9/10/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ1812487-03

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	76	10 - 122	09/20/18 09:48	
18O2-PFHxS	84	26 - 144	09/20/18 09:48	
13C4-PFOS	86	27 - 142	09/20/18 09:48	
13C4-PFBA	88	37 - 151	09/20/18 09:48	
13C5-PFPeA	100	23 - 154	09/20/18 09:48	
13C2-PFHxA	92	27 - 155	09/20/18 09:48	
13C4-PFHpA	92	20 - 153	09/20/18 09:48	
13C4-PFOA	94	31 - 142	09/20/18 09:48	
13C5-PFNA	91	27 - 146	09/20/18 09:48	
13C2-PFDA	84	22 - 155	09/20/18 09:48	
13C2-PFUnDA	87	26 - 138	09/20/18 09:48	
13C2-PFDoDA	86	24 - 131	09/20/18 09:48	
13C2-PFTeDA	85	16 - 136	09/20/18 09:48	
13C8-FOSA	80	19 - 123	09/20/18 09:48	
D3-MeFOSAA	91	18 - 129	09/20/18 09:48	
D5-EtFOSAA	82	19 - 128	09/20/18 09:48	
13C2-4:2 FTS	70	50 - 150	09/20/18 09:48	
13C2-6:2 FTS	87	10 - 173	09/20/18 09:48	
13C2-8:2 FTS	82	10 - 190	09/20/18 09:48	

Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ1812573-03

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	ND U	5.0	0.90	1	09/11/18 22:46	9/11/18	
Perfluoropentane sulfonic acid (PFPeS)	ND U	5.0	5.0	1	09/11/18 22:46	9/11/18	
Perfluorohexane sulfonic acid (PFHxS)	ND U	5.0	0.94	1	09/11/18 22:46	9/11/18	
Perfluoroheptane sulfonic acid (PFHpS)	ND U	5.0	0.88	1	09/11/18 22:46	9/11/18	
Perfluorooctane sulfonic acid (PFOS)	ND U	5.0	1.0	1	09/11/18 22:46	9/11/18	
Perfluorononane sulfonic acid (PFNS)	ND U	5.0	5.0	1	09/11/18 22:46	9/11/18	
Perfluorodecane sulfonic acid (PFDS)	ND U	5.0	1.3	1	09/11/18 22:46	9/11/18	
Perfluoroalkane Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	ND U	10	2.7	1	09/11/18 22:46	9/11/18	
Perfluoropentanoic acid (PFPeA)	ND U	5.0	1.1	1	09/11/18 22:46	9/11/18	
Perfluorohexanoic acid (PFHxA)	1.2 J	5.0	0.92	1	09/11/18 22:46	9/11/18	
Perfluoroheptanoic acid (PFHpA)	ND U	5.0	1.2	1	09/11/18 22:46	9/11/18	
Perfluorooctanoic acid (PFOA)	ND U	2.0	0.46	1	09/11/18 22:46	9/11/18	
Perfluorononanoic acid (PFNA)	ND U	5.0	0.94	1	09/11/18 22:46	9/11/18	
Perfluorodecanoic acid (PFDA)	ND U	5.0	0.52	1	09/11/18 22:46	9/11/18	
Perfluoroundecanoic acid (PFUnDA)	ND U	5.0	0.31	1	09/11/18 22:46	9/11/18	
Perfluorododecanoic acid (PFDoDA)	ND U	5.0	0.46	1	09/11/18 22:46	9/11/18	
Perfluorotridecanoic acid (PFTrDA)	ND U	5.0	0.75	1	09/11/18 22:46	9/11/18	
Perfluorotetradecanoic acid (PFTeDA)	ND U	5.0	1.2	1	09/11/18 22:46	9/11/18	
Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	ND U	5.0	0.35	1	09/11/18 22:46	9/11/18	
N-Methyl perfluorooctane sulfonamidoacetic acid	ND U	8.0	4.2	1	09/11/18 22:46	9/11/18	
N-Ethyl perfluorooctane sulfonamidoacetic acid	ND U	5.0	0.83	1	09/11/18 22:46	9/11/18	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND U	5.0	0.65	1	09/11/18 22:46	9/11/18	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND U	5.0	1.2	1	09/11/18 22:46	9/11/18	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND U	5.0	0.65	1	09/11/18 22:46	9/11/18	

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Analytical Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ1812573-03

Units: ng/L
Basis: NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C3-PFBS	66	10 - 122	09/11/18 22:46	
18O2-PFHxS	67	26 - 144	09/11/18 22:46	
13C4-PFOS	65	27 - 142	09/11/18 22:46	
13C4-PFBA	62	37 - 151	09/11/18 22:46	
13C5-PFPeA	76	23 - 154	09/11/18 22:46	
13C2-PFHxA	71	27 - 155	09/11/18 22:46	
13C4-PFHpA	95	20 - 153	09/11/18 22:46	
13C4-PFOA	75	31 - 142	09/11/18 22:46	
13C5-PFNA	70	27 - 146	09/11/18 22:46	
13C2-PFDA	72	22 - 155	09/11/18 22:46	
13C2-PFUnDA	75	26 - 138	09/11/18 22:46	
13C2-PFDoDA	62	24 - 131	09/11/18 22:46	
13C2-PFTeDA	73	16 - 136	09/11/18 22:46	
13C8-FOSA	79	19 - 123	09/11/18 22:46	
D3-MeFOSAA	75	18 - 129	09/11/18 22:46	
D5-EtFOSAA	77	19 - 128	09/11/18 22:46	
13C2-4:2 FTS	57	50 - 150	09/11/18 22:46	
13C2-6:2 FTS	93	10 - 173	09/11/18 22:46	
13C2-8:2 FTS	88	10 - 190	09/11/18 22:46	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	MW-100S	MW-101S	MW-103S
		K1808431-001	K1808431-002	K1808431-003
13C3-PFBS	10-122	64	62	67
18O2-PFHxS	26-144	74	84	87
13C4-PFOS	27-142	92	71	98
13C4-PFBA	37-151	80	75	93
13C5-PFPeA	23-154	76	75	74
13C2-PFHxA	27-155	91	79	76
13C4-PFHpA	20-153	77	78	69
13C4-PFOA	31-142	86	80	92
13C5-PFNA	27-146	95	71	87
13C2-PFDA	22-155	93	67	86
13C2-PFUnDA	26-138	90	68	104
13C2-PFDoDA	24-131	76	63	90
13C2-PFTeDA	16-136	66	63	90
13C8-FOSA	19-123	60	55	55
D3-MeFOSAA	18-129	77	62	111
D5-EtFOSAA	19-128	69	53	115
13C2-4:2 FTS	50-150	126	66	216*
13C2-6:2 FTS	10-173	156	71	344*
13C2-8:2 FTS	10-190	117	60	322*

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	MW-104S	MW-105S	MW-106SR
		K1808431-004	K1808431-005	K1808431-006
13C3-PFBS	10-122	72	80	71
18O2-PFHxS	26-144	75	86	81
13C4-PFOS	27-142	73	78	82
13C4-PFBA	37-151	87	90	82
13C5-PFPeA	23-154	90	97	85
13C2-PFHxA	27-155	103	91	92
13C4-PFHpA	20-153	85	106	88
13C4-PFOA	31-142	80	89	87
13C5-PFNA	27-146	72	78	83
13C2-PFDA	22-155	74	86	72
13C2-PFUnDA	26-138	73	82	80
13C2-PFDoDA	24-131	71	80	72
13C2-PFTeDA	16-136	71	84	71
13C8-FOSA	19-123	62	77	63
D3-MeFOSAA	18-129	67	93	69
D5-EtFOSAA	19-128	63	80	64
13C2-4:2 FTS	50-150	65	109	112
13C2-6:2 FTS	10-173	66	77	113
13C2-8:2 FTS	10-190	67	86	80

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	MW-109S	MW-112S	MW-114S
		K1808431-007	K1808431-008	K1808431-009
13C3-PFBS	10-122	71	76	78
18O2-PFHxS	26-144	75	80	85
13C4-PFOS	27-142	93	90	93
13C4-PFBA	37-151	82	96	104
13C5-PFPeA	23-154	85	98	98
13C2-PFHxA	27-155	90	104	104
13C4-PFHpA	20-153	80	95	99
13C4-PFOA	31-142	85	86	96
13C5-PFNA	27-146	95	101	100
13C2-PFDA	22-155	90	87	123
13C2-PFUnDA	26-138	106	79	116
13C2-PFDoDA	24-131	96	90	94
13C2-PFTeDA	16-136	78	88	77
13C8-FOSA	19-123	68	60	78
D3-MeFOSAA	18-129	86	224*	113
D5-EtFOSAA	19-128	90	136*	115
13C2-4:2 FTS	50-150	151*	246*	166*
13C2-6:2 FTS	10-173	182*	255*	165
13C2-8:2 FTS	10-190	151	373*	215*

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	DUP-1 K1808431-010	DUP-2 K1808431-011	FB K1808431-012
13C3-PFBS	10-122	76	63	60
18O2-PFHxS	26-144	91	68	53
13C4-PFOS	27-142	96	75	55
13C4-PFBA	37-151	95	75	58
13C5-PFPeA	23-154	95	76	69
13C2-PFHxA	27-155	107	78	68
13C4-PFHpA	20-153	93	71	79
13C4-PFOA	31-142	92	77	55
13C5-PFNA	27-146	91	81	51
13C2-PFDA	22-155	85	71	50
13C2-PFUnDA	26-138	97	87	56
13C2-PFDoDA	24-131	92	78	44
13C2-PFTeDA	16-136	96	70	54
13C8-FOSA	19-123	74	52	59
D3-MeFOSAA	18-129	84	75	58
D5-EtFOSAA	19-128	82	77	57
13C2-4:2 FTS	50-150	99	127	48*
13C2-6:2 FTS	10-173	85	163	67
13C2-8:2 FTS	10-190	85	129	66

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	Equip Blk K1808431-013	Trip Blank K1808431-014	Method Blank KQ1812487-03
13C3-PFBS	10-122	64	63	76
18O2-PFHxS	26-144	55	57	84
13C4-PFOS	27-142	58	58	86
13C4-PFBA	37-151	63	61	88
13C5-PFPeA	23-154	72	71	100
13C2-PFHxA	27-155	73	63	92
13C4-PFHpA	20-153	82	73	92
13C4-PFOA	31-142	59	58	94
13C5-PFNA	27-146	55	57	91
13C2-PFDA	22-155	53	51	84
13C2-PFUnDA	26-138	57	52	87
13C2-PFDoDA	24-131	48	45	86
13C2-PFTeDA	16-136	55	53	85
13C8-FOSA	19-123	60	57	80
D3-MeFOSAA	18-129	60	62	91
D5-EtFOSAA	19-128	62	61	82
13C2-4:2 FTS	50-150	50	45*	70
13C2-6:2 FTS	10-173	76	77	87
13C2-8:2 FTS	10-190	67	61	82

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	Method Blank	Lab Control Sample	Duplicate Lab Control Sample
		KQ1812573-03	KQ1812487-01	KQ1812487-02
13C3-PFBS	10-122	66	76	72
18O2-PFHxS	26-144	67	82	78
13C4-PFOS	27-142	65	79	86
13C4-PFBA	37-151	62	86	89
13C5-PFPeA	23-154	76	97	92
13C2-PFHxA	27-155	71	92	102
13C4-PFHpA	20-153	95	87	87
13C4-PFOA	31-142	75	88	87
13C5-PFNA	27-146	70	85	86
13C2-PFDA	22-155	72	80	88
13C2-PFUnDA	26-138	75	85	92
13C2-PFDoDA	24-131	62	77	84
13C2-PFTeDA	16-136	73	77	75
13C8-FOSA	19-123	79	75	68
D3-MeFOSAA	18-129	75	83	87
D5-EtFOSAA	19-128	77	75	79
13C2-4:2 FTS	50-150	57	67	68
13C2-6:2 FTS	10-173	93	79	74
13C2-8:2 FTS	10-190	88	66	81

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Surrogate	Control Limits	Lab Control Sample	Duplicate Lab Control
		KQ1812573-01	Sample KQ1812573-02
13C3-PFBS	10-122	56	58
18O2-PFHxS	26-144	60	59
13C4-PFOS	27-142	59	61
13C4-PFBA	37-151	58	60
13C5-PFPeA	23-154	63	67
13C2-PFHxA	27-155	63	68
13C4-PFHpA	20-153	77	84
13C4-PFOA	31-142	64	63
13C5-PFNA	27-146	60	60
13C2-PFDA	22-155	59	60
13C2-PFUnDA	26-138	65	65
13C2-PFDoDA	24-131	52	53
13C2-PFTeDA	16-136	57	65
13C8-FOSA	19-123	61	64
D3-MeFOSAA	18-129	60	64
D5-EtFOSAA	19-128	62	64
13C2-4:2 FTS	50-150	51	51
13C2-6:2 FTS	10-173	75	77
13C2-8:2 FTS	10-190	69	72

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not acceptable.

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QA/QC Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102

Service Request: K1808431
Date Analyzed: 09/11/18 22:15

Internal Standard Area and RT SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

File ID: J:\LCMS06\Data\091118\091118_033
Instrument ID: K-LCMS-06
Analysis Method: PFC/537M

Lab Code: KQ1812667-01
Analysis Lot: 606211
Signal ID: 1

	D3-MeFOSA	
	Area	RT
Result ==>	406,271	5.626
Upper Limit ==>	812,542	6.63
Lower Limit ==>	203,136	4.63

Associated Analyses

		Area	RT
Continuing Calibration Blank	KQ1812667-02	480550	5.619
Method Blank	KQ1812573-03	506181	5.622
Lab Control Sample	KQ1812573-01	545375	5.623
Duplicate Lab Control Sample	KQ1812573-02	541906	5.621
FB	K1808431-012	524506	5.621
Equip Blk	K1808431-013	500160	5.629
Trip Blank	K1808431-014	490327	5.627

ALS Group USA, Corp.
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QA/QC Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102

Service Request: K1808431
Date Analyzed: 09/20/18 09:27

Internal Standard Area and RT SUMMARY
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

File ID: J:\LCMS06\Data\091918_b7\091918_082
Instrument ID: K-LCMS-06
Analysis Method: PFC/537M

Lab Code: KQ1814114-01
Analysis Lot: 607276
Signal ID: 1

	D3-MeFOSA	
	Area	RT
Result ==>	455,079	5.623
Upper Limit ==>	910,158	6.62
Lower Limit ==>	227,540	4.62

Associated Analyses

Continuing Calibration Blank	KQ1814114-02	487049	5.622
Method Blank	KQ1812487-03	480905	5.624
Lab Control Sample	KQ1812487-01	481058	5.624
Duplicate Lab Control Sample	KQ1812487-02	450931	5.627
MW-100S	K1808431-001	545298	5.627
MW-101S	K1808431-002	587278	5.625
MW-103S	K1808431-003	438365	5.622
MW-104S	K1808431-004	509857	5.628
MW-105S	K1808431-005	447780	5.622
MW-106SR	K1808431-006	482692	5.626
MW-109S	K1808431-007	537226	5.627
MW-112S	K1808431-008	567464	5.619
MW-114S	K1808431-009	458579	5.622
DUP-1	K1808431-010	485057	5.625
DUP-2	K1808431-011	581027	5.627

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Analyzed: 09/20/18
Date Extracted: 09/10/18

Duplicate Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Units: ng/L
Basis: NA
Analysis Lot: 607276

Analyte Name	Lab Control Sample KQ1812487-01			Duplicate Lab Control Sample KQ1812487-02			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	174	150	116 *	190	150	127 *	11-81	9	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	155	152	102	166	152	109	39-161	7	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	192	154	125	171	154	111	39-144	12	30
N-Ethyl perfluorooctane sulfonamidoacetic acid	187	160	117	177	160	111	40-166	6	30
N-Methyl perfluorooctane sulfonamidoacetic acid	179	160	112	179	160	112	48-162	<1	30
Perfluorobutane sulfonic acid (PFBS)	159	142	112	175	142	123	48-164	10	30
Perfluorobutanoic acid (PFBA)	157	160	98	156	160	98	47-147	<1	30
Perfluorodecane sulfonic acid (PFDS)	166	154	107	172	154	112	35-155	4	30
Perfluorodecanoic acid (PFDA)	155	160	97	147	160	92	54-139	5	30
Perfluorododecanoic acid (PFDoDA)	164	160	103	163	160	102	51-155	<1	30
Perfluoroheptane sulfonic acid (PFHpS)	186	153	122	184	153	121	47-156	<1	30
Perfluoroheptanoic acid (PFHpA)	150	160	94	168	160	105	46-153	11	30
Perfluorohexane sulfonic acid (PFHxS)	171	146	117	173	146	118	46-145	<1	30
Perfluorohexanoic acid (PFHxA)	151	160	95	141	160	88	44-148	7	30
Perfluorononane sulfonic acid (PFNS)	160	154	104	159	154	103	70-130	<1	30
Perfluorononanoic acid (PFNA)	170	160	106	161	160	101	47-155	5	30
Perfluorooctane sulfonamide (FOSA)	164	160	103	187	160	117	35-146	13	30
Perfluorooctane sulfonic acid (PFOS)	156	149	105	151	149	102	29-162	3	30
Perfluorooctanoic acid (PFOA)	157	160	98	171	160	107	52-147	9	30
Perfluoropentane sulfonic acid (PFPeS)	168	151	111	217	151	144 *	70-130	25	30
Perfluoropentanoic acid (PFPeA)	147	160	92	161	160	100	42-160	9	30
Perfluorotetradecanoic acid (PFTeDA)	156	160	97	153	160	96	47-169	2	30
Perfluorotridecanoic acid (PFTrDA)	161	160	101	174	160	109	45-160	8	30
Perfluoroundecanoic acid (PFUnDA)	155	160	97	153	160	96	53-141	<1	30

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Analyzed: 09/11/18
Date Extracted: 09/11/18

Duplicate Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Units: ng/L
Basis: NA
Analysis Lot: 606211

Analyte Name	Lab Control Sample KQ1812573-01			Duplicate Lab Control Sample KQ1812573-02			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	148	150	99 *	144	150	96 *	11-81	2	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	152	152	100	143	152	94	39-161	7	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	166	154	108	159	154	104	39-144	4	30
N-Ethyl perfluorooctane sulfonamidoacetic acid	182	160	114	203	160	127	40-166	11	30
N-Methyl perfluorooctane sulfonamidoacetic acid	163	160	102	141	160	88	48-162	14	30
Perfluorobutane sulfonic acid (PFBS)	140	142	99	133	142	94	48-164	6	30
Perfluorobutanoic acid (PFBA)	172	160	107	157	160	98	47-147	9	30
Perfluorodecane sulfonic acid (PFDS)	159	154	103	156	154	101	35-155	2	30
Perfluorodecanoic acid (PFDA)	181	160	113	166	160	104	54-139	9	30
Perfluorododecanoic acid (PFDoDA)	178	160	111	151	160	94	51-155	17	30
Perfluoroheptane sulfonic acid (PFHpS)	196	153	129	203	153	133	47-156	3	30
Perfluoroheptanoic acid (PFHpA)	150	160	94	129	160	81	46-153	15	30
Perfluorohexane sulfonic acid (PFHxS)	165	146	113	168	146	115	46-145	2	30
Perfluorohexanoic acid (PFHxA)	157	160	98	149	160	93	44-148	6	30
Perfluorononane sulfonic acid (PFNS)	159	154	103	160	154	104	70-130	<1	30
Perfluorononanoic acid (PFNA)	162	160	101	162	160	101	47-155	<1	30
Perfluorooctane sulfonamide (FOSA)	172	160	108	165	160	103	35-146	4	30
Perfluorooctane sulfonic acid (PFOS)	165	149	111	164	149	110	29-162	<1	30
Perfluorooctanoic acid (PFOA)	184	160	115	171	160	107	52-147	7	30
Perfluoropentane sulfonic acid (PFPeS)	191	151	127	182	151	121	70-130	5	30
Perfluoropentanoic acid (PFPeA)	152	160	95	137	160	85	42-160	11	30
Perfluorotetradecanoic acid (PFTeDA)	153	160	96	128	160	80	47-169	18	30
Perfluorotridecanoic acid (PFTrDA)	151	160	94	132	160	82	45-160	14	30
Perfluoroundecanoic acid (PFUnDA)	162	160	101	161	160	100	53-141	<1	30

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Analyzed: 09/20/18 09:48
Date Extracted: 09/10/18

Method Blank Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name: Method Blank **Instrument ID:** K-LCMS-06
Lab Code: KQ1812487-03 **File ID:** J:\LCMS06\Data\091918_b7\091918_084
Analysis Method: PFC/537M **Analysis Lot:** 607276
Prep Method: EPA 3535A **Extraction Lot:** 321523

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	KQ1812487-01	J:\LCMS06\Data\091918_b7\091918_085	09/20/18 09:59
Duplicate Lab Control Sample	KQ1812487-02	J:\LCMS06\Data\091918_b7\091918_086	09/20/18 10:09
MW-100S	K1808431-001	J:\LCMS06\Data\091918_b7\091918_096	09/20/18 11:54
MW-101S	K1808431-002	J:\LCMS06\Data\091918_b7\091918_097	09/20/18 12:05
MW-103S	K1808431-003	J:\LCMS06\Data\091918_b7\091918_098	09/20/18 12:15
MW-104S	K1808431-004	J:\LCMS06\Data\091918_b7\091918_099	09/20/18 12:26
MW-105S	K1808431-005	J:\LCMS06\Data\091918_b7\091918_100	09/20/18 12:36
MW-106SR	K1808431-006	J:\LCMS06\Data\091918_b7\091918_101	09/20/18 12:47
MW-109S	K1808431-007	J:\LCMS06\Data\091918_b7\091918_102	09/20/18 12:57
MW-112S	K1808431-008	J:\LCMS06\Data\091918_b7\091918_103	09/20/18 13:07
MW-114S	K1808431-009	J:\LCMS06\Data\091918_b7\091918_104	09/20/18 13:18
DUP-1	K1808431-010	J:\LCMS06\Data\091918_b7\091918_105	09/20/18 13:28
DUP-2	K1808431-011	J:\LCMS06\Data\091918_b7\091918_106	09/20/18 13:39

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Analyzed: 09/11/18 22:46
Date Extracted: 09/11/18

Method Blank Summary

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name: Method Blank **Instrument ID:** K-LCMS-06
Lab Code: KQ1812573-03 **File ID:** J:\LCMS06\Data\091118\091118_036
Analysis Method: PFC/537M **Analysis Lot:** 606211
Prep Method: EPA 3535A **Extraction Lot:** 321636

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	KQ1812573-01	J:\LCMS06\Data\091118\091118_037	09/11/18 22:57
Duplicate Lab Control Sample	KQ1812573-02	J:\LCMS06\Data\091118\091118_038	09/11/18 23:07
FB	K1808431-012	J:\LCMS06\Data\091118\091118_058	09/12/18 02:36
Equip Blk	K1808431-013	J:\LCMS06\Data\091118\091118_059	09/12/18 02:47
Trip Blank	K1808431-014	J:\LCMS06\Data\091118\091118_060	09/12/18 02:57

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Analyzed: 09/20/18 09:59
Date Extracted: 09/10/18

Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name: Lab Control Sample **Instrument ID:** K-LCMS-06
Lab Code: KQ1812487-01 **File ID:** J:\LCMS06\Data\091918_b7\091918_085
Analysis Method: PFC/537M **Analysis Lot:** 607276
Prep Method: EPA 3535A **Extraction Lot:** 321523

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	KQ1812487-03	J:\LCMS06\Data\091918_b7\091918_084	09/20/18 09:48
Duplicate Lab Control Sample	KQ1812487-02	J:\LCMS06\Data\091918_b7\091918_086	09/20/18 10:09
MW-100S	K1808431-001	J:\LCMS06\Data\091918_b7\091918_096	09/20/18 11:54
MW-101S	K1808431-002	J:\LCMS06\Data\091918_b7\091918_097	09/20/18 12:05
MW-103S	K1808431-003	J:\LCMS06\Data\091918_b7\091918_098	09/20/18 12:15
MW-104S	K1808431-004	J:\LCMS06\Data\091918_b7\091918_099	09/20/18 12:26
MW-105S	K1808431-005	J:\LCMS06\Data\091918_b7\091918_100	09/20/18 12:36
MW-106SR	K1808431-006	J:\LCMS06\Data\091918_b7\091918_101	09/20/18 12:47
MW-109S	K1808431-007	J:\LCMS06\Data\091918_b7\091918_102	09/20/18 12:57
MW-112S	K1808431-008	J:\LCMS06\Data\091918_b7\091918_103	09/20/18 13:07
MW-114S	K1808431-009	J:\LCMS06\Data\091918_b7\091918_104	09/20/18 13:18
DUP-1	K1808431-010	J:\LCMS06\Data\091918_b7\091918_105	09/20/18 13:28
DUP-2	K1808431-011	J:\LCMS06\Data\091918_b7\091918_106	09/20/18 13:39

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431
Date Analyzed: 09/11/18 22:57
Date Extracted: 09/11/18

Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name: Lab Control Sample **Instrument ID:** K-LCMS-06
Lab Code: KQ1812573-01 **File ID:** J:\LCMS06\Data\091118\091118_037
Analysis Method: PFC/537M **Analysis Lot:** 606211
Prep Method: EPA 3535A **Extraction Lot:** 321636

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	KQ1812573-03	J:\LCMS06\Data\091118\091118_036	09/11/18 22:46
Duplicate Lab Control Sample	KQ1812573-02	J:\LCMS06\Data\091118\091118_038	09/11/18 23:07
FB	K1808431-012	J:\LCMS06\Data\091118\091118_058	09/12/18 02:36
Equip Blk	K1808431-013	J:\LCMS06\Data\091118\091118_059	09/12/18 02:47
Trip Blank	K1808431-014	J:\LCMS06\Data\091118\091118_060	09/12/18 02:57

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

#	Lab Code	Sample Name	File Location	Acquisition Date
01	KC1800443-01	0.05 PPB ICAL	091918_007	09/19/2018 20:23
02	KC1800443-02	0.10 PPB ICAL	091918_008	09/19/2018 20:34
03	KC1800443-03	0.50 PPB ICAL	091918_009	09/19/2018 20:44
04	KC1800443-04	1.0 PPB ICAL	091918_010	09/19/2018 20:54
05	KC1800443-05	5.0 PPB ICAL	091918_011	09/19/2018 21:05
06	KC1800443-06	10.0 PPB ICAL	091918_012	09/19/2018 21:15
07	KC1800443-07	15.0 PPB ICAL	091918_013	09/19/2018 21:26

Analyte

13C2-4:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.404	02	5	1.325	03	5	1.251	04	5	1.314
05	5	1.224	06	5	1.221	07	5	1.184			

13C2-6:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.9795	02	5	1.105	03	5	1.081	04	5	1.064
05	5	0.9616	06	5	0.8949	07	5	0.8593			

13C2-8:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.5926	02	5	0.5665	03	5	0.5512	04	5	0.5897
05	5	0.5406	06	5	0.4981	07	5	0.4732			

13C2-PFDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	5.734	02	5	5.215	03	5	5.144	04	5	5.174
05	5	5.057	06	5	4.889	07	5	4.883			

13C2-PFDoDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	8.064	02	5	8.058	03	5	7.915	04	5	8.016
05	5	7.627	06	5	7.62	07	5	7.34			

13C2-PFHxA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	6.611	02	5	6.159	03	5	5.974	04	5	6.02
05	5	5.658	06	5	5.591	07	5	5.539			

13C2-PFTeDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	5.848	02	5	5.531	03	5	5.521	04	5	5.59
05	5	5.411	06	5	5.23	07	5	5.28			

13C2-PFUnDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	5.683	02	5	5.57	03	5	5.677	04	5	5.723

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

13C2-PFUnDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
05	5	5.33	06	5	5.21	07	5	5.199			

13C3-PFBS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.511	02	5	1.482	03	5	1.478	04	5	1.537
05	5	1.501	06	5	1.515	07	5	1.523			

13C4-PFBA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	4.682	02	5	4.525	03	5	4.485	04	5	4.589
05	5	4.46	06	5	4.609	07	5	4.629			

13C4-PFHpA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	6.54	02	5	6.379	03	5	6.448	04	5	6.735
05	5	5.969	06	5	6.772	07	5	6.036			

13C4-PFOA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	8.502	02	5	8.326	03	5	8.357	04	5	8.374
05	5	8.268	06	5	8.343	07	5	7.959			

13C4-PFOS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.895	02	5	0.9432	03	5	0.9044	04	5	0.9627
05	5	0.8615	06	5	0.879	07	5	0.8482			

13C5-PFNA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	6.576	02	5	6.356	03	5	6.441	04	5	6.332
05	5	6.316	06	5	6.268	07	5	5.995			

13C5-PFPeA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	2.705	02	5	2.62	03	5	2.595	04	5	2.621
05	5	2.557	06	5	2.6	07	5	2.553			

13C8-FOSA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	2.142	02	5	1.947	03	5	2.061	04	5	2.119
05	5	2.023	06	5	2.038	07	5	2			

18O2-PFHxS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.8837	02	5	0.9515	03	5	0.9554	04	5	0.9791
05	5	0.9016	06	5	0.9438	07	5	0.8945			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

4:2 Fluorotelomer sulfonic acid (4:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.046861	0.7716	02	0.0937218	0.7314	03	0.468609	0.7263	04	0.937218	0.7508
05	4.68609	0.7064	06	9.37218	0.6933	07	14.0583	0.7013			

6:2 Fluorotelomer sulfonic acid (6:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.047558	0.9373	02	0.0951168	0.6621	03	0.475584	0.7317	04	0.951168	0.7249
05	4.75584	0.6821	06	9.51168	0.7012	07	14.26755	0.6605			

8:2 Fluorotelomer sulfonic acid (8:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.048002	0.9607	02	0.0960045	0.9423	03	0.480022	0.9882	04	0.960045	0.9575
05	4.80022	0.847	06	9.60045	0.8777	07	14.40067	0.8536			

D3-MeFOSAA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.097	02	5	1.052	03	5	1.095	04	5	1.122
05	5	1.078	06	5	1.149	07	5	1.084			

D5-EtFOSAA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.349	02	5	1.223	03	5	1.25	04	5	1.319
05	5	1.234	06	5	1.212	07	5	1.235			

N-Ethyl perfluorooctane sulfonamidoacetic acid

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	0.4311	03	0.5	0.2852	04	1	0.4261	05	5	0.4209
06	10	0.4113	07	15	0.3989						

N-Methyl perfluorooctane sulfonamidoacetic acid

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	0.5618	03	0.5	0.6078	04	1	0.614	05	5	0.6049
06	10	0.5433	07	15	0.598						

Perfluorobutane sulfonic acid (PFBS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.044368	0.5957	02	0.088737	0.6959	03	0.443685	0.6389	04	0.88737	0.6284
05	4.43685	0.6407	06	8.8737	0.6392	07	13.31055	0.6462			

Perfluorobutanoic acid (PFBA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.13	02	0.1	1.045	03	0.5	0.9469	04	1	1.024
05	5	0.9575	06	10	0.9595	07	15	0.9773			

Perfluorodecane sulfonic acid (PFDS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.048233	0.663	02	0.0964667	0.8939	03	0.482333	0.6665	04	0.964667	0.8157
05	4.82333	0.7468	06	9.64667	0.7642	07	14.46998	0.7458			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

Perfluorodecanoic acid (PFDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.8514	02	0.1	0.7247	03	0.5	0.7116	04	1	0.7144
05	5	0.6429	06	10	0.6598	07	15	0.6674			

Perfluorododecanoic acid (PFDoDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.5214	02	0.1	0.5339	03	0.5	0.5012	04	1	0.4882
05	5	0.4756	06	10	0.4746	07	15	0.493			

Perfluoroheptane sulfonic acid (PFHpS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.0953438	0.701	03	0.476719	0.4354	04	0.953438	0.7176	05	4.76719	0.551
06	9.53438	0.6204	07	14.3016	0.6467						

Perfluoroheptanoic acid (PFHpA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.396	02	0.1	1.117	03	0.5	1.067	04	1	1.08
05	5	1.064	06	10	1.042	07	15	1.099			

Perfluorohexane sulfonic acid (PFHxS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.045654	0.8691	02	0.0913075	0.7568	03	0.456538	0.8344	04	0.913075	0.7213
05	4.56538	0.8048	06	9.13075	0.7731	07	13.69613	0.8318			

Perfluorohexanoic acid (PFHxA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.504	02	0.1	1.436	03	0.5	1.228	04	1	1.168
05	5	1.096	06	10	1.107	07	15	1.124			

Perfluorononane sulfonic acid (PFNS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.048079	0.7088	02	0.096158	0.8651	03	0.480789	0.7265	04	0.961578	0.6779
05	4.807891	0.6687	06	9.615782	0.6694	07	14.42367	0.6875			

Perfluorononanoic acid (PFNA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.6214	02	0.1	0.6325	03	0.5	0.7305	04	1	0.7182
05	5	0.6518	06	10	0.6704	07	15	0.6932			

Perfluorooctane sulfonamide (FOSA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.539	02	0.1	1.637	03	0.5	1.534	04	1	1.547
05	5	1.457	06	10	1.47	07	15	1.501			

Perfluorooctane sulfonic acid (PFOS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.046461	0.6347	02	0.0929229	0.5664	03	0.464615	0.6553	04	0.929229	0.587
05	4.64615	0.6231	06	9.29229	0.6149	07	13.93845	0.6237			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

Perfluorooctanoic acid (PFOA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.9468	02	0.1	0.8556	03	0.5	0.6976	04	1	0.7165
05	5	0.6503	06	10	0.6683	07	15	0.6649			

Perfluoropentane sulfonic acid (PFPeS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.047046	0.4755	02	0.094092	0.6335	03	0.470462	0.504	04	0.940923	0.5015
05	4.704616	0.4551	06	9.409233	0.4896	07	14.11384	0.4666			

Perfluoropentanoic acid (PFPeA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	7.578	02	0.1	4.662	03	0.5	2.769	04	1	2.534
05	5	2.207	06	10	2.202	07	15	2.28			

Perfluorotetradecanoic acid (PFTeDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	0.5042	03	0.5	0.2862	04	1	0.2626	05	5	0.2184
06	10	0.2233	07	15	0.2094						

Perfluorotridecanoic acid (PFTrDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.6853	02	0.1	0.6988	03	0.5	0.7306	04	1	0.6826
05	5	0.638	06	10	0.6871	07	15	0.6553			

Perfluoroundecanoic acid (PFUnDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.9864	02	0.1	0.9707	03	0.5	0.7819	04	1	0.8185
05	5	0.7122	06	10	0.7587	07	15	0.7624			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
13C2-4:2 FTS	SURR	Average RF	% RSD	6.0	20	1.275	
13C2-6:2 FTS	SURR	Average RF	% RSD	9.6	20	0.9922	
13C2-8:2 FTS	SURR	Average RF	% RSD	8.3	20	0.5446	
13C2-PFDA	SURR	Average RF	% RSD	5.6	20	5.157	
13C2-PFDoDA	SURR	Average RF	% RSD	3.6	20	7.806	
13C2-PFHxA	SURR	Average RF	% RSD	6.4	20	5.936	
13C2-PFTeDA	SURR	Average RF	% RSD	3.8	20	5.487	
13C2-PFUnDA	SURR	Average RF	% RSD	4.2	20	5.485	
13C3-PFBS	SURR	Average RF	% RSD	1.4	20	1.507	
13C4-PFBA	SURR	Average RF	% RSD	1.8	20	4.568	
13C4-PFHpA	SURR	Average RF	% RSD	4.9	20	6.411	
13C4-PFOA	SURR	Average RF	% RSD	2.0	20	8.304	
13C4-PFOS	SURR	Average RF	% RSD	4.6	20	0.8991	
13C5-PFNA	SURR	Average RF	% RSD	2.8	20	6.326	
13C5-PFPeA	SURR	Average RF	% RSD	2.0	20	2.607	
13C8-FOSA	SURR	Average RF	% RSD	3.3	20	2.047	
18O2-PFHxS	SURR	Average RF	% RSD	3.9	20	0.9299	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	TRG	Average RF	% RSD	3.9	20	0.7259	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	TRG	Average RF	% RSD	13.2	20	0.7286	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	TRG	Average RF	% RSD	6.2	20	0.9181	
D3-MeFOSAA	SURR	Average RF	% RSD	2.9	20	1.097	
D5-EtFOSAA	SURR	Average RF	% RSD	4.2	20	1.26	
N-Ethyl perfluorooctane sulfonamidoacetic acid	TRG	Average RF	% RSD	14.0	20	0.3956	
N-Methyl perfluorooctane sulfonamidoacetic acid	TRG	Average RF	% RSD	4.9	20	0.5883	
Perfluorobutane sulfonic acid (PFBS)	TRG	Average RF	% RSD	4.6	20	0.6407	
Perfluorobutanoic acid (PFBA)	TRG	Average RF	% RSD	6.5	20	1.006	
Perfluorodecane sulfonic acid (PFDS)	TRG	Average RF	% RSD	10.7	20	0.7566	
Perfluorodecanoic acid (PFDA)	TRG	Average RF	% RSD	9.8	20	0.7103	
Perfluorododecanoic acid (PFDoDA)	TRG	Linear	R2	0.9990	0.99	0.4982	
Perfluoroheptane sulfonic acid (PFHpS)	TRG	Average RF	% RSD	17.2	20	0.612	
Perfluoroheptanoic acid (PFHpA)	TRG	Linear	R2	0.9994	0.99	1.124	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
Perfluorohexane sulfonic acid (PFHxS)	TRG	Average RF	% RSD	6.4	20	0.7987	
Perfluorohexanoic acid (PFHxA)	TRG	Linear	R2	0.9974	0.99	1.237	
Perfluorononane sulfonic acid (PFNS)	TRG	Average RF	% RSD	9.7	20	0.7148	
Perfluorononanoic acid (PFNA)	TRG	Linear	R2	0.9992	0.99	0.674	
Perfluorooctane sulfonamide (FOSA)	TRG	Average RF	% RSD	3.9	20	1.526	
Perfluorooctane sulfonic acid (PFOS)	TRG	Average RF	% RSD	4.8	20	0.615	
Perfluorooctanoic acid (PFOA)	TRG	Linear	R2	0.9999	0.99	0.7429	
Perfluoropentane sulfonic acid (PFPeS)	TRG	Average RF	% RSD	11.9	20	0.5037	
Perfluoropentanoic acid (PFPeA)	TRG	Linear	R2	0.9995	0.99	3.462	
Perfluorotetradecanoic acid (PFTeDA)	TRG	Linear	R2	0.9977	0.99	0.284	
Perfluorotridecanoic acid (PFTrDA)	TRG	Linear	R2	0.9977	0.99	0.6825	
Perfluoroundecanoic acid (PFUnDA)	TRG	Linear	R2	0.9957	0.99	0.8273	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

#	Lab Code	Sample Name	File Location	Acquisition Date
01	KC1800430-01	0.05 PPB ICAL	091118_025	09/11/2018 20:51
02	KC1800430-02	0.10 PPB ICAL	091118_026	09/11/2018 21:02
03	KC1800430-03	0.50 PPB ICAL	091118_027	09/11/2018 21:12
04	KC1800430-04	1.0 PPB ICAL	091118_028	09/11/2018 21:22
05	KC1800430-05	5.0 PPB ICAL	091118_029	09/11/2018 21:33
06	KC1800430-06	10.0 PPB ICAL	091118_030	09/11/2018 21:43
07	KC1800430-07	15.0 PPB ICAL	091118_031	09/11/2018 21:54

Analyte

13C2-4:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.685	02	5	1.559	03	5	1.669	04	5	1.594
05	5	1.547	06	5	1.718	07	5	2.034			

13C2-6:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.9771	02	5	0.8763	03	5	0.9092	04	5	0.8964
05	5	0.9438	06	5	0.9599	07	5	0.9451			

13C2-8:2 FTS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.4281	02	5	0.3904	03	5	0.3852	04	5	0.3948
05	5	0.3871	06	5	0.4193	07	5	0.4294			

13C2-PFDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	6.077	02	5	5.671	03	5	6.063	04	5	5.228
05	5	5.412	06	5	5.705	07	5	5.987			

13C2-PFDoDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	9.101	02	5	8.923	03	5	8.951	04	5	8.31
05	5	8.322	06	5	8.703	07	5	9.72			

13C2-PFHxA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	9.044	02	5	8.334	03	5	8.788	04	5	7.708
05	5	8.903	06	5	9.281	07	5	9.627			

13C2-PFTeDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	4.318	02	5	4.091	03	5	4.635	04	5	4.216
05	5	4.132	06	5	4.542	07	5	4.931			

13C2-PFUnDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	6.143	02	5	5.72	03	5	6.392	04	5	5.524

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QA/QC Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

13C2-PFUnDA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
05	5	5.776	06	5	6.253	07	5	6.44			

13C3-PFBS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.821	02	5	1.731	03	5	1.768	04	5	1.817
05	5	1.734	06	5	1.928	07	5	2.089			

13C4-PFBA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	5.775	02	5	5.789	03	5	5.696	04	5	5.077
05	5	5.525	06	5	6.081	07	5	6.519			

13C4-PFHpA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	8.771	02	5	7.953	03	5	9.28	04	5	8.914
05	5	7.367	06	5	8.357	07	5	9.488			

13C4-PFOA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	10.3	02	5	9.759	03	5	10	04	5	8.914
05	5	8.878	06	5	9.665	07	5	10.16			

13C4-PFOS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.294	02	5	1.174	03	5	1.189	04	5	1.107
05	5	1.274	06	5	1.284	07	5	1.426			

13C5-PFNA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	7.321	02	5	6.654	03	5	6.834	04	5	6.173
05	5	6.703	06	5	6.716	07	5	7.303			

13C5-PFPeA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	3.362	02	5	3.243	03	5	3.365	04	5	3.438
05	5	3.241	06	5	3.505	07	5	3.741			

13C8-FOSA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	2.701	02	5	2.73	03	5	2.84	04	5	2.881
05	5	2.684	06	5	2.968	07	5	3.169			

18O2-PFHxS

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	1.453	02	5	1.311	03	5	1.33	04	5	1.273
05	5	1.258	06	5	1.532	07	5	1.566			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

4:2 Fluorotelomer sulfonic acid (4:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.0937218	0.9765	03	0.468609	0.9255	04	0.937218	0.9049	05	4.68609	0.8296
06	9.37218	0.8057	07	14.0583	0.7414						

6:2 Fluorotelomer sulfonic acid (6:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.047558	0.7796	02	0.0951168	0.7635	03	0.475584	0.6534	04	0.951168	0.734
05	4.75584	0.607	06	9.51168	0.6293	07	14.26755	0.6174			

8:2 Fluorotelomer sulfonic acid (8:2 FTS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.0960045	0.6504	03	0.480022	0.6596	04	0.960045	0.636	05	4.80022	0.6007
06	9.60045	0.5774	07	14.40067	0.5697						

D3-MeFOSAA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.7073	02	5	0.6707	03	5	0.724	04	5	0.6004
05	5	0.725	06	5	0.8296	07	5	0.8455			

D5-EtFOSAA

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5	0.6304	02	5	0.623	03	5	0.6432	04	5	0.683
05	5	0.621	06	5	0.7009	07	5	0.7483			

N-Ethyl perfluorooctane sulfonamidoacetic acid

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	0.3205	03	0.5	0.3919	04	1	0.4459	05	5	0.4494
06	10	0.4668	07	15	0.4584						

N-Methyl perfluorooctane sulfonamidoacetic acid

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.2381	02	0.1	0.4826	03	0.5	0.334	04	1	0.454
05	5	0.5164	06	10	0.547	07	15	0.5052			

Perfluorobutane sulfonic acid (PFBS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.044368	0.8274	02	0.088737	0.611	03	0.443685	0.6831	04	0.88737	0.7135
05	4.43685	0.7101	06	8.8737	0.721	07	13.31055	0.7234			

Perfluorobutanoic acid (PFBA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.218	02	0.1	1.048	03	0.5	0.9943	04	1	1.08
05	5	0.9714	06	10	0.9683	07	15	0.9973			

Perfluorodecane sulfonic acid (PFDS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.048233	0.758	02	0.0964667	0.843	03	0.482333	0.8624	04	0.964667	0.7987
05	4.82333	0.6965	06	9.64667	0.8055	07	14.46998	0.7537			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

Perfluorodecanoic acid (PFDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.9409	02	0.1	0.737	03	0.5	0.7484	04	1	0.9136
05	5	0.794	06	10	0.8341	07	15	0.8148			

Perfluorododecanoic acid (PFDoDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.311	02	0.1	0.2586	03	0.5	0.2728	04	1	0.3455
05	5	0.3107	06	10	0.2957	07	15	0.3062			

Perfluoroheptane sulfonic acid (PFHpS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.0953438	0.4951	03	0.476719	0.5539	04	0.953438	0.5559	05	4.76719	0.4973
06	9.53438	0.5056	07	14.3016	0.5309						

Perfluoroheptanoic acid (PFHpA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.363	02	0.1	1.191	03	0.5	1.06	04	1	1.031
05	5	1.111	06	10	1.084	07	15	1.139			

Perfluorohexane sulfonic acid (PFHxS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.0913075	0.8944	03	0.456538	0.9516	04	0.913075	0.9616	05	4.56538	0.8567
06	9.13075	0.8008	07	13.69613	0.8759						

Perfluorohexanoic acid (PFHxA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.075	02	0.1	0.9874	03	0.5	0.8536	04	1	0.9777
05	5	0.8749	06	10	0.851	07	15	0.7925			

Perfluorononane sulfonic acid (PFNS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.048079	0.5738	02	0.096158	0.4761	03	0.480789	0.498	04	0.961578	0.6222
05	4.807891	0.4718	06	9.615782	0.4973	07	14.42367	0.4874			

Perfluorononanoic acid (PFNA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.9794	02	0.1	0.7591	03	0.5	0.8017	04	1	0.8623
05	5	0.7308	06	10	0.8085	07	15	0.8013			

Perfluorooctane sulfonamide (FOSA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	1.481	03	0.5	1.401	04	1	1.454	05	5	1.388
06	10	1.413	07	15	1.389						

Perfluorooctane sulfonic acid (PFOS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.046461	0.629	02	0.0929229	0.6176	03	0.464615	0.6131	04	0.929229	0.6556
05	4.64615	0.5613	06	9.29229	0.5876	07	13.93845	0.579			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte

Perfluorooctanoic acid (PFOA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.8607	02	0.1	0.7241	03	0.5	0.6971	04	1	0.7798
05	5	0.6562	06	10	0.6951	07	15	0.699			

Perfluoropentane sulfonic acid (PFPeS)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.094092	0.6317	03	0.470462	0.6791	04	0.940923	0.5439	05	4.704616	0.5341
06	9.409233	0.5579	07	14.11384	0.6049						

Perfluoropentanoic acid (PFPeA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	7.807	02	0.1	5.14	03	0.5	3.135	04	1	2.771
05	5	2.649	06	10	2.674	07	15	2.68			

Perfluorotetradecanoic acid (PFTeDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.1	0.5307	03	0.5	0.2415	04	1	0.2852	05	5	0.2265
06	10	0.2256	07	15	0.2315						

Perfluorotridecanoic acid (PFTrDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	0.906	02	0.1	0.7635	03	0.5	0.6238	04	1	0.6532
05	5	0.6667	06	10	0.6432	07	15	0.6475			

Perfluoroundecanoic acid (PFUnDA)

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.05	1.342	02	0.1	0.944	03	0.5	0.8084	04	1	0.9149
05	5	0.7796	06	10	0.786	07	15	0.7795			

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
13C2-4:2 FTS	SURR	Average RF	% RSD	9.9	20	1.687	
13C2-6:2 FTS	SURR	Average RF	% RSD	3.9	20	0.9297	
13C2-8:2 FTS	SURR	Average RF	% RSD	4.9	20	0.4049	
13C2-PFDA	SURR	Average RF	% RSD	5.8	20	5.735	
13C2-PFDoDA	SURR	Average RF	% RSD	5.5	20	8.861	
13C2-PFHxA	SURR	Average RF	% RSD	7.2	20	8.812	
13C2-PFTeDA	SURR	Average RF	% RSD	7.0	20	4.409	
13C2-PFUnDA	SURR	Average RF	% RSD	6.0	20	6.035	
13C3-PFBS	SURR	Average RF	% RSD	7.0	20	1.841	
13C4-PFBA	SURR	Average RF	% RSD	7.7	20	5.78	
13C4-PFHpA	SURR	Average RF	% RSD	8.7	20	8.59	
13C4-PFOA	SURR	Average RF	% RSD	5.9	20	9.668	
13C4-PFOS	SURR	Average RF	% RSD	8.3	20	1.25	
13C5-PFNA	SURR	Average RF	% RSD	5.9	20	6.815	
13C5-PFPeA	SURR	Average RF	% RSD	5.1	20	3.414	
13C8-FOSA	SURR	Average RF	% RSD	6.1	20	2.853	
18O2-PFHxS	SURR	Average RF	% RSD	9.1	20	1.389	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	TRG	Average RF	% RSD	10.1	20	0.8639	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	TRG	Average RF	% RSD	10.7	20	0.6835	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	TRG	Average RF	% RSD	6.2	20	0.6156	
D3-MeFOSAA	SURR	Average RF	% RSD	11.8	20	0.7289	
D5-EtFOSAA	SURR	Average RF	% RSD	7.2	20	0.6642	
N-Ethyl perfluorooctane sulfonamidoacetic acid	TRG	Average RF	% RSD	13.3	20	0.4222	
N-Methyl perfluorooctane sulfonamidoacetic acid	TRG	Linear	R2	0.9967	0.99	0.4396	
Perfluorobutane sulfonic acid (PFBS)	TRG	Average RF	% RSD	9.0	20	0.7128	
Perfluorobutanoic acid (PFBA)	TRG	Average RF	% RSD	8.5	20	1.04	
Perfluorodecane sulfonic acid (PFDS)	TRG	Average RF	% RSD	7.2	20	0.7882	
Perfluorodecanoic acid (PFDA)	TRG	Average RF	% RSD	9.4	20	0.8261	
Perfluorododecanoic acid (PFDoDA)	TRG	Linear	R2	0.9988	0.99	0.3001	
Perfluoroheptane sulfonic acid (PFHpS)	TRG	Average RF	% RSD	5.3	20	0.5231	
Perfluoroheptanoic acid (PFHpA)	TRG	Linear	R2	0.9992	0.99	1.14	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
Perfluorohexane sulfonic acid (PFHxS)	TRG	Average RF	% RSD	6.8	20	0.8902	
Perfluorohexanoic acid (PFHxA)	TRG	Linear	R2	0.9952	0.99	0.916	
Perfluorononane sulfonic acid (PFNS)	TRG	Average RF	% RSD	11.0	20	0.5181	
Perfluorononanoic acid (PFNA)	TRG	Linear	R2	0.9984	0.99	0.8205	
Perfluorooctane sulfonamide (FOSA)	TRG	Average RF	% RSD	2.7	20	1.421	
Perfluorooctane sulfonic acid (PFOS)	TRG	Average RF	% RSD	5.3	20	0.6062	
Perfluorooctanoic acid (PFOA)	TRG	Linear	R2	0.9961	0.99	0.7303	
Perfluoropentane sulfonic acid (PFPeS)	TRG	Average RF	% RSD	9.6	20	0.592	
Perfluoropentanoic acid (PFPeA)	TRG	Linear	R2	0.9999	0.99	3.836	
Perfluorotetradecanoic acid (PFTeDA)	TRG	Linear	R2	0.9986	0.99	0.2902	
Perfluorotridecanoic acid (PFTrDA)	TRG	Linear	R2	0.9998	0.99	0.7006	
Perfluoroundecanoic acid (PFUnDA)	TRG	Linear	R2	0.9943	0.99	0.9078	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Verification Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

#	Lab Code	Sample Name	File Location	Acquisition Date
08	KC1800443-08	1.0 PPB ICV	091918_015	09/19/2018 21:47

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
Perfluorobutane sulfonic acid (PFBS)	0.887	1.06	6.407E-1	7.625E-1	19.01	±30	Average RF
Perfluoropentane sulfonic acid (PFPeS)	0.941	1.08	5.037E-1	5.787E-1	14.88	±30	Average RF
Perfluorohexane sulfonic acid (PFHxS)	0.913	1.07	7.987E-1	9.329E-1	16.79	±30	Average RF
Perfluoroheptane sulfonic acid (PFHpS)	0.953	1.11	6.12E-1	7.112E-1	16.21	±30	Average RF
Perfluorooctane sulfonic acid (PFOS)	0.929	0.944	6.15E-1	6.245E-1	1.54	±30	Average RF
Perfluorononane sulfonic acid (PFNS)	0.962	1.11	7.148E-1	8.239E-1	15.26	±30	Average RF
Perfluorodecane sulfonic acid (PFDS)	0.965	1.16	7.566E-1	9.071E-1	19.90	±30	Average RF
Perfluorobutanoic acid (PFBA)	1.00	1.01	1.006E0	1.011E0	0.511	±30	Average RF
Perfluoropentanoic acid (PFPeA)	1.00	1.05	3.462E0	2.593E0	5.24	±30	Linear
Perfluorohexanoic acid (PFHxA)	1.00	0.913	1.237E0	1.06E0	-8.704	±30	Linear
Perfluoroheptanoic acid (PFHpA)	1.00	1.00	1.124E0	1.083E0	0.102	±30	Linear
Perfluorooctanoic acid (PFOA)	1.00	1.11	7.429E-1	7.51E-1	11.01	±30	Linear
Perfluorononanoic acid (PFNA)	1.00	1.15	6.74E-1	7.793E-1	14.68	±30	Linear
Perfluorodecanoic acid (PFDA)	1.00	1.01	7.103E-1	7.199E-1	1.35	±30	Average RF
Perfluoroundecanoic acid (PFUnDA)	1.00	1.05	8.273E-1	8.136E-1	4.60	±30	Linear
Perfluorododecanoic acid (PFDoDA)	1.00	1.07	4.982E-1	5.258E-1	7.47	±30	Linear
Perfluorotridecanoic acid (PFTTrDA)	1.00	1.04	6.825E-1	7.033E-1	3.56	±30	Linear
Perfluorotetradecanoic acid (PFTTeDA)	1.00	0.950	2.84E-1	2.378E-1	-4.993	±30	Linear
Perfluorooctane sulfonamide (FOSA)	1.00	1.07	1.526E0	1.632E0	6.90	±30	Average RF
N-Methyl perfluorooctane sulfonamidoacetic acid	1.00	1.21	5.883E-1	7.117E-1	20.98	±30	Average RF
N-Ethyl perfluorooctane sulfonamidoacetic acid	1.00	1.23	3.956E-1	4.847E-1	22.52	±30	Average RF
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.937	0.994	7.259E-1	7.696E-1	6.03	±30	Average RF
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.951	1.09	7.286E-1	8.331E-1	14.35	±30	Average RF
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.960	1.09	9.181E-1	1.047E0	13.99	±30	Average RF

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
13C3-PFBS	5.00	4.95	1.507E0	1.491E0	-1.033	±30	Average RF
18O2-PFHxS	5.00	4.39	9.299E-1	8.16E-1	-12.249	±30	Average RF
13C4-PFOS	5.00	4.71	8.991E-1	8.474E-1	-5.756	±30	Average RF
13C4-PFBA	5.00	4.78	4.568E0	4.371E0	-4.307	±30	Average RF
13C5-PFPeA	5.00	4.93	2.607E0	2.57E0	-1.411	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/19/2018

Initial Calibration Verification Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800443
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
13C2-PFHxA	5.00	5.12	5.936E0	6.083E0	2.48	±30	Average RF
13C4-PFHpA	5.00	4.96	6.411E0	6.358E0	-0.835	±30	Average RF
13C4-PFOA	5.00	4.82	8.304E0	8.014E0	-3.500	±30	Average RF
13C5-PFNA	5.00	4.71	6.326E0	5.964E0	-5.728	±30	Average RF
13C2-PFDA	5.00	5.20	5.157E0	5.361E0	3.95	±30	Average RF
13C2-PFUnDA	5.00	4.92	5.485E0	5.4E0	-1.550	±30	Average RF
13C2-PFDoDA	5.00	5.09	7.806E0	7.944E0	1.77	±30	Average RF
13C2-PFTeDA	5.00	5.00	5.487E0	5.486E0	-0.023	±30	Average RF
13C8-FOSA	5.00	4.97	2.047E0	2.037E0	-0.502	±30	Average RF
D3-MeFOSAA	5.00	5.02	1.097E0	1.102E0	0.444	±30	Average RF
D5-EtFOSAA	5.00	5.25	1.26E0	1.324E0	5.03	±30	Average RF
13C2-4:2 FTS	5.00	5.63	1.275E0	1.435E0	12.61	±30	Average RF
13C2-6:2 FTS	5.00	4.80	9.922E-1	9.52E-1	-4.047	±30	Average RF
13C2-8:2 FTS	5.00	5.32	5.446E-1	5.794E-1	6.40	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Verification Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

#	Lab Code	Sample Name	File Location	Acquisition Date
08	KC1800430-08	1.0 PPB ICV	091118_033	09/11/2018 22:15

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
Perfluorobutane sulfonic acid (PFBS)	0.887	0.951	7.128E-1	7.638E-1	7.16	±30	Average RF
Perfluoropentane sulfonic acid (PFPeS)	0.941	1.03	5.92E-1	6.473E-1	9.36	±30	Average RF
Perfluorohexane sulfonic acid (PFHxS)	0.913	0.872	8.902E-1	8.5E-1	-4.509	±30	Average RF
Perfluoroheptane sulfonic acid (PFHpS)	0.953	0.946	5.231E-1	5.193E-1	-0.732	±30	Average RF
Perfluorooctane sulfonic acid (PFOS)	0.929	0.866	6.062E-1	5.65E-1	-6.792	±30	Average RF
Perfluorononane sulfonic acid (PFNS)	0.962	1.02	5.181E-1	5.486E-1	5.89	±30	Average RF
Perfluorodecane sulfonic acid (PFDS)	0.965	0.948	7.882E-1	7.749E-1	-1.695	±30	Average RF
Perfluorobutanoic acid (PFBA)	1.00	0.969	1.04E0	1.008E0	-3.079	±30	Average RF
Perfluoropentanoic acid (PFPeA)	1.00	1.04	3.836E0	2.99E0	3.83	±30	Linear
Perfluorohexanoic acid (PFHxA)	1.00	1.06	9.16E-1	9.23E-1	5.62	±30	Linear
Perfluoroheptanoic acid (PFHpA)	1.00	1.03	1.14E0	1.144E0	2.52	±30	Linear
Perfluorooctanoic acid (PFOA)	1.00	0.986	7.303E-1	6.897E-1	-1.427	±30	Linear
Perfluorononanoic acid (PFNA)	1.00	1.02	8.205E-1	8.111E-1	1.75	±30	Linear
Perfluorodecanoic acid (PFDA)	1.00	1.05	8.261E-1	8.654E-1	4.75	±30	Average RF
Perfluoroundecanoic acid (PFUnDA)	1.00	0.961	9.078E-1	7.794E-1	-3.936	±30	Linear
Perfluorododecanoic acid (PFDoDA)	1.00	1.12	3.001E-1	3.392E-1	11.74	±30	Linear
Perfluorotridecanoic acid (PFTTrDA)	1.00	1.03	7.006E-1	6.781E-1	3.11	±30	Linear
Perfluorotetradecanoic acid (PFTeDA)	1.00	1.03	2.902E-1	2.604E-1	3.26	±30	Linear
Perfluorooctane sulfonamide (FOSA)	1.00	1.08	1.421E0	1.531E0	7.76	±30	Average RF
N-Methyl perfluorooctane sulfonamidoacetic acid	1.00	1.34	4.396E-1	6.774E-1	33.72*	±30	Linear
N-Ethyl perfluorooctane sulfonamidoacetic acid	1.00	1.15	4.222E-1	4.862E-1	15.18	±30	Average RF
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.937	0.939	8.639E-1	8.656E-1	0.194	±30	Average RF
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.951	1.09	6.835E-1	7.837E-1	14.67	±30	Average RF
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.960	1.04	6.156E-1	6.668E-1	8.31	±30	Average RF

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
13C3-PFBS	5.00	5.69	1.841E0	2.095E0	13.79	±30	Average RF
18O2-PFHxS	5.00	5.90	1.389E0	1.64E0	18.09	±30	Average RF
13C4-PFOS	5.00	5.90	1.25E0	1.475E0	18.00	±30	Average RF
13C4-PFBA	5.00	5.68	5.78E0	6.571E0	13.68	±30	Average RF
13C5-PFPeA	5.00	5.71	3.414E0	3.896E0	14.14	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994

Service Request: K1808431
Calibration Date: 9/11/2018

Initial Calibration Verification Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1800430
Instrument ID: K-LCMS-06

Signal ID: 1

Analyte Name	Expected	Result	Average RF	SSV RF	Rec.	Criteria	Curve Fit
13C2-PFHxA	5.00	5.69	8.812E0	1.004E1	13.89	±30	Average RF
13C4-PFHpA	5.00	6.10	8.59E0	1.049E1	22.07	±30	Average RF
13C4-PFOA	5.00	6.14	9.668E0	1.186E1	22.71	±30	Average RF
13C5-PFNA	5.00	5.87	6.815E0	8.003E0	17.44	±30	Average RF
13C2-PFDA	5.00	5.92	5.735E0	6.792E0	18.43	±30	Average RF
13C2-PFUnDA	5.00	6.02	6.035E0	7.269E0	20.45	±30	Average RF
13C2-PFDoDA	5.00	6.16	8.861E0	1.091E1	23.13	±30	Average RF
13C2-PFTeDA	5.00	5.91	4.409E0	5.209E0	18.13	±30	Average RF
13C8-FOSA	5.00	5.57	2.853E0	3.18E0	11.46	±30	Average RF
D3-MeFOSAA	5.00	5.91	7.289E-1	8.612E-1	18.14	±30	Average RF
D5-EtFOSAA	5.00	5.78	6.642E-1	7.682E-1	15.65	±30	Average RF
13C2-4:2 FTS	5.00	5.50	1.687E0	1.856E0	10.03	±30	Average RF
13C2-6:2 FTS	5.00	5.53	9.297E-1	1.029E0	10.63	±30	Average RF
13C2-8:2 FTS	5.00	5.91	4.049E-1	4.783E-1	18.11	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102

Service Request: K1808431
Date Analyzed: 09/11/18 22:15

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: J:\LCMS06\Data\091118\091118_033
Signal ID: 1

Calibration Date: 9/11/2018
Calibration ID: KC1800430
Analysis Lot: 606211
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	Rec.	% Drift	Criteria	Curve Fit
Perfluorobutane sulfonic acid (PFBS)	0.887	0.951	0.7128	0.7638	107	NA	±30	Average RF
Perfluoropentane sulfonic acid (PFPeS)	0.941	1.03	0.592	0.6473	109	NA	±30	Average RF
Perfluorohexane sulfonic acid (PFHxS)	0.913	0.872	0.8902	0.85	95.5	NA	±30	Average RF
Perfluoroheptane sulfonic acid (PFHpS)	0.953	0.947	0.5231	0.5193	99.3	NA	±30	Average RF
Perfluorooctane sulfonic acid (PFOS)	0.929	0.866	0.6062	0.565	93.2	NA	±30	Average RF
Perfluorononane sulfonic acid (PFNS)	0.962	1.02	0.5181	0.5486	106	NA	±30	Average RF
Perfluorodecane sulfonic acid (PFDS)	0.965	0.948	0.7882	0.7749	98.3	NA	±30	Average RF
Perfluorobutanoic acid (PFBA)	1.00	0.969	1.0395	1.0075	96.9	NA	±30	Average RF
Perfluoropentanoic acid (PFPeA)	1.00	1.04	3.8364	2.9895	104	3.8	±30	Linear
Perfluorohexanoic acid (PFHxA)	1.00	1.06	0.916	0.923	106	5.6	±30	Linear
Perfluoroheptanoic acid (PFHpA)	1.00	1.03	1.1396	1.1437	103	2.5	±30	Linear
Perfluorooctanoic acid (PFOA)	1.00	0.986	0.7303	0.6897	98.6	-1.4	±30	Linear
Perfluorononanoic acid (PFNA)	1.00	1.02	0.8205	0.8111	102	1.8	±30	Linear
Perfluorodecanoic acid (PFDA)	1.00	1.05	0.8261	0.8654	105	NA	±30	Average RF
Perfluoroundecanoic acid (PFUnDA)	1.00	0.961	0.9078	0.7794	96.1	-3.9	±30	Linear
Perfluorododecanoic acid (PFDoDA)	1.00	1.12	0.3001	0.3392	112	11.7	±30	Linear
Perfluorotridecanoic acid (PFTrDA)	1.00	1.03	0.7006	0.6781	103	3.1	±30	Linear
Perfluorotetradecanoic acid (PFTeDA)	1.00	1.03	0.2902	0.2604	103	3.3	±30	Linear
Perfluorooctane sulfonamide (FOSA)	1.00	1.08	1.4209	1.5311	108	NA	±30	Average RF
N-Methyl perfluorooctane sulfonamidoacetic acid	1.00	1.34	0.4396	0.6774	134*	33.7*	±30	Linear
N-Ethyl perfluorooctane sulfonamidoacetic acid	1.00	1.15	0.4222	0.4862	115	NA	±30	Average RF
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.937	0.939	0.8639	0.8656	100	NA	±30	Average RF
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.951	1.09	0.6835	0.7837	115	NA	±30	Average RF
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.960	1.04	0.6156	0.6668	108	NA	±30	Average RF

Analyte Name	Expected	Result	Average RF	CCV RF	Rec.	% Drift	Criteria	Curve Fit
13C3-PFBS	5.00	5.69	1.8411	2.095	114	NA	±30	Average RF
18O2-PFHxS	5.00	5.90	1.3891	1.6404	118	NA	±30	Average RF
13C4-PFOS	5.00	5.90	1.2498	1.4749	118	NA	±30	Average RF
13C4-PFBA	5.00	5.68	5.7803	6.5713	114	NA	±30	Average RF
13C5-PFPeA	5.00	5.71	3.4135	3.8962	114	NA	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102

Service Request: K1808431
Date Analyzed: 09/11/18 22:15

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: J:\LCMS06\Data\091118\091118_033
Signal ID: 1

Calibration Date: 9/11/2018
Calibration ID: KC1800430
Analysis Lot: 606211
Units: ng/mL

13C2-PFHxA	5.00	5.69	8.8121	10.0357	114	NA	±30	Average RF
13C4-PFHpA	5.00	6.10	8.5901	10.486	122	NA	±30	Average RF
13C4-PFOA	5.00	6.14	9.668	11.8634	123	NA	±30	Average RF
13C5-PFNA	5.00	5.87	6.8147	8.0033	117	NA	±30	Average RF
13C2-PFDA	5.00	5.92	5.7349	6.7918	118	NA	±30	Average RF
13C2-PFUnDA	5.00	6.02	6.0352	7.2695	120	NA	±30	Average RF
13C2-PFDoDA	5.00	6.16	8.8614	10.9109	123	NA	±30	Average RF
13C2-PFTeDA	5.00	5.91	4.4093	5.2086	118	NA	±30	Average RF
13C8-FOSA	5.00	5.57	2.8533	3.1803	111	NA	±30	Average RF
D3-MeFOSAA	5.00	5.91	0.7289	0.8612	118	NA	±30	Average RF
D5-EtFOSAA	5.00	5.78	0.6642	0.7682	116	NA	±30	Average RF
13C2-4:2 FTS	5.00	5.50	1.6867	1.8559	110	NA	±30	Average RF
13C2-6:2 FTS	5.00	5.53	0.9297	1.0285	111	NA	±30	Average RF
13C2-8:2 FTS	5.00	5.91	0.4049	0.4783	118	NA	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102

Service Request: K1808431
Date Analyzed: 09/20/18 09:27

**Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS**

Analysis Method: PFC/537M
File ID: J:\LCMS06\Data\091918_b7\091918_082
Signal ID: 1

Calibration Date: 9/19/2018
Calibration ID: KC1800443
Analysis Lot: 607276
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	Rec.	% Drift	Criteria	Curve Fit
Perfluorobutane sulfonic acid (PFBS)	0.887	0.936	0.6407	0.6761	106	NA	±30	Average RF
Perfluoropentane sulfonic acid (PFPeS)	0.941	0.882	0.5037	0.4719	93.7	NA	±30	Average RF
Perfluorohexane sulfonic acid (PFHxS)	0.913	0.969	0.7987	0.8474	106	NA	±30	Average RF
Perfluoroheptane sulfonic acid (PFHpS)	0.953	1.25	0.612	0.8029	131*	NA	±30	Average RF
Perfluorooctane sulfonic acid (PFOS)	0.929	0.955	0.615	0.6318	103	NA	±30	Average RF
Perfluorononane sulfonic acid (PFNS)	0.962	0.910	0.7148	0.6766	94.6	NA	±30	Average RF
Perfluorodecane sulfonic acid (PFDS)	0.965	1.09	0.7566	0.8515	113	NA	±30	Average RF
Perfluorobutanoic acid (PFBA)	1.00	0.985	1.0058	0.991	98.5	NA	±30	Average RF
Perfluoropentanoic acid (PFPeA)	1.00	1.04	3.4617	2.5552	104	3.6	±30	Linear
Perfluorohexanoic acid (PFHxA)	1.00	0.905	1.2375	1.0507	90.5	-9.5	±30	Linear
Perfluoroheptanoic acid (PFHpA)	1.00	1.04	1.1236	1.1218	104	3.7	±30	Linear
Perfluorooctanoic acid (PFOA)	1.00	1.06	0.7429	0.7174	106	6.0	±30	Linear
Perfluorononanoic acid (PFNA)	1.00	1.11	0.674	0.7528	111	10.8	±30	Linear
Perfluorodecanoic acid (PFDA)	1.00	1.01	0.7103	0.7156	101	NA	±30	Average RF
Perfluoroundecanoic acid (PFUnDA)	1.00	0.976	0.8273	0.7599	97.6	-2.4	±30	Linear
Perfluorododecanoic acid (PFDoDA)	1.00	0.962	0.4982	0.4711	96.2	-3.8	±30	Linear
Perfluorotridecanoic acid (PFTrDA)	1.00	1.11	0.6825	0.7541	111	11.0	±30	Linear
Perfluorotetradecanoic acid (PFTeDA)	1.00	1.07	0.284	0.2647	107	7.2	±30	Linear
Perfluorooctane sulfonamide (FOSA)	1.00	1.01	1.5264	1.5403	101	NA	±30	Average RF
N-Methyl perfluorooctane sulfonamidoacetic acid	1.00	1.14	0.5883	0.6715	114	NA	±30	Average RF
N-Ethyl perfluorooctane sulfonamidoacetic acid	1.00	1.03	0.3956	0.4079	103	NA	±30	Average RF
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.937	1.01	0.7259	0.7799	107	NA	±30	Average RF
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.951	1.01	0.7286	0.7727	106	NA	±30	Average RF
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.960	0.966	0.9181	0.9242	101	NA	±30	Average RF

Analyte Name	Expected	Result	Average RF	CCV RF	Rec.	% Drift	Criteria	Curve Fit
13C3-PFBS	5.00	5.37	1.5068	1.6187	107	NA	±30	Average RF
18O2-PFHxS	5.00	4.74	0.9299	0.8815	94.8	NA	±30	Average RF
13C4-PFOS	5.00	4.86	0.8991	0.8742	97.2	NA	±30	Average RF
13C4-PFBA	5.00	5.20	4.5683	4.7467	104	NA	±30	Average RF
13C5-PFPeA	5.00	5.30	2.6072	2.7622	106	NA	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102

Service Request: K1808431
Date Analyzed: 09/20/18 09:27

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: J:\LCMS06\Data\091918_b7\091918_082
Signal ID: 1

Calibration Date: 9/19/2018
Calibration ID: KC1800443
Analysis Lot: 607276
Units: ng/mL

13C2-PFHxA	5.00	5.63	5.9359	6.6873	113	NA	±30	Average RF
13C4-PFHpA	5.00	4.89	6.4112	6.2681	97.8	NA	±30	Average RF
13C4-PFOA	5.00	4.73	8.3043	7.8617	94.7	NA	±30	Average RF
13C5-PFNA	5.00	4.71	6.3265	5.9631	94.3	NA	±30	Average RF
13C2-PFDA	5.00	5.14	5.1568	5.3012	103	NA	±30	Average RF
13C2-PFUnDA	5.00	5.07	5.4847	5.5623	101	NA	±30	Average RF
13C2-PFDoDA	5.00	5.11	7.8058	7.9698	102	NA	±30	Average RF
13C2-PFTeDA	5.00	4.75	5.4874	5.2132	95.0	NA	±30	Average RF
13C8-FOSA	5.00	5.16	2.0471	2.1124	103	NA	±30	Average RF
D3-MeFOSAA	5.00	4.98	1.0968	1.0923	99.6	NA	±30	Average RF
D5-EtFOSAA	5.00	5.18	1.2603	1.3052	104	NA	±30	Average RF
13C2-4:2 FTS	5.00	5.03	1.2747	1.2825	101	NA	±30	Average RF
13C2-6:2 FTS	5.00	4.71	0.9922	0.9348	94.2	NA	±30	Average RF
13C2-8:2 FTS	5.00	5.12	0.5446	0.5579	102	NA	±30	Average RF

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102

Service Request: K1808431

Analysis Run Log
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M

Analysis Lot: 606211

Instrument ID: K-LCMS-06

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
J:\LCMS06\Data\091118\091118_033	Continuing Calibration Verification	KQ1812667-01	9/11/2018	22:15	
J:\LCMS06\Data\091118\091118_034	Continuing Calibration Blank	KQ1812667-02	9/11/2018	22:25	
J:\LCMS06\Data\091118\091118_036	Method Blank	KQ1812573-03	9/11/2018	22:46	
J:\LCMS06\Data\091118\091118_037	Lab Control Sample	KQ1812573-01	9/11/2018	22:57	
J:\LCMS06\Data\091118\091118_038	Duplicate Lab Control Sample	KQ1812573-02	9/11/2018	23:07	
J:\LCMS06\Data\091118\091118_045	ZZZZZZZ	ZZZZZZZ	9/12/2018	00:20	
J:\LCMS06\Data\091118\091118_046	ZZZZZZZ	ZZZZZZZ	9/12/2018	00:31	
J:\LCMS06\Data\091118\091118_047	ZZZZZZZ	ZZZZZZZ	9/12/2018	00:41	
J:\LCMS06\Data\091118\091118_048	ZZZZZZZ	ZZZZZZZ	9/12/2018	00:52	
J:\LCMS06\Data\091118\091118_049	ZZZZZZZ	ZZZZZZZ	9/12/2018	01:02	
J:\LCMS06\Data\091118\091118_050	ZZZZZZZ	ZZZZZZZ	9/12/2018	01:13	
J:\LCMS06\Data\091118\091118_051	ZZZZZZZ	ZZZZZZZ	9/12/2018	01:23	
J:\LCMS06\Data\091118\091118_053	ZZZZZZZ	ZZZZZZZ	9/12/2018	01:44	
J:\LCMS06\Data\091118\091118_054	ZZZZZZZ	ZZZZZZZ	9/12/2018	01:55	
J:\LCMS06\Data\091118\091118_055	ZZZZZZZ	ZZZZZZZ	9/12/2018	02:05	
J:\LCMS06\Data\091118\091118_057	ZZZZZZZ	ZZZZZZZ	9/12/2018	02:26	
J:\LCMS06\Data\091118\091118_058	FB	K1808431-012	9/12/2018	02:36	
J:\LCMS06\Data\091118\091118_059	Equip Blk	K1808431-013	9/12/2018	02:47	
J:\LCMS06\Data\091118\091118_060	Trip Blank	K1808431-014	9/12/2018	02:57	

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102

Service Request: K1808431

Analysis Run Log
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M

Analysis Lot: 607276

Instrument ID: K-LCMS-06

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
J:\LCMS06\Data\091918_b7\091918_082	Continuing Calibration Verification	KQ1814114-01	9/20/2018	09:27	
J:\LCMS06\Data\091918_b7\091918_083	Continuing Calibration Blank	KQ1814114-02	9/20/2018	09:38	
J:\LCMS06\Data\091918_b7\091918_084	Method Blank	KQ1812487-03	9/20/2018	09:48	
J:\LCMS06\Data\091918_b7\091918_085	Lab Control Sample	KQ1812487-01	9/20/2018	09:59	
J:\LCMS06\Data\091918_b7\091918_086	Duplicate Lab Control Sample	KQ1812487-02	9/20/2018	10:09	
J:\LCMS06\Data\091918_b7\091918_087	ZZZZZZZ	ZZZZZZZ	9/20/2018	10:20	
J:\LCMS06\Data\091918_b7\091918_088	ZZZZZZZ	ZZZZZZZ	9/20/2018	10:30	
J:\LCMS06\Data\091918_b7\091918_089	ZZZZZZZ	ZZZZZZZ	9/20/2018	10:41	
J:\LCMS06\Data\091918_b7\091918_090	ZZZZZZZ	ZZZZZZZ	9/20/2018	10:51	
J:\LCMS06\Data\091918_b7\091918_091	ZZZZZZZ	ZZZZZZZ	9/20/2018	11:02	
J:\LCMS06\Data\091918_b7\091918_092	ZZZZZZZ	ZZZZZZZ	9/20/2018	11:12	
J:\LCMS06\Data\091918_b7\091918_093	ZZZZZZZ	ZZZZZZZ	9/20/2018	11:23	
J:\LCMS06\Data\091918_b7\091918_094	ZZZZZZZ	ZZZZZZZ	9/20/2018	11:33	
J:\LCMS06\Data\091918_b7\091918_095	ZZZZZZZ	ZZZZZZZ	9/20/2018	11:44	
J:\LCMS06\Data\091918_b7\091918_096	MW-100S	K1808431-001	9/20/2018	11:54	
J:\LCMS06\Data\091918_b7\091918_097	MW-101S	K1808431-002	9/20/2018	12:05	
J:\LCMS06\Data\091918_b7\091918_098	MW-103S	K1808431-003	9/20/2018	12:15	
J:\LCMS06\Data\091918_b7\091918_099	MW-104S	K1808431-004	9/20/2018	12:26	
J:\LCMS06\Data\091918_b7\091918_100	MW-105S	K1808431-005	9/20/2018	12:36	
J:\LCMS06\Data\091918_b7\091918_101	MW-106SR	K1808431-006	9/20/2018	12:47	
J:\LCMS06\Data\091918_b7\091918_102	MW-109S	K1808431-007	9/20/2018	12:57	
J:\LCMS06\Data\091918_b7\091918_103	MW-112S	K1808431-008	9/20/2018	13:07	
J:\LCMS06\Data\091918_b7\091918_104	MW-114S	K1808431-009	9/20/2018	13:18	
J:\LCMS06\Data\091918_b7\091918_105	DUP-1	K1808431-010	9/20/2018	13:28	
J:\LCMS06\Data\091918_b7\091918_106	DUP-2	K1808431-011	9/20/2018	13:39	

ALS Group USA, Corp.
dba ALS Environmental

Prep Summary Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request: K1808431

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Prep Method: EPA 3535A

Extraction Lot: 321523

Analytical Method: PFC/537M

Extraction Date: 09/10/18 08:16

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
MW-100S	K1808431-001	9/5/18	9/6/18	285.0000 mL	8 mL	
MW-101S	K1808431-002	9/5/18	9/6/18	295.0000 mL	8 mL	
MW-103S	K1808431-003	9/5/18	9/6/18	285.0000 mL	8 mL	
MW-104S	K1808431-004	9/5/18	9/6/18	315.0000 mL	8 mL	
MW-105S	K1808431-005	9/5/18	9/6/18	285.0000 mL	8 mL	
MW-106SR	K1808431-006	9/5/18	9/6/18	285.0000 mL	8 mL	
MW-109S	K1808431-007	9/5/18	9/6/18	295.0000 mL	8 mL	
MW-112S	K1808431-008	9/5/18	9/6/18	285.0000 mL	8 mL	
MW-114S	K1808431-009	9/5/18	9/6/18	285.0000 mL	8 mL	
DUP-1	K1808431-010	9/5/18	9/6/18	275.0000 mL	8 mL	
DUP-2	K1808431-011	9/5/18	9/6/18	305.0000 mL	8 mL	
Lab Control Sample	KQ1812487-01LCS	NA	NA	250 mL	8 mL	
Duplicate Lab Control Sample	KQ1812487-02DLCS	NA	NA	250 mL	8 mL	
Method Blank	KQ1812487-03MB	NA	NA	250 mL	8 mL	

ALS Group USA, Corp.
dba ALS Environmental

Prep Summary Report

Client: Applied EcoSystems, Inc.
Project: RACER Flint West #12994/11-4317-102
Sample Matrix: Water

Service Request:K1808431

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Prep Method: EPA 3535A

Extraction Lot: 321636

Analytical Method: PFC/537M

Extraction Date: 09/11/18 08:20

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
FB	K1808431-012	9/5/18	9/6/18	290.0000 mL	8 mL	
Equip Blk	K1808431-013	9/5/18	9/6/18	300.0000 mL	8 mL	
Trip Blank	K1808431-014	9/5/18	9/6/18	290.0000 mL	8 mL	
Lab Control Sample	KQ1812573-01LCS	NA	NA	250 mL	8 mL	
Duplicate Lab Control Sample	KQ1812573-02DLCS	NA	NA	250 mL	8 mL	
Method Blank	KQ1812573-03MB	NA	NA	250 mL	8 mL	



Analytical Laboratory Report

Report ID: S95636.01(01)
Generated on 10/30/2018

Report to
Attention: Rodney Abke
Applied Ecosystems
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Burton, MI 48529

Phone: 810-715-2525 FAX: 810-715-2526
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Barbara Ball (bball@meritlabs.com)

Report Summary
Lab Sample ID(s): S95636.01-S95636.08
Project: Racer #12990 / 11-4317-102
Collected Date: 10/16/2018
Submitted Date/Time: 10/16/2018 16:40
Sampled by: Heather Dean
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

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.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

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



Analytical Laboratory 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



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
N/A	Not Applicable
RSK-175	RSK-175
SM3500-Cr B	Standard Method 3500 Cr B 2011
SM5310C	Standard Method 5310C 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260B	SW 846 Method 8260B Revision 2 December 1996 / 5030C Revision 3 May 2003



Analytical Laboratory Report

Sample Summary (8 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S95636.01	MW-111S	Water	10/16/18 10:40
S95636.02	MW-112S	Water	10/16/18 12:00
S95636.03	MW-109S	Water	10/16/18 13:00
S95636.04	MW-113S	Water	10/16/18 14:00
S95636.05	MW-114S	Water	10/16/18 14:50
S95636.06	Dupe 1	Water	10/16/18 00:01
S95636.07	Fd Blk	Water	10/16/18 10:00
S95636.08	Trip Blank	Water	10/16/18 00:01



Analytical Laboratory Report

Lab Sample ID: S95636.01

Sample Tag: MW-111S

Collected Date/Time: 10/16/2018 10:40

Matrix: Water

COC Reference: 110521

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
6	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/23/18 13:16	JML	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	

Inorganics

Method: SM3500-Cr B, Run Date: 10/17/18 10:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	0.008	0.01	0.004	mg/L	1	18540-29-9	c

Method: SM3500-Cr B, Run Date: 10/17/18 10:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	0.006	0.01	0.004	mg/L	1	18540-29-9	

Method: SM5310C, Run Date: 10/23/18 14:14, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	7.0	1	0.414	mg/L	1		x

Metals

Method: E200.8, Run Date: 10/17/18 10:44, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.000385	mg/L	5	7440-38-2	
Chromium	0.007	0.005	0.000150	mg/L	5	7440-47-3	
Copper	0.000631	0.005	0.000290	mg/L	5	7440-50-8	b
Iron	0.02	0.02	0.00112	mg/L	5	7439-89-6	
Lead	Not detected	0.003	0.0000550	mg/L	5	7439-92-1	
Manganese	0.011	0.005	0.000405	mg/L	5	7439-96-5	
Selenium	Not detected	0.005	0.00251	mg/L	5	7782-49-2	
Zinc	Not detected	0.005	0.00138	mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/17/18 10:56, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.000385	mg/L	5	7440-38-2	f
Chromium, Dissolved	0.006	0.005	0.000150	mg/L	5	7440-47-3	f
Copper, Dissolved	0.000872	0.005	0.000290	mg/L	5	7440-50-8	bf
Iron, Dissolved	0.01484	0.02	0.00112	mg/L	5	7439-89-6	bf
Lead, Dissolved	Not detected	0.003	0.0000550	mg/L	5	7439-92-1	f

c-Filtered in lab

x-Preserved from bulk sample

b-Value detected less than reporting limit, but greater than MDL

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S95636.01 (continued)

Sample Tag: MW-111S

Method: E200.8, Run Date: 10/17/18 10:56, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Manganese, Dissolved	0.011	0.005	0.000405	mg/L	5	7439-96-5	f
Selenium, Dissolved	Not detected	0.005	0.00251	mg/L	5	7782-49-2	f
Zinc, Dissolved	0.006	0.005	0.00138	mg/L	5	7440-66-6	f

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 18:42, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.27	ug/L	1	60-29-7	
Acetone*	4.7	50	4.0	ug/L	1	67-64-1	J
Methyl iodide*	Not detected	1	0.24	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.13	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.25	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.38	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	3.3	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.57	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.20	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.24	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.18	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.21	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.28	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	Not detected	5	0.16	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	Not detected	1	0.14	ug/L	1	156-60-5	
1,1-Dichloroethane*	0.19	1	0.15	ug/L	1	75-34-3	J
cis-1,2-Dichloroethene*	4	1	0.21	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.2	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.15	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.36	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.27	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.35	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.19	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.19	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.11	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.17	ug/L	1	107-06-2	
Trichloroethene*	10	1	0.29	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.18	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.19	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.45	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.17	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.17	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.20	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.34	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.13	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.26	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.20	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.12	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.16	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.22	ug/L	1	630-20-6	

f-Filtered and preserved in lab

J-Estimated value less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S95636.01 (continued)

Sample Tag: MW-111S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 18:42, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene*	Not detected	1	0.10	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.42	ug/L	1		
o-Xylene*	Not detected	1	0.16	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.13	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.12	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.35	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.27	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.54	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.12	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.15	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.18	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.14	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.16	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.16	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.19	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.20	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.18	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.13	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.14	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.17	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.35	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.48	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.24	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.25	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.18	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.21	ug/L	1	91-57-6	

Organics

Method: RSK-175, Run Date: 10/24/18 21:43, Analyst: TA

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Methane in Water*	1,400	1.0	0.17	ug/L	1	74-82-8	O

O-Analysis performed by outside laboratory. See attached report.



Analytical Laboratory Report

Lab Sample ID: S95636.02

Sample Tag: MW-112S

Collected Date/Time: 10/16/2018 12:00

Matrix: Water

COC Reference: 110521

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
6	40ml Glass	HCL	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/23/18 13:16	JML	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	

Inorganics

Method: SM3500-Cr B, Run Date: 10/17/18 10:55, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.02	0.01	mg/L	2.5	18540-29-9	c

Method: SM3500-Cr B, Run Date: 10/17/18 10:35, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.02	0.01	mg/L	2.5	18540-29-9	

Method: SM5310C, Run Date: 10/23/18 14:38, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	35.1	1	0.414	mg/L	1		x

Metals

Method: E200.8, Run Date: 10/17/18 10:58, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.075	0.002	0.000385	mg/L	5	7440-38-2	
Chromium	0.000938	0.005	0.000150	mg/L	5	7440-47-3	b
Copper	Not detected	0.005	0.000290	mg/L	5	7440-50-8	
Iron	5.67	0.02	0.00112	mg/L	5	7439-89-6	
Lead	0.000109	0.003	0.0000550	mg/L	5	7439-92-1	b
Manganese	0.250	0.005	0.000405	mg/L	5	7439-96-5	
Selenium	Not detected	0.005	0.00251	mg/L	5	7782-49-2	
Zinc	0.00221	0.005	0.00138	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 10/17/18 11:02, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.049	0.002	0.000385	mg/L	5	7440-38-2	f
Chromium, Dissolved	0.000480	0.005	0.000150	mg/L	5	7440-47-3	bf
Copper, Dissolved	Not detected	0.005	0.000290	mg/L	5	7440-50-8	f
Iron, Dissolved	3.38	0.02	0.00112	mg/L	5	7439-89-6	f

c-Filtered in lab

x-Preserved from bulk sample

b-Value detected less than reporting limit, but greater than MDL

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S95636.02 (continued)

Sample Tag: MW-112S

Method: E200.8, Run Date: 10/17/18 11:02, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead, Dissolved	0.00069	0.003	0.0000550	mg/L	5	7439-92-1	bf
Manganese, Dissolved	0.233	0.005	0.000405	mg/L	5	7439-96-5	f
Selenium, Dissolved	Not detected	0.005	0.00251	mg/L	5	7782-49-2	f
Zinc, Dissolved	0.00449	0.005	0.00138	mg/L	5	7440-66-6	bf

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 19:03, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.27	ug/L	1	60-29-7	
Acetone*	7.1	50	4.0	ug/L	1	67-64-1	J
Methyl iodide*	Not detected	1	0.24	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.13	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.25	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.38	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	3.3	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.57	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.20	ug/L	1	74-87-3	
Vinyl chloride*	3	1	0.24	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.18	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.21	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.28	ug/L	1	75-69-4	
1,1-Dichloroethene*	0.78	1	0.27	ug/L	1	75-35-4	J
Methylene chloride*	0.22	5	0.16	ug/L	1	75-09-2	JB
trans-1,2-Dichloroethene*	0.17	1	0.14	ug/L	1	156-60-5	J
1,1-Dichloroethane*	0.71	1	0.15	ug/L	1	75-34-3	J
cis-1,2-Dichloroethene*	2	1	0.21	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.2	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.15	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.36	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.27	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.35	ug/L	1	108-10-1	
2-Hexanone*	0.68	50	0.19	ug/L	1	591-78-6	J
Carbon tetrachloride*	Not detected	1	0.19	ug/L	1	56-23-5	
Benzene*	0.14	1	0.11	ug/L	1	71-43-2	J
1,2-Dichloroethane*	Not detected	1	0.17	ug/L	1	107-06-2	
Trichloroethene*	8	1	0.29	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.18	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.19	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.45	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.17	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.17	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.20	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.34	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.13	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.26	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.20	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.12	ug/L	1	106-93-4	

b-Value detected less than reporting limit, but greater than MDL f-Filtered and preserved in lab

J-Estimated value less than reporting limit, but greater than MDL

B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S95636.02 (continued)

Sample Tag: MW-112S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 19:03, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chlorobenzene*	Not detected	1	0.16	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.22	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.10	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.42	ug/L	1		
o-Xylene*	Not detected	1	0.16	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.13	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.12	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.35	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.27	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.54	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.12	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.15	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.18	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.14	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.16	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.16	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.19	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.20	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.18	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.13	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.14	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.17	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.35	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.48	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.24	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.25	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.18	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.21	ug/L	1	91-57-6	

Organics

Method: RSK-175, Run Date: 10/24/18 22:00, Analyst: TA

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Methane in Water*	Not detected	1.0	0.17	ug/L	1	74-82-8	O

O-Analysis performed by outside laboratory. See attached report.



Analytical Laboratory Report

Lab Sample ID: S95636.03

Sample Tag: MW-109S

Collected Date/Time: 10/16/2018 13:00

Matrix: Water

COC Reference: 110521

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
6	40ml Glass	HCL	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/23/18 13:16	JML	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	

Inorganics

Method: SM3500-Cr B, Run Date: 10/17/18 11:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.000	0.02	mg/L	5	18540-29-9	c

Method: SM3500-Cr B, Run Date: 10/17/18 10:40, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.25	0.1	mg/L	25	18540-29-9	

Method: SM5310C, Run Date: 10/23/18 15:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	24.1	1	0.414	mg/L	1		x

Metals

Method: E200.8, Run Date: 10/17/18 11:06, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.028	0.002	0.000385	mg/L	5	7440-38-2	
Chromium	0.000418	0.005	0.000150	mg/L	5	7440-47-3	b
Copper	0.000907	0.005	0.000290	mg/L	5	7440-50-8	b
Iron	14.5	0.02	0.00112	mg/L	5	7439-89-6	
Lead	0.000074	0.003	0.0000550	mg/L	5	7439-92-1	b
Manganese	0.459	0.005	0.000405	mg/L	5	7439-96-5	
Selenium	Not detected	0.005	0.00251	mg/L	5	7782-49-2	
Zinc	0.00162	0.005	0.00138	mg/L	5	7440-66-6	b

Method: E200.8, Run Date: 10/17/18 11:11, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.021	0.002	0.000385	mg/L	5	7440-38-2	f
Chromium, Dissolved	0.000245	0.005	0.000150	mg/L	5	7440-47-3	bf
Copper, Dissolved	0.000474	0.005	0.000290	mg/L	5	7440-50-8	bf
Iron, Dissolved	9.71	0.02	0.00112	mg/L	5	7439-89-6	f

c-Filtered in lab

x-Preserved from bulk sample

b-Value detected less than reporting limit, but greater than MDL

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S95636.03 (continued)

Sample Tag: MW-109S

Method: E200.8, Run Date: 10/17/18 11:11, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead, Dissolved	Not detected	0.003	0.0000550	mg/L	5	7439-92-1	f
Manganese, Dissolved	0.464	0.005	0.000405	mg/L	5	7439-96-5	f
Selenium, Dissolved	Not detected	0.005	0.00251	mg/L	5	7782-49-2	f
Zinc, Dissolved	0.00376	0.005	0.00138	mg/L	5	7440-66-6	bf

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/25/18 00:14, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.50	ug/L	1	60-29-7	
Acetone*	4.76	50	0.56	ug/L	1	67-64-1	JB
Methyl iodide*	Not detected	1	0.25	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.24	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.19	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.57	ug/L	1	107-13-1	
2-Butanone (MEK)*	2.51	25	0.26	ug/L	1	78-93-3	J
Dichlorodifluoromethane*	Not detected	5	0.50	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.26	ug/L	1	74-87-3	
Vinyl chloride*	26	1	0.31	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.32	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.34	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.33	ug/L	1	75-69-4	
1,1-Dichloroethene*	0.74	1	0.27	ug/L	1	75-35-4	J
Methylene chloride*	Not detected	5	0.29	ug/L	1	75-09-2	
trans-1,2-Dichloroethene*	0.62	1	0.20	ug/L	1	156-60-5	J
1,1-Dichloroethane*	1	1	0.20	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	42	1	0.26	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.3	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.20	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.38	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.28	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.14	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.29	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.20	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.20	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.16	ug/L	1	107-06-2	
Trichloroethene*	8	1	0.23	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.20	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.23	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.20	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.19	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.25	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.25	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.28	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.20	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.20	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.24	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.30	ug/L	1	106-93-4	

f-Filtered and preserved in lab

b-Value detected less than reporting limit, but greater than MDL

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S95636.03 (continued)

Sample Tag: MW-109S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/25/18 00:14, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chlorobenzene*	Not detected	1	0.17	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.24	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.26	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
o-Xylene*	Not detected	1	0.25	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.18	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.25	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.22	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.18	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.33	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.23	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.27	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.26	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.18	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.22	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.25	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.21	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.23	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.28	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.061	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.22	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.21	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.47	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.19	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.20	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.21	ug/L	1	91-20-3	
2-Methylnaphthalene*	0.31	5	0.16	ug/L	1	91-57-6	JB

Organics

Method: RSK-175, Run Date: 10/24/18 22:17, Analyst: TA

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Methane in Water*	200	1.0	0.17	ug/L	1	74-82-8	O

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank

O-Analysis performed by outside laboratory. See attached report.



Analytical Laboratory Report

Lab Sample ID: S95636.04

Sample Tag: MW-113S

Collected Date/Time: 10/16/2018 14:00

Matrix: Water

COC Reference: 110521

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
6	40ml Glass	HCL	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/23/18 13:16	JML	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	

Inorganics

Method: SM3500-Cr B, Run Date: 10/17/18 11:05, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.02	0.01	mg/L	2.5	18540-29-9	c

Method: SM3500-Cr B, Run Date: 10/17/18 10:45, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.02	0.01	mg/L	2.5	18540-29-9	

Method: SM5310C, Run Date: 10/23/18 15:23, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	8.4	1	0.414	mg/L	1		x

Metals

Method: E200.8, Run Date: 10/17/18 11:15, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.007	0.002	0.000385	mg/L	5	7440-38-2	
Chromium	0.023	0.005	0.000150	mg/L	5	7440-47-3	
Copper	0.000876	0.005	0.000290	mg/L	5	7440-50-8	b
Iron	2.17	0.02	0.00112	mg/L	5	7439-89-6	
Lead	Not detected	0.003	0.0000550	mg/L	5	7439-92-1	
Manganese	0.096	0.005	0.000405	mg/L	5	7439-96-5	
Selenium	Not detected	0.005	0.00251	mg/L	5	7782-49-2	
Zinc	Not detected	0.005	0.00138	mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/17/18 11:19, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.006	0.002	0.000385	mg/L	5	7440-38-2	f
Chromium, Dissolved	0.021	0.005	0.000150	mg/L	5	7440-47-3	f
Copper, Dissolved	Not detected	0.005	0.000290	mg/L	5	7440-50-8	f
Iron, Dissolved	1.50	0.02	0.00112	mg/L	5	7439-89-6	f

c-Filtered in lab

x-Preserved from bulk sample

b-Value detected less than reporting limit, but greater than MDL

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S95636.04 (continued)

Sample Tag: MW-113S

Method: E200.8, Run Date: 10/17/18 11:19, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead, Dissolved	0.000132	0.003	0.0000550	mg/L	5	7439-92-1	bf
Manganese, Dissolved	0.097	0.005	0.000405	mg/L	5	7439-96-5	f
Selenium, Dissolved	Not detected	0.005	0.00251	mg/L	5	7782-49-2	f
Zinc, Dissolved	0.00195	0.005	0.00138	mg/L	5	7440-66-6	bf

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 19:41, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.27	ug/L	1	60-29-7	
Acetone*	4.1	50	4.0	ug/L	1	67-64-1	J
Methyl iodide*	Not detected	1	0.24	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.13	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.25	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.38	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	3.3	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.57	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.20	ug/L	1	74-87-3	
Vinyl chloride*	1	1	0.24	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.18	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.21	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.28	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	0.22	5	0.16	ug/L	1	75-09-2	JB
trans-1,2-Dichloroethene*	Not detected	1	0.14	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.15	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	8	1	0.21	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.2	ug/L	1	109-99-9	
Chloroform*	Not detected	1	0.15	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.36	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.27	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.35	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.19	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.19	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.11	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.17	ug/L	1	107-06-2	
Trichloroethene*	21	1	0.29	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.18	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.19	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.45	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.17	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.17	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.20	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.34	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.13	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.26	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.20	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.12	ug/L	1	106-93-4	

b-Value detected less than reporting limit, but greater than MDL f-Filtered and preserved in lab

J-Estimated value less than reporting limit, but greater than MDL

B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S95636.04 (continued)

Sample Tag: MW-113S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 19:41, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chlorobenzene*	Not detected	1	0.16	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.22	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.10	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.42	ug/L	1		
o-Xylene*	Not detected	1	0.16	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.13	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.12	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.35	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.27	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.54	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.12	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.15	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.18	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.14	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.16	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.16	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.19	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.20	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.18	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.13	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.14	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.17	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.35	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.48	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.24	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.25	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.18	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.21	ug/L	1	91-57-6	

Organics

Method: RSK-175, Run Date: 10/24/18 23:24, Analyst: TA

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Methane in Water*	260	1.0	0.17	ug/L	1	74-82-8	O

O-Analysis performed by outside laboratory. See attached report.



Analytical Laboratory Report

Lab Sample ID: S95636.05

Sample Tag: MW-114S

Collected Date/Time: 10/16/2018 14:50

Matrix: Water

COC Reference: 110521

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
6	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/23/18 13:16	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/25/18 00:33, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	50	2.5	ug/L	5	60-29-7	Y
Acetone*	11.8	250	2.8	ug/L	5	67-64-1	JYB
Methyl iodide*	Not detected	5	1.3	ug/L	5	74-88-4	Y
Carbon disulfide*	Not detected	30	1.2	ug/L	5	75-15-0	Y
tert-Methyl butyl ether (MTBE)*	Not detected	30	0.95	ug/L	5	1634-04-4	Y
Acrylonitrile*	Not detected	10	2.8	ug/L	5	107-13-1	Y
2-Butanone (MEK)*	2.8	130	1.3	ug/L	5	78-93-3	JY
Dichlorodifluoromethane*	Not detected	30	2.5	ug/L	5	75-71-8	Y
Chloromethane*	Not detected	30	1.3	ug/L	5	74-87-3	Y
Vinyl chloride*	7	5	1.5	ug/L	5	75-01-4	Y
Bromomethane*	Not detected	30	1.6	ug/L	5	74-83-9	Y
Chloroethane*	Not detected	30	1.7	ug/L	5	75-00-3	Y
Trichlorofluoromethane*	Not detected	5	1.6	ug/L	5	75-69-4	Y
1,1-Dichloroethene*	Not detected	5	1.3	ug/L	5	75-35-4	Y
Methylene chloride*	2.1	30	1.4	ug/L	5	75-09-2	JYB
trans-1,2-Dichloroethene*	1.90	5	0.99	ug/L	5	156-60-5	JY
1,1-Dichloroethane*	2.5	5	1.0	ug/L	5	75-34-3	JY
cis-1,2-Dichloroethene*	166	5	1.3	ug/L	5	156-59-2	Y
Tetrahydrofuran*	Not detected	450	6.3	ug/L	5	109-99-9	Y
Chloroform*	Not detected	5	1.0	ug/L	5	67-66-3	Y
Bromochloromethane*	Not detected	5	1.9	ug/L	5	74-97-5	Y
1,1,1-Trichloroethane*	Not detected	5	1.4	ug/L	5	71-55-6	Y
4-Methyl-2-pentanone (MIBK)*	Not detected	250	0.71	ug/L	5	108-10-1	Y
2-Hexanone*	Not detected	250	1.4	ug/L	5	591-78-6	Y
Carbon tetrachloride*	Not detected	5	0.98	ug/L	5	56-23-5	Y
Benzene*	Not detected	5	1.00	ug/L	5	71-43-2	Y
1,2-Dichloroethane*	Not detected	5	0.78	ug/L	5	107-06-2	Y
Trichloroethene*	167	5	1.2	ug/L	5	79-01-6	Y
1,2-Dichloropropane*	Not detected	5	1.0	ug/L	5	78-87-5	Y
Bromodichloromethane*	Not detected	5	1.1	ug/L	5	75-27-4	Y
Dibromomethane*	Not detected	30	1.0	ug/L	5	74-95-3	Y
cis-1,3-Dichloropropene*	Not detected	5	0.97	ug/L	5	10061-01-5	Y
Toluene*	Not detected	5	1.2	ug/L	5	108-88-3	Y
trans-1,3-Dichloropropene*	Not detected	5	1.3	ug/L	5	10061-02-6	Y
1,1,2-Trichloroethane*	Not detected	5	1.4	ug/L	5	79-00-5	Y

Y-Elevated reporting limit due to high target concentration

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S95636.05 (continued)

Sample Tag: MW-114S

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/25/18 00:33, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Tetrachloroethene*	Not detected	5	1.0	ug/L	5	127-18-4	Y
trans-1,4-Dichloro-2-butene*	Not detected	5	1.00	ug/L	5	110-57-6	Y
Dibromochloromethane*	Not detected	30	1.2	ug/L	5	124-48-1	Y
1,2-Dibromoethane*	Not detected	5	1.5	ug/L	5	106-93-4	Y
Chlorobenzene*	Not detected	5	0.84	ug/L	5	108-90-7	Y
1,1,1,2-Tetrachloroethane*	Not detected	5	1.2	ug/L	5	630-20-6	Y
Ethylbenzene*	Not detected	5	1.3	ug/L	5	100-41-4	Y
p,m-Xylene*	Not detected	10	2.1	ug/L	5		Y
o-Xylene*	Not detected	5	1.3	ug/L	5	95-47-6	Y
Styrene*	Not detected	5	0.89	ug/L	5	100-42-5	Y
Isopropylbenzene*	Not detected	30	1.2	ug/L	5	98-82-8	Y
Bromoform*	Not detected	5	1.1	ug/L	5	75-25-2	Y
1,1,2,2-Tetrachloroethane*	Not detected	5	0.90	ug/L	5	79-34-5	Y
1,2,3-Trichloropropane*	Not detected	5	1.6	ug/L	5	96-18-4	Y
n-Propylbenzene*	Not detected	5	1.1	ug/L	5	103-65-1	Y
Bromobenzene*	Not detected	5	1.3	ug/L	5	108-86-1	Y
1,3,5-Trimethylbenzene*	Not detected	5	1.3	ug/L	5	108-67-8	Y
tert-Butylbenzene*	Not detected	5	0.90	ug/L	5	98-06-6	Y
1,2,4-Trimethylbenzene*	Not detected	5	1.1	ug/L	5	95-63-6	Y
sec-Butylbenzene*	Not detected	5	1.2	ug/L	5	135-98-8	Y
p-Isopropyltoluene*	Not detected	30	1.0	ug/L	5	99-87-6	Y
1,3-Dichlorobenzene*	Not detected	5	1.2	ug/L	5	541-73-1	Y
1,4-Dichlorobenzene*	Not detected	5	1.1	ug/L	5	106-46-7	Y
1,2-Dichlorobenzene*	Not detected	5	1.4	ug/L	5	95-50-1	Y
1,2,3-Trimethylbenzene*	Not detected	5	0.31	ug/L	5	526-73-8	Y
n-Butylbenzene*	Not detected	5	1.1	ug/L	5	104-51-8	Y
Hexachloroethane*	Not detected	30	1.1	ug/L	5	67-72-1	Y
1,2-Dibromo-3-chloropropane*	Not detected	30	2.3	ug/L	5	96-12-8	Y
1,2,4-Trichlorobenzene*	Not detected	30	0.96	ug/L	5	120-82-1	Y
1,2,3-Trichlorobenzene*	Not detected	30	1.0	ug/L	5	87-61-6	Y
Naphthalene*	Not detected	30	1.1	ug/L	5	91-20-3	Y
2-Methylnaphthalene*	1.05	30	0.82	ug/L	5	91-57-6	JYB

Organics

Method: RSK-175, Run Date: 10/24/18 22:34, Analyst: TA

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Methane in Water*	190	1.0	0.17	ug/L	1	74-82-8	O

Y-Elevated reporting limit due to high target concentration

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank

O-Analysis performed by outside laboratory. See attached report.



Analytical Laboratory Report

Lab Sample ID: S95636.06

Sample Tag: Dupe 1

Collected Date/Time: 10/16/2018 00:01

Matrix: Water

COC Reference: 110521

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
5	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/23/18 13:16	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/25/18 00:52, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	50	2.5	ug/L	5	60-29-7	Y
Acetone*	12.6	250	2.8	ug/L	5	67-64-1	JYB
Methyl iodide*	Not detected	5	1.3	ug/L	5	74-88-4	Y
Carbon disulfide*	Not detected	30	1.2	ug/L	5	75-15-0	Y
tert-Methyl butyl ether (MTBE)*	Not detected	30	0.95	ug/L	5	1634-04-4	Y
Acrylonitrile*	Not detected	10	2.8	ug/L	5	107-13-1	Y
2-Butanone (MEK)*	2.4	130	1.3	ug/L	5	78-93-3	JY
Dichlorodifluoromethane*	Not detected	30	2.5	ug/L	5	75-71-8	Y
Chloromethane*	Not detected	30	1.3	ug/L	5	74-87-3	Y
Vinyl chloride*	9	5	1.5	ug/L	5	75-01-4	Y
Bromomethane*	Not detected	30	1.6	ug/L	5	74-83-9	Y
Chloroethane*	Not detected	30	1.7	ug/L	5	75-00-3	Y
Trichlorofluoromethane*	Not detected	5	1.6	ug/L	5	75-69-4	Y
1,1-Dichloroethene*	Not detected	5	1.3	ug/L	5	75-35-4	Y
Methylene chloride*	2.1	30	1.4	ug/L	5	75-09-2	JYB
trans-1,2-Dichloroethene*	2.20	5	0.99	ug/L	5	156-60-5	JY
1,1-Dichloroethane*	3.0	5	1.0	ug/L	5	75-34-3	JY
cis-1,2-Dichloroethene*	186	5	1.3	ug/L	5	156-59-2	Y
Tetrahydrofuran*	Not detected	450	6.3	ug/L	5	109-99-9	Y
Chloroform*	Not detected	5	1.0	ug/L	5	67-66-3	Y
Bromochloromethane*	Not detected	5	1.9	ug/L	5	74-97-5	Y
1,1,1-Trichloroethane*	1.8	5	1.4	ug/L	5	71-55-6	JY
4-Methyl-2-pentanone (MIBK)*	Not detected	250	0.71	ug/L	5	108-10-1	Y
2-Hexanone*	Not detected	250	1.4	ug/L	5	591-78-6	Y
Carbon tetrachloride*	Not detected	5	0.98	ug/L	5	56-23-5	Y
Benzene*	Not detected	5	1.00	ug/L	5	71-43-2	Y
1,2-Dichloroethane*	Not detected	5	0.78	ug/L	5	107-06-2	Y
Trichloroethene*	243	5	1.2	ug/L	5	79-01-6	Y
1,2-Dichloropropane*	Not detected	5	1.0	ug/L	5	78-87-5	Y
Bromodichloromethane*	Not detected	5	1.1	ug/L	5	75-27-4	Y
Dibromomethane*	Not detected	30	1.0	ug/L	5	74-95-3	Y
cis-1,3-Dichloropropene*	Not detected	5	0.97	ug/L	5	10061-01-5	Y
Toluene*	Not detected	5	1.2	ug/L	5	108-88-3	Y
trans-1,3-Dichloropropene*	Not detected	5	1.3	ug/L	5	10061-02-6	Y
1,1,2-Trichloroethane*	Not detected	5	1.4	ug/L	5	79-00-5	Y

Y-Elevated reporting limit due to high target concentration

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S95636.06 (continued)

Sample Tag: Dupe 1

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/25/18 00:52, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Tetrachloroethene*	Not detected	5	1.0	ug/L	5	127-18-4	Y
trans-1,4-Dichloro-2-butene*	Not detected	5	1.00	ug/L	5	110-57-6	Y
Dibromochloromethane*	Not detected	30	1.2	ug/L	5	124-48-1	Y
1,2-Dibromoethane*	Not detected	5	1.5	ug/L	5	106-93-4	Y
Chlorobenzene*	Not detected	5	0.84	ug/L	5	108-90-7	Y
1,1,1,2-Tetrachloroethane*	Not detected	5	1.2	ug/L	5	630-20-6	Y
Ethylbenzene*	Not detected	5	1.3	ug/L	5	100-41-4	Y
p,m-Xylene*	Not detected	10	2.1	ug/L	5		Y
o-Xylene*	Not detected	5	1.3	ug/L	5	95-47-6	Y
Styrene*	Not detected	5	0.89	ug/L	5	100-42-5	Y
Isopropylbenzene*	Not detected	30	1.2	ug/L	5	98-82-8	Y
Bromoform*	Not detected	5	1.1	ug/L	5	75-25-2	Y
1,1,2,2-Tetrachloroethane*	Not detected	5	0.90	ug/L	5	79-34-5	Y
1,2,3-Trichloropropane*	Not detected	5	1.6	ug/L	5	96-18-4	Y
n-Propylbenzene*	Not detected	5	1.1	ug/L	5	103-65-1	Y
Bromobenzene*	Not detected	5	1.3	ug/L	5	108-86-1	Y
1,3,5-Trimethylbenzene*	Not detected	5	1.3	ug/L	5	108-67-8	Y
tert-Butylbenzene*	Not detected	5	0.90	ug/L	5	98-06-6	Y
1,2,4-Trimethylbenzene*	Not detected	5	1.1	ug/L	5	95-63-6	Y
sec-Butylbenzene*	Not detected	5	1.2	ug/L	5	135-98-8	Y
p-Isopropyltoluene*	Not detected	30	1.0	ug/L	5	99-87-6	Y
1,3-Dichlorobenzene*	Not detected	5	1.2	ug/L	5	541-73-1	Y
1,4-Dichlorobenzene*	Not detected	5	1.1	ug/L	5	106-46-7	Y
1,2-Dichlorobenzene*	Not detected	5	1.4	ug/L	5	95-50-1	Y
1,2,3-Trimethylbenzene*	Not detected	5	0.31	ug/L	5	526-73-8	Y
n-Butylbenzene*	Not detected	5	1.1	ug/L	5	104-51-8	Y
Hexachloroethane*	Not detected	30	1.1	ug/L	5	67-72-1	Y
1,2-Dibromo-3-chloropropane*	Not detected	30	2.3	ug/L	5	96-12-8	Y
1,2,4-Trichlorobenzene*	Not detected	30	0.96	ug/L	5	120-82-1	Y
1,2,3-Trichlorobenzene*	Not detected	30	1.0	ug/L	5	87-61-6	Y
Naphthalene*	Not detected	30	1.1	ug/L	5	91-20-3	Y
2-Methylnaphthalene*	Not detected	30	0.82	ug/L	5	91-57-6	Y

Organics

Method: RSK-175, Run Date: 10/24/18 22:50, Analyst: TA

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Methane in Water*	20	1.0	0.17	ug/L	1	74-82-8	O

Y-Elevated reporting limit due to high target concentration

O-Analysis performed by outside laboratory. See attached report.



Analytical Laboratory Report

Lab Sample ID: S95636.07

Sample Tag: Fd Blk

Collected Date/Time: 10/16/2018 10:00

Matrix: Water

COC Reference: 110521

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
6	40ml Glass	HCL	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/23/18 13:16	JML	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	
Metal Digestion	Completed	SW3015A	10/17/18 09:00	CCM	

Inorganics

Method: SM3500-Cr B, Run Date: 10/17/18 11:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.004	mg/L	1	18540-29-9	Fc

Method: SM3500-Cr B, Run Date: 10/17/18 10:50, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.004	mg/L	1	18540-29-9	F

Method: SM5310C, Run Date: 10/23/18 15:45, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	Not detected	1	0.414	mg/L	1		x

Metals

Method: E200.8, Run Date: 10/17/18 10:38, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	Not detected	0.002	0.000154	mg/L	2	7440-38-2	
Chromium	Not detected	0.005	0.0000600	mg/L	2	7440-47-3	
Copper	Not detected	0.005	0.000116	mg/L	2	7440-50-8	
Iron	0.001352	0.02	0.000448	mg/L	2	7439-89-6	b
Lead	Not detected	0.003	0.0000220	mg/L	2	7439-92-1	
Manganese	Not detected	0.005	0.000162	mg/L	2	7439-96-5	
Selenium	Not detected	0.005	0.00100	mg/L	2	7782-49-2	
Zinc	Not detected	0.005	0.000552	mg/L	2	7440-66-6	

Method: E200.8, Run Date: 10/17/18 10:40, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002	0.000154	mg/L	2	7440-38-2	f
Chromium, Dissolved	Not detected	0.005	0.0000600	mg/L	2	7440-47-3	f
Copper, Dissolved	0.000406	0.005	0.000116	mg/L	2	7440-50-8	bf
Iron, Dissolved	0.000896	0.02	0.000448	mg/L	2	7439-89-6	bf

F-Analysis run outside of holding time c-Filtered in lab

x-Preserved from bulk sample

b-Value detected less than reporting limit, but greater than MDL

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S95636.07 (continued)

Sample Tag: Fd BLK

Method: E200.8, Run Date: 10/17/18 10:40, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead, Dissolved	Not detected	0.003	0.0000220	mg/L	2	7439-92-1	f
Manganese, Dissolved	Not detected	0.005	0.000162	mg/L	2	7439-96-5	f
Selenium, Dissolved	Not detected	0.005	0.00100	mg/L	2	7782-49-2	f
Zinc, Dissolved	0.006	0.005	0.000552	mg/L	2	7440-66-6	f

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 17:54, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.27	ug/L	1	60-29-7	
Acetone*	Not detected	50	4.0	ug/L	1	67-64-1	
Methyl iodide*	Not detected	1	0.24	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.13	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.25	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.38	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	3.3	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.57	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.20	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.24	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.18	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.21	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.28	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	0.20	5	0.16	ug/L	1	75-09-2	JB
trans-1,2-Dichloroethene*	Not detected	1	0.14	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.15	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.21	ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90	1.2	ug/L	1	109-99-9	
Chloroform*	0.42	1	0.15	ug/L	1	67-66-3	J
Bromochloromethane*	Not detected	1	0.36	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.27	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.35	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.19	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.19	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.11	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.17	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.29	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.18	ug/L	1	78-87-5	
Bromodichloromethane*	0.29	1	0.19	ug/L	1	75-27-4	J
Dibromomethane*	Not detected	5	0.45	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.17	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.17	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.20	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.34	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.13	ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene*	Not detected	1	0.26	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.20	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.12	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.16	ug/L	1	108-90-7	

f-Filtered and preserved in lab

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S95636.07 (continued)

Sample Tag: Fd BLK

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 17:54, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,1,1,2-Tetrachloroethane*	Not detected	1	0.22	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.10	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.42	ug/L	1		
o-Xylene*	Not detected	1	0.16	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.13	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.12	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.35	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.27	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.54	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.12	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.15	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.18	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.14	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.16	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.16	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.19	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.20	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.18	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.13	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.14	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.17	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.35	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.48	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.24	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.25	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.18	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.21	ug/L	1	91-57-6	

Organics

Method: RSK-175, Run Date: 10/24/18 23:07, Analyst: TA

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Methane in Water*	Not detected	1.0	0.17	ug/L	1	74-82-8	O

O-Analysis performed by outside laboratory. See attached report.



Analytical Laboratory Report

Lab Sample ID: S95636.08

Sample Tag: Trip Blank

Collected Date/Time: 10/16/2018 00:01

Matrix: Water

COC Reference: 110521

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/23/18 13:16	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 18:14, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether*	Not detected	10	0.27	ug/L	1	60-29-7	
Acetone*	Not detected	50	4.0	ug/L	1	67-64-1	
Methyl iodide*	Not detected	1	0.24	ug/L	1	74-88-4	
Carbon disulfide*	Not detected	5	0.13	ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)*	Not detected	5	0.25	ug/L	1	1634-04-4	
Acrylonitrile*	Not detected	2	0.38	ug/L	1	107-13-1	
2-Butanone (MEK)*	Not detected	25	3.3	ug/L	1	78-93-3	
Dichlorodifluoromethane*	Not detected	5	0.57	ug/L	1	75-71-8	
Chloromethane*	Not detected	5	0.20	ug/L	1	74-87-3	
Vinyl chloride*	Not detected	1	0.24	ug/L	1	75-01-4	
Bromomethane*	Not detected	5	0.18	ug/L	1	74-83-9	
Chloroethane*	Not detected	5	0.21	ug/L	1	75-00-3	
Trichlorofluoromethane*	Not detected	1	0.28	ug/L	1	75-69-4	
1,1-Dichloroethene*	Not detected	1	0.27	ug/L	1	75-35-4	
Methylene chloride*	0.31	5	0.16	ug/L	1	75-09-2	JB
trans-1,2-Dichloroethene*	Not detected	1	0.14	ug/L	1	156-60-5	
1,1-Dichloroethane*	Not detected	1	0.15	ug/L	1	75-34-3	
cis-1,2-Dichloroethene*	Not detected	1	0.21	ug/L	1	156-59-2	
Tetrahydrofuran*	1.4	90	1.2	ug/L	1	109-99-9	JB
Chloroform*	Not detected	1	0.15	ug/L	1	67-66-3	
Bromochloromethane*	Not detected	1	0.36	ug/L	1	74-97-5	
1,1,1-Trichloroethane*	Not detected	1	0.27	ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)*	Not detected	50	0.35	ug/L	1	108-10-1	
2-Hexanone*	Not detected	50	0.19	ug/L	1	591-78-6	
Carbon tetrachloride*	Not detected	1	0.19	ug/L	1	56-23-5	
Benzene*	Not detected	1	0.11	ug/L	1	71-43-2	
1,2-Dichloroethane*	Not detected	1	0.17	ug/L	1	107-06-2	
Trichloroethene*	Not detected	1	0.29	ug/L	1	79-01-6	
1,2-Dichloropropane*	Not detected	1	0.18	ug/L	1	78-87-5	
Bromodichloromethane*	Not detected	1	0.19	ug/L	1	75-27-4	
Dibromomethane*	Not detected	5	0.45	ug/L	1	74-95-3	
cis-1,3-Dichloropropene*	Not detected	1	0.17	ug/L	1	10061-01-5	
Toluene*	Not detected	1	0.17	ug/L	1	108-88-3	
trans-1,3-Dichloropropene*	Not detected	1	0.20	ug/L	1	10061-02-6	
1,1,2-Trichloroethane*	Not detected	1	0.34	ug/L	1	79-00-5	
Tetrachloroethene*	Not detected	1	0.13	ug/L	1	127-18-4	

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S95636.08 (continued)

Sample Tag: Trip Blank

Volatile Organics - DEQ List, Method: SW5030C/8260B, Run Date: 10/22/18 18:14, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,4-Dichloro-2-butene*	Not detected	1	0.26	ug/L	1	110-57-6	
Dibromochloromethane*	Not detected	5	0.20	ug/L	1	124-48-1	
1,2-Dibromoethane*	Not detected	1	0.12	ug/L	1	106-93-4	
Chlorobenzene*	Not detected	1	0.16	ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane*	Not detected	1	0.22	ug/L	1	630-20-6	
Ethylbenzene*	Not detected	1	0.10	ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2	0.42	ug/L	1		
o-Xylene*	Not detected	1	0.16	ug/L	1	95-47-6	
Styrene*	Not detected	1	0.13	ug/L	1	100-42-5	
Isopropylbenzene*	Not detected	5	0.12	ug/L	1	98-82-8	
Bromoform*	Not detected	1	0.35	ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane*	Not detected	1	0.27	ug/L	1	79-34-5	
1,2,3-Trichloropropane*	Not detected	1	0.54	ug/L	1	96-18-4	
n-Propylbenzene*	Not detected	1	0.12	ug/L	1	103-65-1	
Bromobenzene*	Not detected	1	0.15	ug/L	1	108-86-1	
1,3,5-Trimethylbenzene*	Not detected	1	0.18	ug/L	1	108-67-8	
tert-Butylbenzene*	Not detected	1	0.14	ug/L	1	98-06-6	
1,2,4-Trimethylbenzene*	Not detected	1	0.16	ug/L	1	95-63-6	
sec-Butylbenzene*	Not detected	1	0.16	ug/L	1	135-98-8	
p-Isopropyltoluene*	Not detected	5	0.19	ug/L	1	99-87-6	
1,3-Dichlorobenzene*	Not detected	1	0.20	ug/L	1	541-73-1	
1,4-Dichlorobenzene*	Not detected	1	0.18	ug/L	1	106-46-7	
1,2-Dichlorobenzene*	Not detected	1	0.13	ug/L	1	95-50-1	
1,2,3-Trimethylbenzene*	Not detected	1	0.14	ug/L	1	526-73-8	
n-Butylbenzene*	Not detected	1	0.17	ug/L	1	104-51-8	
Hexachloroethane*	Not detected	5	0.35	ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane*	Not detected	5	0.48	ug/L	1	96-12-8	
1,2,4-Trichlorobenzene*	Not detected	5	0.24	ug/L	1	120-82-1	
1,2,3-Trichlorobenzene*	Not detected	5	0.25	ug/L	1	87-61-6	
Naphthalene*	Not detected	5	0.18	ug/L	1	91-20-3	
2-Methylnaphthalene*	Not detected	5	0.21	ug/L	1	91-57-6	

Merit Laboratories Login Checklist

Lab Set ID:S95636

Client:APPLIED (Applied Ecosystems)

Project: Racer #12990 / 11-4317-102

Submitted: 10/16/2018 16:40 Login User: MMC

Attention: Rodney Abke

Address: Applied Ecosystems
G4300 S. Saginaw St.
Burton, MI 48529

Phone: 810-715-2525

FAX: 810-715-2526

Email: rabke@appliedecosystems.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 3.9
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out Missing filtering notes and collection times
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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 Bottle Preservation Check

Lab Set ID: S95636 Initials: MMC

Client: APPLIED (Applied Ecosystems)

Project: Racer #12990 / 11-4317-102

Submitted: 10/16/2018 16:40 Login User:

Attention: Rodney Abke
 Address: Applied Ecosystems
 G4300 S. Saginaw St.
 Burton, MI 48529

Phone: 810-715-2525 FAX: 810-715-2526
 Email: rabke@appliedecosystems.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes	
									<2	>12	other	ml add	new pH		
S95636.01	X								X						
S95636.02	X								X						
S95636.03	X								X						
S95636.04	X								X						
S95636.07	X								X						



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

110521

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Rodney Abke
 COMPANY Applied EcoSystems
 ADDRESS G-4300 S. Saginaw St.
 CITY Burton STATE MI ZIP CODE 48729
 PHONE NO. 810-715-2525 FAX NO. 810-715-2526
 E-MAIL ADDRESS rabke@appliedecosystems.com

CONTACT NAME Mike Smith SAME
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP CODE _____
 PHONE NO. _____ E-MAIL ADDRESS _____

PROJECT NO./NAME Racer #12990/11-4317-102 SAMPLER(S) - PLEASE PRINT/SIGN NAME Heather Dean Heather Dean
 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)

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	VOCs	Dissolved Metals*	Total metals*	Total Organic Carbon	Methane	Certifications		Project Locations		Special Instructions
	DATE	TIME																<input type="checkbox"/> OHIO VAP	<input type="checkbox"/> Drinking Water	<input type="checkbox"/> DoD	<input type="checkbox"/> NPDES	
95636.01	10/16/18	10:40	MW-111S	W	10	✓	✓	✓	✓				✓	✓	✓	✓	✓					*-metals includes:
.02	10.16.18	12:00	MW-112S	W	10	✓	✓	✓	✓				✓	✓	✓	✓	✓					Ar, Cr (Total & Hex)
.03	10.16.18	13:00	MW-109S	W	10	✓	✓	✓	✓				✓	✓	✓	✓	✓					Cu, Pb, Se, Zn
.04	10.16.18	14:00	MW-113S	W	10	✓	✓	✓	✓				✓	✓	✓	✓	✓					Fe, Mn
.05	10.16.18	14:50	MW-114S	W	6		✓						✓				✓					
.06	10.16.18		Dupe 1	W	5		✓						✓				✓					
.07	10.16.18		Fd Blk	W	10	✓	✓	✓	✓				✓	✓	✓	✓	✓					
.08	10.16.18		Trip Blank	W	1		✓						✓									

RELINQUISHED BY: Heather Dean Sampler DATE 10.16.18 TIME 15:40
 RECEIVED BY: [Signature] DATE 10.16.18 TIME 15:40
 RELINQUISHED BY: [Signature] DATE 10/16/18 TIME 16:30
 RECEIVED BY: M Chilcote DATE 10/16/18 TIME 10:40

RELINQUISHED BY: _____ DATE _____ TIME _____
 RECEIVED BY: _____ DATE _____ TIME _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 NOTES: TEMP. ON ARRIVAL 3.9

ANALYTICAL REPORT

Job Number: 190-17811-1

Job Description: S95636 - Methane

For:

Merit Laboratories
2680 E Lansing Drive
East Lansing, MI 48823
Attention: John Laverty



Approved for release.
Sue Schafer
Project Manager II
10/29/2018 10:24 AM

Sue Schafer, Project Manager II
4101 Shuffel Street NW, North Canton, OH, 44720
(810)229-2763
sue.schafer@testamericainc.com
10/29/2018

cc: Barbara Ball

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Definitions/Glossary

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job Narrative
190-17811-1

Comments

No additional comments.

Receipt

The samples were received on 10/18/2018 10:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 8.9° C.

GC VOA

Method(s) RSK-175: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 240-351733.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Client Sample ID: 95636.01

Lab Sample ID: 190-17811-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Methane	1400		1.0	ug/L	1		RSK-175	Total/NA

Client Sample ID: 95636.02

Lab Sample ID: 190-17811-2

No Detections.

Client Sample ID: 95636.03

Lab Sample ID: 190-17811-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Methane	200		1.0	ug/L	1		RSK-175	Total/NA

Client Sample ID: 95636.05

Lab Sample ID: 190-17811-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Methane	190		1.0	ug/L	1		RSK-175	Total/NA

Client Sample ID: 95636.06

Lab Sample ID: 190-17811-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Methane	200		1.0	ug/L	1		RSK-175	Total/NA

Client Sample ID: 95636.07

Lab Sample ID: 190-17811-6

No Detections.

Client Sample ID: 95636.04

Lab Sample ID: 190-17811-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Methane	260		1.0	ug/L	1		RSK-175	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Client Sample ID: 95636.01

Date Collected: 10/16/18 10:40
Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-1

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	1400		1.0	ug/L			10/24/18 21:43	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,1,1-Trifluoroethane	108		60 - 140				10/24/18 21:43	1

Client Sample ID: 95636.02

Date Collected: 10/16/18 12:00
Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-2

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<1.0		1.0	ug/L			10/24/18 22:00	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,1,1-Trifluoroethane	108		60 - 140				10/24/18 22:00	1

Client Sample ID: 95636.03

Date Collected: 10/16/18 13:00
Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-3

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	200		1.0	ug/L			10/24/18 22:17	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,1,1-Trifluoroethane	104		60 - 140				10/24/18 22:17	1

Client Sample ID: 95636.05

Date Collected: 10/16/18 14:50
Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-4

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	190		1.0	ug/L			10/24/18 22:34	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,1,1-Trifluoroethane	98		60 - 140				10/24/18 22:34	1

Client Sample ID: 95636.06

Date Collected: 10/16/18 00:01
Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-5

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	200		1.0	ug/L			10/24/18 22:50	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,1,1-Trifluoroethane	98		60 - 140				10/24/18 22:50	1

Client Sample Results

Client: Merit Laboratories
 Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Client Sample ID: 95636.07

Lab Sample ID: 190-17811-6

Date Collected: 10/16/18 00:01

Matrix: Water

Date Received: 10/18/18 10:05

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<1.0		1.0	ug/L			10/24/18 23:07	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,1,1-Trifluoroethane	104		60 - 140				10/24/18 23:07	1

Client Sample ID: 95636.04

Lab Sample ID: 190-17811-7

Date Collected: 10/16/18 14:00

Matrix: Water

Date Received: 10/18/18 10:05

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	260		1.0	ug/L			10/24/18 23:24	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,1,1-Trifluoroethane	101		60 - 140				10/24/18 23:24	1

Default Detection Limits

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	RL		Units	Method
Methane	1.0	0.17	ug/L	RSK-175

Surrogate Summary

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Method: RSK-175 - Dissolved Gases (GC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TFE2 (60-140)
190-17811-1	95636.01	108
190-17811-2	95636.02	108
190-17811-3	95636.03	104
190-17811-4	95636.05	98
190-17811-5	95636.06	98
190-17811-6	95636.07	104
190-17811-7	95636.04	101
LCS 240-351733/5	Lab Control Sample	102
LCSD 240-351733/6	Lab Control Sample Dup	101
MB 240-351733/4	Method Blank	111

Surrogate Legend

TFE = 1,1,1-Trifluoroethane

QC Sample Results

Client: Merit Laboratories
 Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-351733/4
Matrix: Water
Analysis Batch: 351733

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<1.0		1.0	ug/L			10/24/18 16:23	1
Surrogate	MB %Recovery	MB Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,1,1-Trifluoroethane	111		60 - 140				10/24/18 16:23	1

Lab Sample ID: LCS 240-351733/5
Matrix: Water
Analysis Batch: 351733

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	511	426		ug/L		83	80 - 120
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
1,1,1-Trifluoroethane	102		60 - 140				

Lab Sample ID: LCSD 240-351733/6
Matrix: Water
Analysis Batch: 351733

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	511	457		ug/L		89	80 - 120	7	35
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
1,1,1-Trifluoroethane	101		60 - 140						

QC Association Summary

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

GC VOA

Analysis Batch: 351733

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-17811-1	95636.01	Total/NA	Water	RSK-175	
190-17811-2	95636.02	Total/NA	Water	RSK-175	
190-17811-3	95636.03	Total/NA	Water	RSK-175	
190-17811-4	95636.05	Total/NA	Water	RSK-175	
190-17811-5	95636.06	Total/NA	Water	RSK-175	
190-17811-6	95636.07	Total/NA	Water	RSK-175	
190-17811-7	95636.04	Total/NA	Water	RSK-175	
MB 240-351733/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-351733/5	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 240-351733/6	Lab Control Sample Dup	Total/NA	Water	RSK-175	

Lab Chronicle

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Client Sample ID: 95636.01

Date Collected: 10/16/18 10:40

Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	351733	10/24/18 21:43	BPM	TAL CAN

Client Sample ID: 95636.02

Date Collected: 10/16/18 12:00

Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	351733	10/24/18 22:00	BPM	TAL CAN

Client Sample ID: 95636.03

Date Collected: 10/16/18 13:00

Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	351733	10/24/18 22:17	BPM	TAL CAN

Client Sample ID: 95636.05

Date Collected: 10/16/18 14:50

Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	351733	10/24/18 22:34	BPM	TAL CAN

Client Sample ID: 95636.06

Date Collected: 10/16/18 00:01

Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	351733	10/24/18 22:50	BPM	TAL CAN

Client Sample ID: 95636.07

Date Collected: 10/16/18 00:01

Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	351733	10/24/18 23:07	BPM	TAL CAN

Lab Chronicle

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Client Sample ID: 95636.04
Date Collected: 10/16/18 14:00
Date Received: 10/18/18 10:05

Lab Sample ID: 190-17811-7
Matrix: Water

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Analysis	RSK-175		1	351733	10/24/18 23:24	BPM	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: Merit Laboratories
 Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Laboratory: TestAmerica Michigan

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Michigan	State Program	5	57	05-05-20

Laboratory: TestAmerica Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-19
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-19
Kansas	NELAP	7	E-10336	01-31-19
Kentucky (UST)	State Program	4	58	02-23-19
Kentucky (WW)	State Program	4	98016	12-31-18 *
Minnesota	NELAP	5	039-999-348	12-31-18 *
Minnesota (Petrofund)	State Program	1	3506	07-31-19
Nevada	State Program	9	OH00048	07-31-19
New Jersey	NELAP	2	OH001	06-30-19
New York	NELAP	2	10975	03-31-19
Ohio VAP	State Program	5	CL0024	09-06-19
Oregon	NELAP	10	4062	02-23-19
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Texas	NELAP	6	T104704517-17-9	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19
Washington	State Program	10	C971	01-12-19
West Virginia DEP	State Program	3	210	12-31-18 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Method	Method Description	Protocol	Laboratory
RSK-175	Dissolved Gases (GC)	RSK	TAL CAN

Protocol References:

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: Merit Laboratories
Project/Site: S95636 - Methane

TestAmerica Job ID: 190-17811-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
190-17811-1	95636.01	Water	10/16/18 10:40	10/18/18 10:05
190-17811-2	95636.02	Water	10/16/18 12:00	10/18/18 10:05
190-17811-3	95636.03	Water	10/16/18 13:00	10/18/18 10:05
190-17811-4	95636.05	Water	10/16/18 14:50	10/18/18 10:05
190-17811-5	95636.06	Water	10/16/18 00:01	10/18/18 10:05
190-17811-6	95636.07	Water	10/16/18 00:01	10/18/18 10:05
190-17811-7	95636.04	Water	10/16/18 14:00	10/18/18 10:05

GC VOA MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1

SDG No.: _____

Instrument ID: ZPID Analysis Batch Number: 351262Lab Sample ID: STD1 240-351262/3 IC Client Sample ID: _____Date Analyzed: 10/22/18 13:09 Lab File ID: Z0102203.D GC Column: HP-PLOT/Q ID: 0.53 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Methane	1.19	Incomplete Integration	matthewsb	10/23/18 13:30
Ethylene	1.89	Incomplete Integration	matthewsb	10/22/18 13:53
Acetylene	2.00	Incomplete Integration	matthewsb	10/22/18 13:54
Ethane	2.21	Incomplete Integration	matthewsb	10/22/18 13:54
Propane	4.56	Incomplete Integration	matthewsb	10/22/18 13:54

Lab Sample ID: STD 240-351262/4 IC Client Sample ID: _____Date Analyzed: 10/22/18 13:26 Lab File ID: Z0102204.D GC Column: HP-PLOT/Q ID: 0.53 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Acetylene	2.00	Incomplete Integration	matthewsb	10/22/18 13:54
Ethane	2.21	Incomplete Integration	matthewsb	10/22/18 13:54
Propane	4.56	Incomplete Integration	matthewsb	10/22/18 13:55

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
MEEP LCS 00003	10/31/18	10/17/18	DIWATER, Lot 1	43 mL	MEEP_00004	4.3 mL	Methane	511 ug/L
.MEEP_00004	12/03/18		LGC, Lot 978581		(Purchased Reagent)		Methane	5.11 mg/L
SAICALSURR 00015	07/13/20		SynQuest Laboratories, Inc., Lot 469800		(Purchased Reagent)		1,1,1-Trifluoroethane	11190 ug/L
SARSK2NDSRCE_00011	03/18/19		Air Liquide-Scott Specialty gases, Lot 403-120156		(Purchased Reagent)		Methane	6558 ug/L
SARSKHIGHCALP_00009	04/09/19		Matheson Trigas, Lot 109-66-14469		(Purchased Reagent)		Acetylene	10657 ug/L
							Ethane	12338 ug/L
							Ethylene	11518 ug/L
							Methane	6558 ug/L
							Propane	18077 ug/L
SARSKLOWCAL_00010	03/27/19		MATHESON TRI-GAS INC., Lot 109-56-13136		(Purchased Reagent)		Acetylene	1066 ug/L
							Ethane	1234 ug/L
							Ethylene	1152 ug/L
							Methane	656 ug/L
							Propane	1808 ug/L
SARSKSURR_00011	11/22/18		Matheson Trigas, Lot 9302603973		(Purchased Reagent)		1,1,1-Trifluoroethane	11190 ug/L

Method RSK-175

Dissolved Gases (GC) by Method
RSK_175

FORM II
GC VOA SURROGATE RECOVERY

Lab Name: TestAmerica Canton

Job No.: 190-17811-1

SDG No.: _____

Matrix: Water

Level: Low

GC Column (1): HP-PLOT/Q ID: 0.53 (mm)

Client Sample ID	Lab Sample ID	TFE1 #
95636.01	190-17811-1	108
95636.02	190-17811-2	108
95636.03	190-17811-3	104
95636.05	190-17811-4	98
95636.06	190-17811-5	98
95636.07	190-17811-6	104
95636.04	190-17811-7	101
	MB 240-351733/4	111
	LCS 240-351733/5	102
	LCSD 240-351733/6	101

TFE = 1,1,1-Trifluoroethane

QC LIMITS
60-140

Column to be used to flag recovery values

FORM II RSK-175

FORM III
GC VOA LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Canton Job No.: 190-17811-1

SDG No.: _____

Matrix: Water Level: Low Lab File ID: Z0102405.D

Lab ID: LCS 240-351733/5 Client ID: _____

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	QC LIMITS REC	#
Methane	511	426	83	80-120	

Column to be used to flag recovery and RPD values

FORM III
GC VOA LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Canton Job No.: 190-17811-1

SDG No.: _____

Matrix: Water Level: Low Lab File ID: Z0102406.D

Lab ID: LCSD 240-351733/6 Client ID: _____

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Methane	511	457	89	7	35	80-120	

Column to be used to flag recovery and RPD values

FORM IV
GC VOA METHOD BLANK SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: MB 240-351733/4
 Matrix: Water Date Extracted: _____
 Lab File ID: (1) Z0102404.D Lab File ID: (2) _____
 Date Analyzed: (1) 10/24/2018 16:23 Date Analyzed: (2) _____
 Instrument ID: (1) ZPID Instrument ID: (2) _____
 GC Column: (1) HP-PLOT/Q ID: 0.53 (mm) GC Column: (2) _____ ID: _____

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
	LCS 240-351733/5	10/24/2018 16:40	
	LCSD 240-351733/6	10/24/2018 16:57	
95636.01	190-17811-1	10/24/2018 21:43	
95636.02	190-17811-2	10/24/2018 22:00	
95636.03	190-17811-3	10/24/2018 22:17	
95636.05	190-17811-4	10/24/2018 22:34	
95636.06	190-17811-5	10/24/2018 22:50	
95636.07	190-17811-6	10/24/2018 23:07	
95636.04	190-17811-7	10/24/2018 23:24	

FORM VIII
GC VOA ANALYTICAL SEQUENCE

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Sample No.: CCVRT 240-351733/3 Date Analyzed: 10/24/2018 16:07
 Instrument ID: ZPID GC Column: HP-PLOT/Q ID: 0.53 (mm)
 Lab File ID (Standard): Z0102403.D Heated Purge: (Y/N) N
 Calibration ID: 47591

THE ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, STANDARDS, MS/MSDs AND LCSS IS GIVEN BELOW:

				TFE		
				RT #		
CONTINUING CALIBRATION SURROGATE				3.35		
UPPER LIMIT				3.40		
LOWER LIMIT				3.30		
LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	LAB FILE ID			
CCVRT 240-351733/3		10/24/2018 16:07	Z0102403.D	3.35		
MB 240-351733/4		10/24/2018 16:23	Z0102404.D	3.35		
LCS 240-351733/5		10/24/2018 16:40	Z0102405.D	3.35		
LCSD 240-351733/6		10/24/2018 16:57	Z0102406.D	3.35		
CCV 240-351733/19		10/24/2018 20:36	Z0102419.D	3.35		
190-17811-1	95636.01	10/24/2018 21:43	Z0102423.D	3.35		
190-17811-2	95636.02	10/24/2018 22:00	Z0102424.D	3.35		
190-17811-3	95636.03	10/24/2018 22:17	Z0102425.D	3.35		
190-17811-4	95636.05	10/24/2018 22:34	Z0102426.D	3.35		
190-17811-5	95636.06	10/24/2018 22:50	Z0102427.D	3.35		
190-17811-6	95636.07	10/24/2018 23:07	Z0102428.D	3.35		
190-17811-7	95636.04	10/24/2018 23:24	Z0102429.D	3.35		
CCV 240-351733/30		10/24/2018 23:41	Z0102430.D	3.35		

TFE = 1,1,1-Trifluoroethane

TFE RT Limit = ± 0.05 minutes of surrogate RT

Column used to flag values outside QC limits

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: 95636.01 Lab Sample ID: 190-17811-1
 Matrix: Water Lab File ID: Z0102423.D
 Analysis Method: RSK-175 Date Collected: 10/16/2018 10:40
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 21:43
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	1400		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	108		60-140

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: 95636.02 Lab Sample ID: 190-17811-2
 Matrix: Water Lab File ID: Z0102424.D
 Analysis Method: RSK-175 Date Collected: 10/16/2018 12:00
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 22:00
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	<1.0		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	108		60-140

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: 95636.03 Lab Sample ID: 190-17811-3
 Matrix: Water Lab File ID: Z0102425.D
 Analysis Method: RSK-175 Date Collected: 10/16/2018 13:00
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 22:17
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	200		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	104		60-140

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: 95636.05 Lab Sample ID: 190-17811-4
 Matrix: Water Lab File ID: Z0102426.D
 Analysis Method: RSK-175 Date Collected: 10/16/2018 14:50
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 22:34
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	190		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	98		60-140

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: 95636.06 Lab Sample ID: 190-17811-5
 Matrix: Water Lab File ID: Z0102427.D
 Analysis Method: RSK-175 Date Collected: 10/16/2018 00:01
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 22:50
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	200		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	98		60-140

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: 95636.07 Lab Sample ID: 190-17811-6
 Matrix: Water Lab File ID: Z0102428.D
 Analysis Method: RSK-175 Date Collected: 10/16/2018 00:01
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 23:07
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	<1.0		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	104		60-140

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: 95636.04 Lab Sample ID: 190-17811-7
 Matrix: Water Lab File ID: Z0102429.D
 Analysis Method: RSK-175 Date Collected: 10/16/2018 14:00
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 23:24
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	260		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	101		60-140

FORM VI
GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1 Analy Batch No.: 351262

SDG No.: _____

Instrument ID: ZPID GC Column: HP-PLOT/Q ID: 0.53 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/22/2018 13:09 Calibration End Date: 10/22/2018 14:34 Calibration ID: 47590

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD1 240-351262/3	Z0102203.D
Level 2	STD 240-351262/4	Z0102204.D
Level 3	STD 240-351262/5	Z0102205.D
Level 4	STD 240-351262/6	Z0102206.D
Level 5	STD 240-351262/7	Z0102207.D
Level 6	STD 240-351262/8	Z0102208.D

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6					RT WINDOW	AVG RT
Methane	1.187	1.187	1.186	1.185	1.186	1.185					1.135 - 1.235	1.186
Ethylene	1.887	1.887	1.886	1.885	1.884	1.880					1.830 - 1.930	1.885
Acetylene	2.002	2.002	2.000	2.000	1.999	1.995					1.945 - 2.045	2.000
Ethane	2.209	2.208	2.208	2.207	2.206	2.199					1.999 - 2.399	2.206
Propane	4.559	4.557	4.556	4.555	4.554	4.535					4.485 - 4.585	4.553

FORM VI
GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Canton Job No.: 190-17811-1 Analy Batch No.: 351262

SDG No.: _____

Instrument ID: ZPID GC Column: HP-PLOT/Q ID: 0.53 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/22/2018 13:09 Calibration End Date: 10/22/2018 14:34 Calibration ID: 47590

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD1 240-351262/3	Z0102203.D
Level 2	STD 240-351262/4	Z0102204.D
Level 3	STD 240-351262/5	Z0102205.D
Level 4	STD 240-351262/6	Z0102206.D
Level 5	STD 240-351262/7	Z0102207.D
Level 6	STD 240-351262/8	Z0102208.D

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R ² OR COD	#	MIN R ² OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3	LVL 4		B	M1	M2								
Methane	8642.5 6372.5	6610.0 5925.5	6298.9	6393.7	Ave		6707.18243			14.5			20.0			
Ethylene	6394.9 5799.7	5798.8 5396.3	5721.7	5811.8	Ave		5820.52899			5.5			20.0			
Acetylene	2468.3 3434.0	2503.1 3313.8	2758.0	3205.1	Ave		2947.05553			14.4			30.0			
Ethane	6521.6 6052.7	5842.1 5641.3	5869.9	6041.9	Ave		5994.93225			5.0			20.0			
Propane	6508.2 6161.5	5832.5 5786.0	5913.4	6099.7	Ave		6050.19871			4.4			20.0			

Note: The M1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI
GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Canton Job No.: 190-17811-1 Analy Batch No.: 351262

SDG No.: _____

Instrument ID: ZPID GC Column: HP-PLOT/Q ID: 0.53 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/22/2018 13:09 Calibration End Date: 10/22/2018 14:34 Calibration ID: 47590

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD1 240-351262/3	Z0102203.D
Level 2	STD 240-351262/4	Z0102204.D
Level 3	STD 240-351262/5	Z0102205.D
Level 4	STD 240-351262/6	Z0102206.D
Level 5	STD 240-351262/7	Z0102207.D
Level 6	STD 240-351262/8	Z0102208.D

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (UG/L)				
		LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Methane	Ave	2465 25343316	13197	62879	638257	2725480	0.285 4277	2.00	9.98	99.8	428
Ethylene	Ave	3203 40535362	20331	100304	1018840	4356593	0.501 7512	3.51	17.5	175	751
Acetylene	Ave	1144 23031933	8121	44740	519915	2386702	0.463 6950	3.24	16.2	162	695
Ethane	Ave	3499 45392947	21941	110227	1134571	4870279	0.537 8047	3.76	18.8	188	805
Propane	Ave	5116 68212789	32094	162695	1678203	7263997	0.786 11789	5.50	27.5	275	1179

Curve Type Legend:

Ave = Average

FORM VI
GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1 Analy Batch No.: 351262

SDG No.: _____

Instrument ID: ZPID GC Column: HP-PLOT/Q ID: 0.53 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/22/2018 14:51 Calibration End Date: 10/22/2018 16:15 Calibration ID: 47591

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD1 240-351262/9	Z0102209.D
Level 2	STD2 240-351262/10	Z0102210.D
Level 3	STD3 240-351262/11	Z0102211.D
Level 4	STD4 240-351262/12	Z0102212.D
Level 5	STD5 240-351262/13	Z0102213.D
Level 6	STD6 240-351262/14	Z0102214.D

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6					RT WINDOW	AVG RT
1,1,1-Trifluoroethane	3.354	3.354	3.354	3.352	3.349	3.347					3.247 - 3.447	3.352

FORM VI
GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Canton Job No.: 190-17811-1 Analy Batch No.: 351262

SDG No.: _____

Instrument ID: ZPID GC Column: HP-PLOT/Q ID: 0.53 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/22/2018 14:51 Calibration End Date: 10/22/2018 16:15 Calibration ID: 47591

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD1 240-351262/9	Z0102209.D
Level 2	STD2 240-351262/10	Z0102210.D
Level 3	STD3 240-351262/11	Z0102211.D
Level 4	STD4 240-351262/12	Z0102212.D
Level 5	STD5 240-351262/13	Z0102213.D
Level 6	STD6 240-351262/14	Z0102214.D

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3	LVL 4		B	M1	M2								
1,1,1-Trifluoroethane	2567.4 2490.2	2638.5 2415.0	2424.5	2345.8	Ave		2480.23869				4.4		30.0			

Note: The M1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI
GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Canton Job No.: 190-17811-1 Analy Batch No.: 351262

SDG No.: _____

Instrument ID: ZPID GC Column: HP-PLOT/Q ID: 0.53 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/22/2018 14:51 Calibration End Date: 10/22/2018 16:15 Calibration ID: 47591

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD1 240-351262/9	Z0102209.D
Level 2	STD2 240-351262/10	Z0102210.D
Level 3	STD3 240-351262/11	Z0102211.D
Level 4	STD4 240-351262/12	Z0102212.D
Level 5	STD5 240-351262/13	Z0102213.D
Level 6	STD6 240-351262/14	Z0102214.D

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (UG/L)				
		LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
1,1,1-Trifluoroethane	Ave	499646 23499093	898592	4128426	7988848	18173302	195 9730	341	1703	3406	7298

Curve Type Legend:

Ave = Average

FORM VII
GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: ICV 240-351262/15 Calibration Date: 10/22/2018 16:32
 Instrument ID: ZPID Calib Start Date: 10/22/2018 13:09
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 14:34
 Lab File ID: Z0102215.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Methane	Ave	6707	6354		270	285	-5.3	20.0
Ethylene	Ave	5821	5870		505	501	0.9	20.0
Acetylene	Ave	2947	3540		557	463	20.1	30.0
Ethane	Ave	5995	6102		546	536	1.8	20.0
Propane	Ave	6050	6065		786	784	0.2	20.0

FORM VII
GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: ICV 240-351262/15 Calibration Date: 10/22/2018 16:32
 Instrument ID: ZPID Calib Start Date: 10/22/2018 13:09
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 14:34
 Lab File ID: Z0102215.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW	
		FROM	TO
Methane	1.19	1.14	1.24
Ethylene	1.88	1.83	1.93
Acetylene	2.00	1.95	2.05
Ethane	2.21	2.00	2.40
Propane	4.55	4.49	4.59

FORM VII
GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: ICV 240-351262/15 Calibration Date: 10/22/2018 16:32
 Instrument ID: ZPID Calib Start Date: 10/22/2018 14:51
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 16:15
 Lab File ID: Z0102215.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
1,1,1-Trifluoroethane	Ave	2480	2332		8690	9240	-6.0	30.0

FORM VII
GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: ICV 240-351262/15 Calibration Date: 10/22/2018 16:32
 Instrument ID: ZPID Calib Start Date: 10/22/2018 14:51
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 16:15
 Lab File ID: Z0102215.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW	
		FROM	TO
1,1,1-Trifluoroethane	3.35	3.25	3.45

FORM VII
GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCVRT 240-351733/3 Calibration Date: 10/24/2018 16:07
 Instrument ID: ZPID Calib Start Date: 10/22/2018 13:09
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 14:34
 Lab File ID: Z0102403.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Methane	Ave	6707	6450		274	285	-3.8	20.0
Ethylene	Ave	5821	5949		512	501	2.2	20.0
Acetylene	Ave	2947	3466		545	463	17.6	30.0
Ethane	Ave	5995	6238		558	536	4.0	20.0
Propane	Ave	6050	6443		837	786	6.5	20.0

FORM VII
GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCVRT 240-351733/3 Calibration Date: 10/24/2018 16:07
 Instrument ID: ZPID Calib Start Date: 10/22/2018 13:09
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 14:34
 Lab File ID: Z0102403.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW	
		FROM	TO
Methane	1.19	1.14	1.24
Ethylene	1.89	1.84	1.94
Acetylene	2.00	1.95	2.05
Ethane	2.21	2.01	2.41
Propane	4.55	4.50	4.60

FORM VII
GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCVRT 240-351733/3 Calibration Date: 10/24/2018 16:07
 Instrument ID: ZPID Calib Start Date: 10/22/2018 14:51
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 16:15
 Lab File ID: Z0102403.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
1,1,1-Trifluoroethane	Ave	2480	2414		9000	9240	-2.7	20.0

FORM VII
GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCVRT 240-351733/3 Calibration Date: 10/24/2018 16:07
 Instrument ID: ZPID Calib Start Date: 10/22/2018 14:51
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 16:15
 Lab File ID: Z0102403.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW	
		FROM	TO
1,1,1-Trifluoroethane	3.35	3.25	3.45

FORM VII
GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCV 240-351733/19 Calibration Date: 10/24/2018 20:36
 Instrument ID: ZPID Calib Start Date: 10/22/2018 13:09
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 14:34
 Lab File ID: Z0102419.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Methane	Ave	6707	6332		269	285	-5.6	20.0
Ethylene	Ave	5821	5812		500	501	-0.1	20.0
Acetylene	Ave	2947	3503		551	463	18.9	30.0
Ethane	Ave	5995	6024		539	536	0.5	20.0
Propane	Ave	6050	6084		790	786	0.6	20.0

FORM VII
GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCV 240-351733/19 Calibration Date: 10/24/2018 20:36
 Instrument ID: ZPID Calib Start Date: 10/22/2018 13:09
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 14:34
 Lab File ID: Z0102419.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW	
		FROM	TO
Methane	1.18	1.14	1.24
Ethylene	1.88	1.84	1.94
Acetylene	2.00	1.95	2.05
Ethane	2.21	2.01	2.41
Propane	4.55	4.50	4.60

FORM VII
GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCV 240-351733/19 Calibration Date: 10/24/2018 20:36
 Instrument ID: ZPID Calib Start Date: 10/22/2018 14:51
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 16:15
 Lab File ID: Z0102419.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
1,1,1-Trifluoroethane	Ave	2480	2539		9460	9240	2.4	20.0

FORM VII
GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCV 240-351733/19 Calibration Date: 10/24/2018 20:36
 Instrument ID: ZPID Calib Start Date: 10/22/2018 14:51
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 16:15
 Lab File ID: Z0102419.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW	
		FROM	TO
1,1,1-Trifluoroethane	3.35	3.25	3.45

FORM VII
GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCV 240-351733/30 Calibration Date: 10/24/2018 23:41
 Instrument ID: ZPID Calib Start Date: 10/22/2018 13:09
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 14:34
 Lab File ID: Z0102430.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Methane	Ave	6707	6343		270	285	-5.4	20.0
Ethylene	Ave	5821	5744		494	501	-1.3	20.0
Acetylene	Ave	2947	3481		547	463	18.1	30.0
Ethane	Ave	5995	5975		535	536	-0.3	20.0
Propane	Ave	6050	6012		781	786	-0.6	20.0

FORM VII
GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCV 240-351733/30 Calibration Date: 10/24/2018 23:41
 Instrument ID: ZPID Calib Start Date: 10/22/2018 13:09
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 14:34
 Lab File ID: Z0102430.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW	
		FROM	TO
Methane	1.19	1.14	1.24
Ethylene	1.88	1.84	1.94
Acetylene	2.00	1.95	2.05
Ethane	2.21	2.01	2.41
Propane	4.55	4.50	4.60

FORM VII
GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCV 240-351733/30 Calibration Date: 10/24/2018 23:41
 Instrument ID: ZPID Calib Start Date: 10/22/2018 14:51
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 16:15
 Lab File ID: Z0102430.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
1,1,1-Trifluoroethane	Ave	2480	2432		9060	9240	-1.9	20.0

FORM VII
GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Lab Sample ID: CCV 240-351733/30 Calibration Date: 10/24/2018 23:41
 Instrument ID: ZPID Calib Start Date: 10/22/2018 14:51
 GC Column: HP-PLOT/Q ID: 0.53 (mm) Calib End Date: 10/22/2018 16:15
 Lab File ID: Z0102430.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW	
		FROM	TO
1,1,1-Trifluoroethane	3.35	3.25	3.45

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 240-351733/4
 Matrix: Water Lab File ID: Z0102404.D
 Analysis Method: RSK-175 Date Collected: _____
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 16:23
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	<1.0		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	111		60-140

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCS 240-351733/5
 Matrix: Water Lab File ID: Z0102405.D
 Analysis Method: RSK-175 Date Collected: _____
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 16:40
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	426		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	102		60-140

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCSD 240-351733/6
 Matrix: Water Lab File ID: Z0102406.D
 Analysis Method: RSK-175 Date Collected: _____
 Sample wt/vol: 23 (mL) Date Analyzed: 10/24/2018 16:57
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: HP-PLOT/Q ID: 0.53 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 351733 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL
74-82-8	Methane	457		1.0

CAS NO.	SURROGATE	%REC	Q	LIMITS
420-46-2	1,1,1-Trifluoroethane	101		60-140

GC VOA ANALYSIS RUN LOG

Lab Name: TestAmerica Canton Job No.: 190-17811-1

SDG No.: _____

Instrument ID: ZPID Start Date: 10/22/2018 13:09Analysis Batch Number: 351262 End Date: 10/22/2018 16:32

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD1 240-351262/3 IC		10/22/2018 13:09	1	Z0102203.D	HP-PLOT/Q 0.53 (mm)
STD 240-351262/4 IC		10/22/2018 13:26	1	Z0102204.D	HP-PLOT/Q 0.53 (mm)
STD 240-351262/5 IC		10/22/2018 13:43	1	Z0102205.D	HP-PLOT/Q 0.53 (mm)
STD 240-351262/6 IC		10/22/2018 14:00	1	Z0102206.D	HP-PLOT/Q 0.53 (mm)
STD 240-351262/7 IC		10/22/2018 14:17	1	Z0102207.D	HP-PLOT/Q 0.53 (mm)
STD 240-351262/8 IC		10/22/2018 14:34	1	Z0102208.D	HP-PLOT/Q 0.53 (mm)
STD1 240-351262/9 IC		10/22/2018 14:51	1	Z0102209.D	HP-PLOT/Q 0.53 (mm)
STD2 240-351262/10 IC		10/22/2018 15:07	1	Z0102210.D	HP-PLOT/Q 0.53 (mm)
STD3 240-351262/11 IC		10/22/2018 15:24	1	Z0102211.D	HP-PLOT/Q 0.53 (mm)
STD4 240-351262/12 IC		10/22/2018 15:41	1	Z0102212.D	HP-PLOT/Q 0.53 (mm)
STD5 240-351262/13 IC		10/22/2018 15:58	1	Z0102213.D	HP-PLOT/Q 0.53 (mm)
STD6 240-351262/14 IC		10/22/2018 16:15	1	Z0102214.D	HP-PLOT/Q 0.53 (mm)
ICV 240-351262/15		10/22/2018 16:32	1	Z0102215.D	HP-PLOT/Q 0.53 (mm)

GC VOA ANALYSIS RUN LOG

Lab Name: TestAmerica Canton Job No.: 190-17811-1

SDG No.: _____

Instrument ID: ZPID Start Date: 10/24/2018 16:07Analysis Batch Number: 351733 End Date: 10/24/2018 23:41

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVRT 240-351733/3		10/24/2018 16:07	1	Z0102403.D	HP-PLOT/Q 0.53 (mm)
MB 240-351733/4		10/24/2018 16:23	1	Z0102404.D	HP-PLOT/Q 0.53 (mm)
LCS 240-351733/5		10/24/2018 16:40	1	Z0102405.D	HP-PLOT/Q 0.53 (mm)
LCSD 240-351733/6		10/24/2018 16:57	1	Z0102406.D	HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 17:14	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 17:31	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 17:48	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 18:05	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 18:22	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 18:38	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 18:55	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 19:12	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 19:29	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 19:46	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 20:02	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 20:19	1		HP-PLOT/Q 0.53 (mm)
CCV 240-351733/19		10/24/2018 20:36	1	Z0102419.D	HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 20:53	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 21:10	1		HP-PLOT/Q 0.53 (mm)
ZZZZZ		10/24/2018 21:26	1		HP-PLOT/Q 0.53 (mm)
190-17811-1		10/24/2018 21:43	1	Z0102423.D	HP-PLOT/Q 0.53 (mm)
190-17811-2		10/24/2018 22:00	1	Z0102424.D	HP-PLOT/Q 0.53 (mm)
190-17811-3		10/24/2018 22:17	1	Z0102425.D	HP-PLOT/Q 0.53 (mm)
190-17811-4		10/24/2018 22:34	1	Z0102426.D	HP-PLOT/Q 0.53 (mm)
190-17811-5		10/24/2018 22:50	1	Z0102427.D	HP-PLOT/Q 0.53 (mm)
190-17811-6		10/24/2018 23:07	1	Z0102428.D	HP-PLOT/Q 0.53 (mm)
190-17811-7		10/24/2018 23:24	1	Z0102429.D	HP-PLOT/Q 0.53 (mm)
CCV 240-351733/30		10/24/2018 23:41	1	Z0102430.D	HP-PLOT/Q 0.53 (mm)

GC VOA BATCH WORKSHEET

Lab Name: TestAmerica Canton Job No.: 190-17811-1

SDG No.: _____

Batch Number: 351733 Batch Start Date: 10/24/18 16:07 Batch Analyst: Matthews, Brandon

Batch Method: RSK-175 Batch End Date: _____

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	Initial pH	MEEP LCS 00003	SARSKHIGHCALP 00009	SARSKSURR 00011
CCVRT 240-351733/3		RSK-175		23 mL	23 mL	7 SU		1 mL	19 mL
MB 240-351733/4		RSK-175		23 mL	23 mL	7 SU			19 mL
LCS 240-351733/5		RSK-175		23 mL	23 mL	7 SU	23 mL		20 mL
LCS 240-351733/6		RSK-175		23 mL	23 mL	7 SU	23 mL		20 mL
CCV 240-351733/19		RSK-175		23 mL	23 mL	7 SU		1 mL	19 mL
190-17811-C-1	95636.01	RSK-175	T	23 mL	23 mL	<2 SU			19 mL
190-17811-C-2	95636.02	RSK-175	T	23 mL	23 mL	<2 SU			19 mL
190-17811-C-3	95636.03	RSK-175	T	23 mL	23 mL	<2 SU			19 mL
190-17811-A-4	95636.05	RSK-175	T	23 mL	23 mL	<2 SU			20 mL
190-17811-A-5	95636.06	RSK-175	T	23 mL	23 mL	<2 SU			20 mL
190-17811-A-6	95636.07	RSK-175	T	23 mL	23 mL	<2 SU			20 mL
190-17811-C-7	95636.04	RSK-175	T	23 mL	23 mL	<2 SU			20 mL
CCV 240-351733/30		RSK-175		23 mL	23 mL	7 SU		1 mL	19 mL

Batch Notes	
pH Paper ID	3780291

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Subcontract Data

Shipping and Receiving Documents

- MSDS or Known Hazard Information Supplied by Client
 Bottle stickers applied ELEMENT comment entered MSDS COC scanned emailed to EHS
 - Discrepancies Client ID Merit Labs
 - Short Hold Work Order # 190-17811
 - Rush 24hr 2day 3day 5day Other
- Receipt evaluation performed by - Initials AMY Date 10/18/18 Time 10:06

Cooler/Sample Receipt

(AFTER HOURS receipt, complete gray areas)
 Place cooler in walk-in, place this form in Refrigerator.
 Date/Time rec'd _____ Initials _____

Method of Shipment:

- Walk-In Client TestAmerica Field/Courier
- Other Client/3rd Party Courier _____
- Fed Ex Tracking # _____
- UPS Tracking # _____
- Other _____

Shipping Container Type:

- Cooler Box
 - None Other _____
- ### Packing Materials:
- Plastic Bags Foam
 - Bubble Wrap Paper
 - Packing Peanuts None
 - Other _____

Custody Seals Intact:

- Yes No
 - N/A (not used or required)
- ### Cooling Materials:
- Ice (solid) Ice (Melted)
 - Blue Ice None
 - Other _____

Biological ; Temp (°C) Corrected Samples	Frozen		Received within 2 hours		Sample Flagged																																													
	yes	no	yes	no	yes	no																																												
<table border="1"> <thead> <tr> <th colspan="4">Receipt Temperatures</th> <th colspan="2">Received on</th> <th colspan="2"><input type="checkbox"/> Check if Additional Sheets Required</th> </tr> <tr> <th>Thermometer ID</th> <th>Observed (°C)</th> <th>Corrected (°C)</th> <th>Temp Sample Blank</th> <th>Temp Sample</th> <th>same day sampled?</th> <th>Acceptable**</th> <th>Cooler ID</th> <th>Note Affected Samples if temperature not acceptable</th> </tr> </thead> <tbody> <tr> <td>140252433</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/> Yes <input type="checkbox"/> No</td> <td><input type="checkbox"/> Yes <input type="checkbox"/> No</td> <td></td> <td></td> </tr> <tr> <td>140252496</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/> Yes <input type="checkbox"/> No</td> <td><input type="checkbox"/> Yes <input type="checkbox"/> No</td> <td></td> <td></td> </tr> <tr> <td>4P313207</td> <td>9.6</td> <td>8.9</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/> Yes <input type="checkbox"/> No</td> <td><input type="checkbox"/> Yes <input type="checkbox"/> No</td> <td></td> <td></td> </tr> </tbody> </table>							Receipt Temperatures				Received on		<input type="checkbox"/> Check if Additional Sheets Required		Thermometer ID	Observed (°C)	Corrected (°C)	Temp Sample Blank	Temp Sample	same day sampled?	Acceptable**	Cooler ID	Note Affected Samples if temperature not acceptable	140252433			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			140252496			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			4P313207	9.6	8.9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Receipt Temperatures				Received on		<input type="checkbox"/> Check if Additional Sheets Required																																												
Thermometer ID	Observed (°C)	Corrected (°C)	Temp Sample Blank	Temp Sample	same day sampled?	Acceptable**	Cooler ID	Note Affected Samples if temperature not acceptable																																										
140252433			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No																																												
140252496			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No																																												
4P313207	9.6	8.9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No																																												
<p>* Receipt temperatures are considered acceptable if the samples are received on the same day they were collected & show signs that the cooling process has started. Temperature acceptance for most tests is ≤6.0°C, but not frozen. For additional information, please refer to SOP DT-SCA-004 Sample Receipt and Login, Attachment 2 - Holding Times, Preservation and Container Requirements</p>																																																		

C.F.
-0.7

Receipt Questions**	Y	N	n/a	"No" answers require additional comment
COC present & TA receipt signature, date, & time properly documented?	<input checked="" type="checkbox"/>			
Containers & labels in good condition? (uncracked, not leaking, appropriately filled, labels legible & attached)	<input checked="" type="checkbox"/>			
Appropriate containers used & adequate volume provided?	<input checked="" type="checkbox"/>			Preserved Bottles Checked with pH Strips* Yes/No
Number of sample containers match COC?	<input checked="" type="checkbox"/>			2 vials 95636-06 hand corrected on COC
Samples received within hold time?	<input checked="" type="checkbox"/>			
Samples submitted for GRO and Volatiles analyses (3250, 624, 524) received without headspace?	<input checked="" type="checkbox"/>			no head space - methane not included.
Was a Trip Blank received with VOA samples?		<input checked="" type="checkbox"/>		
Were the samples free of any questionable physical conformities? For example, field duplicates or multiple bottles of the same sample do not significantly vary in appearance (color, proportion of solids, etc)	<input checked="" type="checkbox"/>			
Were the COC, bottle labels and all other items free of all other discrepancies or issues that would need to be addressed with the Project Manager and/or Client?				Temp > 6°C

** May not be applicable if samples are not for compliance testing * Excludes FOG, Volatiles, TOC Vials

Client Contact Record

Contact via: Phone Email Other _____ Person Contacted: _____ Date/Time: _____
 Discrepancy allowance agreement is on record in the client project file
 Discussion/Resolution _____

Any additional documentation and clarification from client must be noted in the narrative and/or scanned into the COC directory

Reviewed by PM Signature [Signature] Date 10/18/18

WI Page 1 of 1

WI No DT-SCA-WI-001 12 effective 05/11/12

Chain of Custody Record



Client Information (Sub Contract Lab)		Lab PIV: Schafer, Sue	Carrier Tracking No(s): 190-20781-1					
Client Contact: sue.schafer@testamericainc.com		E-Mail: sue.schafer@testamericainc.com	Page: Page 1 of 1					
Shipping/Receiving		State of Origin: Michigan	Job #: 190-17811-1					
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):						
Address: 4101 Shuffel Street NW, North Canton, OH, 44720		Analysis Requested						
Phone: 330-497-9396(Tel) 330-497-0772(Fax)		Total Number of containers						
Email:		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O/S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)						
Due Date Requested: 10/31/2018		Special Instructions/Note: RSK						
TAT Requested (days):		Perform MS/MSD (Yes or No)						
FO #:		Field Filtered Sample (Yes or No)						
WO #:		RSK 175/ (MOD) MEE Only						
Project #: 19001249		Matrix (W=Water, S=Solid, O=Organic, A=Air)						
SSOW#:		Preservation Code:						
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=Water, S=Solid, O=Organic, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK 175/ (MOD) MEE Only	Total Number of containers
95636.01 (190-17811-1)	10/16/18	10:40 Eastern	Water	Water	X	X		3
95636.02 (190-17811-2)	10/16/18	12:00 Eastern	Water	Water	X	X		3
95636.03 (190-17811-3)	10/16/18	13:00 Eastern	Water	Water	X	X		3
95636.05 (190-17811-4)	10/16/18	14:50 Eastern	Water	Water	X	X		3
95636.06 (190-17811-5)	10/16/18	00:01 Eastern	Water	Water	X	X		2
95636.07 (190-17811-6)	10/16/18	00:01 Eastern	Water	Water	X	X		3

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/testing/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
 Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) _____
 Primary Deliverable Rank: 2
 Empty Kit Relinquished by: _____ Date: _____
 Relinquished by: _____ Date/Time: 10/18/18 1500 Company: JAL Company
 Relinquished by: _____ Date/Time: _____ Company: _____
 Relinquished by: _____ Date/Time: _____ Company: _____
 Custody Seals Intact: _____ Custody Seal No.: _____
 Δ Yes Δ No
 Cooler Temperature(s) °C and Other Remarks: _____
 Received by: _____ Date/Time: 10/19/18 850 Company: _____
 Received by: _____ Date/Time: _____ Company: _____
 Received by: _____ Date/Time: _____ Company: _____
 Method of Shipment: _____
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Special Instructions/QC Requirements: _____


TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login # : _____

Client TAMI Site Name _____ Cooler unpacked by: SL
 Cooler Received on 10/19/18 Opened on 10/19/18
 FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other
 Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
 COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt See Multiple Cooler Form
 IR GUN# IR-8 (CF +0.9 °C) Observed Cooler Temp. 0.8 °C Corrected Cooler Temp. 1.7 °C
 IR GUN #36 (CF +0.6 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
 -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
 4. Did custody papers accompany the sample(s)? Yes No
 5. Were the custody papers relinquished & signed in the appropriate place? Yes No
 6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
 7. Did all bottles arrive in good condition (Unbroken)? Yes No
 8. Could all bottle labels be reconciled with the COC? Yes No
 9. Were correct bottle(s) used for the test(s) indicated? Yes No
 10. Sufficient quantity received to perform indicated analyses? Yes No
 11. Are these work share samples? Yes No
 If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC849161
 13. Were VOAs on the COC? Yes No
 14. Were air bubbles >6 mm in any VOA vials? Yes No NA  Larger than this.
 15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
 16. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:
 VOAs
 Oil and Grease
 TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by: _____

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
 Sample(s) _____ were received in a broken container.
 Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
 Time preserved: _____ Preservative(s) added/Lot number(s): _____

Chain of Custody Record




Client Information (Sub Contract Lab)		Sampler:	Lab P/M:	Carrier Tracking No(s):	COC No:
Client Contact: Shipping/Receiving		Phone:	Schafer, Sue	State of Origin: Michigan	190-20782.1
Company: TestAmerica Laboratories, Inc.		E-Mail: sue.schafer@testamericainc.com		Page: 1 of 1	Job #: 190-17811-1
Address: 4101 Shuffel Street NW, City: North Canton State, Zip: OH, 44720 Phone: 330-497-9396(Tel) 330-497-0772(Fax) Email:		Due Date Requested: 10/31/2018 TAT Requested (days):	Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O/S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA L - EDA Other:		
Project Name: S95636 - Methane Site:		PO #: WO #: Project #: 19001249 SSOW#:	Analysis Requested		
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Swab, On-surface, BT-TESMA, AALP)
95636.04 (190-17811-7)		10/16/18	14:00 Eastern	Water	Water
Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)	RSK_175/ (MOD) MEE Only	Total Number of containers	
X		X		3	
Special Instructions/Note: RSK					
<p>Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.</p>					
<p>Possible Hazard Identification Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify) _____ Primary Deliverable Rank: 2 Empty Kit Relinquished by: _____ Date: _____ Relinquished by: _____ Date/Time: 10/16/18 1500 Relinquished by: _____ Date/Time: _____ Relinquished by: _____ Date/Time: _____ Custody Seal No.: _____ Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No</p>					
<p>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements:</p>					
<p>Received by: _____ Date/Time: 10/19/18 850 Received by: _____ Date/Time: _____ Received by: _____ Date/Time: _____ Cooler Temperature(s) °C and Other Remarks:</p>					

Canton Facility

Client TAMI Site Name _____ Cooler unpacked by: SL
Cooler Received on 10/19/18 Opened on 10/19/18
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box _____ Client Cooler _____ Box _____ Other _____
Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
COOLANT: Wet Ice Blue Ice Dry Ice Water None

- Cooler temperature upon receipt See Multiple Cooler Form
IR GUN# IR-8 (CF +0.9 °C) Observed Cooler Temp. 0.8 °C Corrected Cooler Temp. 1.7 °C
IR GUN #36 (CF +0.6 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
- Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
-Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
-Were tamper/custody seals intact and uncompromised? Yes No NA
- Shippers' packing slip attached to the cooler(s)? Yes No
- Did custody papers accompany the sample(s)? Yes No
- Were the custody papers relinquished & signed in the appropriate place? Yes No
- Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
- Did all bottles arrive in good condition (Unbroken)? Yes No
- Could all bottle labels be reconciled with the COC? Yes No
- Were correct bottle(s) used for the test(s) indicated? Yes No
- Sufficient quantity received to perform indicated analyses? Yes No
- Are these work share samples?
If yes, Questions 12-16 have been checked at the originating laboratory.
- Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC849161
- Were VOAs on the COC? Yes No
- Were air bubbles >6 mm in any VOA vials? Yes No NA  Larger than this.
- Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
- Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by: _____

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____



Analytical Laboratory Report

Report ID: S95699.01(01)
Generated on 10/24/2018

Report to

Attention: Rodney Abke
Applied Ecosystems
G4300 S. Saginaw St.
Burton, MI 48529

Phone: 810-715-2525 FAX: 810-715-2526
Email: rabke@appliedecosystems.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

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

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S95699.01-S95699.02
Project: 11-4317-102 Racer / Flint
Collected Date: 10/17/2018
Submitted Date/Time: 10/17/2018 15:55
Sampled by: Heather Dean
P.O. #: PO

Table of Contents

- Cover Page (Page 1)
- General Report Notes (Page 2)
- Report Narrative (Page 2)
- Laboratory Certifications (Page 3)
- Qualifier Descriptions (Page 3)
- Glossary of Abbreviations (Page 3)
- Method Summary (Page 4)
- Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

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.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

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



Analytical Laboratory 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



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
SM3500-Cr B	Standard Method 3500 Cr B 2011
SM5310C	Standard Method 5310C 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007



Analytical Laboratory Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S95699.01	MW-114S	Water	10/17/18 09:55
S95699.02	Dupe 1	Water	10/17/18 00:01



Analytical Laboratory Report

Lab Sample ID: S95699.01

Sample Tag: MW-114S

Collected Date/Time: 10/17/2018 09:55

Matrix: Water

COC Reference: 112288

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.8	IR
1	125ml Plastic	HNO3	Yes	4.8	IR
2	40ml Glass	H2SO4	Yes	4.8	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	10/22/18 11:45	CCM	
Metal Digestion	Completed	SW3015A	10/22/18 11:45	CCM	

Inorganics

Method: SM3500-Cr B, Run Date: 10/17/18 16:45, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.004	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 10/17/18 16:55, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.004	mg/L	1	18540-29-9	

Method: SM5310C, Run Date: 10/23/18 18:12, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	5.9	1	0.414	mg/L	1		

Metals

Method: E200.8, Run Date: 10/22/18 13:07, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.023	0.002	0.000385	mg/L	5	7440-38-2	
Chromium	0.000975	0.005	0.000150	mg/L	5	7440-47-3	b
Copper	0.002911	0.005	0.000290	mg/L	5	7440-50-8	b
Iron	0.62	0.02	0.00112	mg/L	5	7439-89-6	
Lead	0.000094	0.003	0.0000550	mg/L	5	7439-92-1	b
Manganese	2.06	0.005	0.000405	mg/L	5	7439-96-5	
Selenium	Not detected	0.005	0.00251	mg/L	5	7782-49-2	
Zinc	0.008	0.005	0.00138	mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/22/18 13:11, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.016	0.002	0.000385	mg/L	5	7440-38-2	
Chromium, Dissolved	0.000751	0.005	0.000150	mg/L	5	7440-47-3	b
Copper, Dissolved	0.002661	0.005	0.000290	mg/L	5	7440-50-8	b
Iron, Dissolved	0.46	0.02	0.00112	mg/L	5	7439-89-6	
Lead, Dissolved	0.000061	0.003	0.0000550	mg/L	5	7439-92-1	b
Manganese, Dissolved	1.99	0.005	0.000405	mg/L	5	7439-96-5	
Selenium, Dissolved	Not detected	0.005	0.00251	mg/L	5	7782-49-2	
Zinc, Dissolved	0.00237	0.005	0.00138	mg/L	5	7440-66-6	b

b-Value detected less than reporting limit, but greater than MDL



Analytical Laboratory Report

Lab Sample ID: S95699.02

Sample Tag: Dupe 1

Collected Date/Time: 10/17/2018 00:01

Matrix: Water

COC Reference: 112288

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	4.8	IR
1	125ml Plastic	HNO3	Yes	4.8	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	10/22/18 11:45	CCM	
Metal Digestion	Completed	SW3015A	10/22/18 11:45	CCM	

Inorganics

Method: SM3500-Cr B, Run Date: 10/17/18 16:50, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI, Dissolved	Not detected	0.01	0.004	mg/L	1	18540-29-9	

Method: SM3500-Cr B, Run Date: 10/17/18 17:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	0.01	0.004	mg/L	1	18540-29-9	

Metals

Method: E200.8, Run Date: 10/22/18 13:14, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.022	0.002	0.000385	mg/L	5	7440-38-2	
Chromium	0.001079	0.005	0.000150	mg/L	5	7440-47-3	b
Copper	0.002819	0.005	0.000290	mg/L	5	7440-50-8	b
Iron	0.59	0.02	0.00112	mg/L	5	7439-89-6	
Lead	0.000103	0.003	0.0000550	mg/L	5	7439-92-1	b
Manganese	2.08	0.005	0.000405	mg/L	5	7439-96-5	
Selenium	Not detected	0.005	0.00251	mg/L	5	7782-49-2	
Zinc	0.010	0.005	0.00138	mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/22/18 13:18, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.016	0.002	0.000385	mg/L	5	7440-38-2	
Chromium, Dissolved	0.000536	0.005	0.000150	mg/L	5	7440-47-3	b
Copper, Dissolved	0.002583	0.005	0.000290	mg/L	5	7440-50-8	b
Iron, Dissolved	0.47	0.02	0.00112	mg/L	5	7439-89-6	
Lead, Dissolved	0.000055	0.003	0.0000550	mg/L	5	7439-92-1	b
Manganese, Dissolved	1.96	0.005	0.000405	mg/L	5	7439-96-5	
Selenium, Dissolved	Not detected	0.005	0.00251	mg/L	5	7782-49-2	
Zinc, Dissolved	0.00230	0.005	0.00138	mg/L	5	7440-66-6	b

b-Value detected less than reporting limit, but greater than MDL

Merit Laboratories Login Checklist

Lab Set ID:S95699

Client:APPLIED (Applied Ecosystems)

Project: 11-4317-102 Racer / Flint

Submitted: 10/17/2018 15:55 Login User: SRS

Attention: Rodney Abke

Address: Applied Ecosystems
G4300 S. Saginaw St.
Burton, MI 48529

Phone: 810-715-2525

FAX: 810-715-2526

Email: rabke@appliedecosystems.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.8 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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 Bottle Preservation Check

Lab Set ID: S95699 Initials: SRS

Client: APPLIED (Applied Ecosystems)

Project: 11-4317-102 Racer / Flint

Submitted: 10/17/2018 15:55 Login User:

Attention: Rodney Abke
 Address: Applied Ecosystems
 G4300 S. Saginaw St.
 Burton, MI 48529

Phone: 810-715-2525 FAX: 810-715-2526
 Email: rabke@appliedecosystems.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S95699.01	X										5	0.3	<2	Lot# 192717
S95699.02	X										5	0.3	<2	Lot# 192717

ATTACHMENT #4: SOIL ANALYTICAL TABLES

SOIL ANALYTICAL DATA (Metals and Detected VOCs)
RACER - Flint West #12990

Sample ID	SB124-4	SB124-10	SB124-21	SB125-4	SB125-13	SB125-19	SB126-4	SB126-11	SB126-15	SB127-4	SB127-8	SB127-15	SB127-20	SB128-3	SB128-7	SB128-10	SB129-4	SB129-8	SB129-18	SB130-4	SB130-10	SB130-18	SB131-4	SB131-10	SB131-18				
Date Collected	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/22/14	4/22/14	4/22/14	4/22/14	4/22/14	4/22/14	4/22/14	4/22/14	4/22/14				
ANALYTE (ug/kg)	DW	GSI																											
Arsenic	5,800.00	5,800.00	D&G=B	1,130.00	1,100.00	1,830.00	570.00	1,440.00	1,410.00	1,300.00	1,250.00	1,180.00	410.00	1,630.00	2,060.00	1,780.00	500.00	1,550.00	1,150.00	2,790.00	1,740.00	1,460.00	3,580.00	1,700.00	1,980.00	1,630.00	1,300.00	2,080.00	
Chromium	18,000.00	18,000.00	D&G=B	1,220.00	1,460.00	3,350.00	2,050.00	3,260.00	4,240.00	1,220.00	1,460.00	2,920.00	2,870.00	1,980.00	2,560.00	4,540.00	610.00	1,460.00	2,860.00	5,890.00	2,550.00	4,080.00	4,730.00	3,090.00	1,150.00	2,770.00	1,640.00	2,800.00	2,620.00
Copper	5,800,000.00	120,000.00	GX	1,700.00	2,300.00	8,200.00	7,400.00	6,100.00	11,400.00	3,400.00	3,100.00	5,600.00	1,600.00	3,000.00	5,800.00	1,200.00	3,900.00	5,600.00	5,300.00	13,000.00	3,600.00	7,200.00	17,700.00	1,700.00	9,800.00	8,500.00	3,100.00	7,900.00	
Lead	700,000.00	5,000,000.00	GX	2,510.00	3,120.00	7,590.00	13,800.00	5,100.00	8,590.00	2,280.00	3,790.00	5,470.00	4,710.00	5,740.00	7,330.00	950.00	6,250.00	11,400.00	6,950.00	104,000.00	6,100.00	7,420.00	123,000.00	2,110.00	6,510.00	36,400.00	4,740.00	6,020.00	
Selenium	4,000.00	410.00	G=B			210.00						210.00							130.00			150.00							
Zinc	2,400,000.00	2,600,000.00	G=B	4,600.00	5,100.00	19,000.00	11,400.00	12,200.00	20,800.00	5,900.00	8,600.00	14,700.00	3,700.00	10,300.00	20,300.00	2,400.00	6,000.00	13,200.00	9,900.00	21,300.00	13,100.00	19,200.00	51,800.00	5,800.00	18,000.00	16,800.00	13,600.00	18,600.00	

ANALYTE (ug/kg)	DW	GSI																										
2 Butanone (MEK)	260,000.00	44,000.00		45.00	71.00	56.00		165.00	79.00	82.00	150.00	75.00	46.00	66.00	148.00	126.00	44.00	123.00	127.00	40.00	53.00	82.00	69.00	68.00	70.00	79.00	65.00	164.00
Vinyl Chloride	40.00	260.00							23.00																	73.00		90.00
1,1-Dichloroethene	140.00	2,600.00																								34.00		18.00
trans-1,2-Dichloroethene	2,000.00	30,000.00																								100.00		62.00
1,1-Dichloroethane	18,000.00	15,000.00																								69.00		35.00
cis-1,2-Dichloroethene	1,400.00	12,000.00			58.00				350.00													300.00			6,380.00		2,820.00	
Tetrahydrofuran	1,900.00	220,000.00		170.00	190.00	190.00	150.00	180.00	180.00	140.00	190.00	210.00	190.00	190.00	170.00	190.00	150.00	150.00	140.00	150.00	180.00	180.00	180.00	170.00	160.00	150.00	180.00	160.00
Chloroform	1,600.00	7,000.00							16.00																			
1,1,1-Trichloroethane	4,000.00	1,800.00							11.00																			
Benzene	100.00	4,000.00																								36.00		
Trichloroethene	100.00	4,000.00			1,420.00				3,650.00													6,170.00			6,080.00	28.00		12,160.00
Toluene	16,000.00	5,400.00		11.00																13.00		19.00				45.00		
Ethylbenzene	1,500.00	360.00																								15.00		
Total Xylenes	5,600.00	820.00																		21.00						92.00		91.00
Isopropylbenzene	91,000.00	3,200.00																		16.00						13.00		
n-Propylbenzene	1,600.00	NC																								16.00		
1,2-Dichlorobenzene	14,000.00	280.00																		21.00								
1,2,4-Trimethylbenzene	2,100.00	570.00																			14.00					24.00		22.00
1,2,3-Trimethylbenzene	NC	NC																								13.40		11.80
Naphthalene	35,000.00	730.00		10.80			14.40	17.00		13.70			12.90		14.30		345.70	46.90	39.50	12.50						51.50		100.30
2-Methylnaphthalene	57,000.00	4,200.00		10.20			14.00	39.00		13.00	19.00				30.00		10.00	820.00	46.00	43.00						54.10		71.80

- NOTES:
- Blank cells indicate no detectable concentrations
 - X Exceeds DW criteria
 - X Exceeds GSI criteria
 - X Exceeds both DW and GSI criteria
 - X Compound also found in associated method blank, suggesting a laboratory artifact.
 - NC Insufficient data to develop criterion/no criterion
 - GX Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River

SOIL ANALYTICAL DATA (Detected VOCs)
RACER - Flint West #12990

	Sample ID		SB132-12	SB132-15	SB133-17	SB133-19	SB133-20
	Date Collected		7/10/14	7/10/14	7/10/14	7/10/14	7/10/14
ANALYTE (ug/kg)	DW	GSI					
2 Butanone (MEK)	260,000.00	44,000.00					
Vinyl Chloride	40.00	260.00	180	89	46		
1,1-Dichloroethene	140.00	2,600.00					
trans-1,2-Dichloroethene	2,000.00	30,000.00			18.00		
1,1-Dichloroethane	18,000.00	15,000.00			13.00		
cis-1,2-Dichloroethene	1,400.00	12,000.00	2200.00	1200.00	1990.00	530.00	270.00
Tetrahydrofuran	1,900.00	220,000.00	1500.00	300.00	150.00	160.00	117.00
Chloroform	1,600.00	7,000.00					
1,1,1-Trichloroethane	4,000.00	1,800.00			24.90	35.20	17.80
Benzene	100.00	4,000.00					
Trichloroethene	100.00	4,000.00	29500	13700	11680	10860	7520
Tetrachloroethene	100.00	1,200.00				17	
Toluene	16,000.00	5,400.00					
Ethylbenzene	1,500.00	360.00					
Total Xylenes	5,600.00	820.00					
Isopropylbenzene	91,000.00	3,200.00					
n-Propylbenzene	1,600.00	NC					
1,2 -Dichlorobenzene	14,000.00	280.00					
1,2,4-Trimethylbenzene	2,100.00	570.00					
1,2,3-Trimethylbenzene	NC	NC					
Naphthalene	35,000.00	730.00					
2-Methylnaphthalene	57,000.00	4,200.00			15.00	12.00	9.20

NOTES:

	Blank cells indicate no detectable concentrations
X	Exceeds DW criteria
X	Exceeds GSI criteria
X	Exceeds both DW and GSI criteria
X	Compound also found in associated method blank, suggesting a laboratory artifact.
NC	Insufficient data to develop criterion/no criterion
GX	Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River

SOIL ANALYTICAL DATA
RACER - Flint West #12990

		Sample ID	SB134-18	SB135-19	SB136-19	SB137-18	SB134-20	SB135-21	SB136-21	SB137-20.5
		Date Collected	12/22/14	12/22/14	12/22/14	12/22/14	12/22/14	12/22/14	12/22/14	12/22/14
ANALYTE (ug/kg)	DW	GSI								
Arsenic	4,600	4,600	380	1,900	1,870	1,660	1,690	2,080	3,350	3,040
Cadmium	6,000	5,400	G							
Copper	5,800,000	120,000	G	4,500	4,000	4,600	4,200	3,900	4,300	4,500
Lead	700,000	7,700,000	G	5,690	2,850	3,060	2,810	3,380	2,890	3,740
Selenium	4,000	400								
Zinc	2,400,000	260,000	G	5,900	17,500	13,600	13,500	19,500	15,300	18,800
2 Butanone (MEK)	260,000	44,000								
Vinyl Chloride	40	260		14						56
1,1-Dichloroethene	140	2,600								
trans-1,2-Dichloroethene	2,000	30,000		10.9		14				
1,1-Dichloroethane	18,000	15,000								
cis-1,2-Dichloroethene	1,400	12,000		1,100	340	670	120	800	450	290
Tetrahydrofuran	1,900	220,000								
Chloroform	1,600	7,000								
1,1,1-Trichloroethane	4,000	1,800			12.5	20.5		8.7		
Benzene	100	4,000								
Trichloroethene	100	4,000		7,890	8,760	4,250	2,040	6,540	9,390	
Tetrachloroethene	100	1,200								
Toluene	16,000	5,400	70							
Ethylbenzene	1,500	360	16							
Total Xylenes	5,600	820	85							
Isopropylbenzene	91,000	3,200								
n-Propylbenzene	1,600	NC	14							
1,2 -Dichlorobenzene	14,000	280								
1,2,4-Trimethylbenzene	2,100	570								
1,2,3-Trimethylbenzene	NC	NC								
Naphthalene	35,000	730	36.6							
2-Methylnaphthalene	57,000	4,200	29							

NOTES:

	Blank cells indicate no detectable concentrations
X	Exceeds residential and non-residential DW criteria
X	Exceeds GSI criteria: calculated based on 257ppm total hardness in the Flint River
X	Exceeds both DW and GSI criteria
X	Compound also found in associated method blank, suggesting a laboratory artifact.
NC	Insufficient data to develop criterion/no criterion
GX	Groundwater to Surface Water Interface Criteria - calculated based on 257ppm total hardness in the Flint River

ATTACHMENT #5: GRAPH OF TCE CONCENTRATION

TCE in MW-109S, MW-111S, MW-113S, MW-114S (downgradient wells)

