February 13, 2017 Reference No. 012636

Mr. Rich Conforti
MDEQ, OWMRP
P.O. Box 30241
Lansing, Michigan
U.S.A. 48909-7741

Dear Mr. Conforti:

Re: November 2016 PFAS Sampling Results Summary
RACER Former Peregrine, Inc., Coldwater Road Facility, Genesee Township, Michigan
MID 000 020 743

On behalf of Revitalizing Auto Communities Environmental Response Trust (RACER), the following presents a summary of the Per and Polyfluoroalkyl Substances (PFAS) sampling complete in November 2016 at the former Peregrine Coldwater Road Facility (Site) located at 1245 E Coldwater Road in Genesee Township, near Flint, Michigan.

Sampling was completed in response to a request from the Michigan Department of Environmental Quality (MDEQ) received on July 13, 2016. One of the uses of PFAS is chrome plating operations which historically took place at the Site. Sampling was completed in accordance with the MDEQ approved sampling plan dated October 7, 2016.

1. Site Background

Former chrome plating operations we performed at the Site in the northwest portion of the Site from approximately 1953 through 1987, as presented on Figure 1. A smaller zinc plating line was also present toward the south portion of the facility. There were 13 chrome plating lines and 2 zinc plating lines. A number of these plating lines had collection sumps associated with them. Spent plating solutions were generated which variously contained chrome, zinc, copper, acid, alkali, cyanide, and potentially PFAS as a demisting agent. Plating solutions were recycled through the plating system, which included a variety of solution regeneration activities that occurred at the filtration and treatment area located in the basement. Spent plating solutions were pumped to the Waste Water Treatment Plant (WWTP) for treatment. The WWTP is located off-Site to the northwest of the Site at the Former Coldwater Road WWTP. The resultant WWTP sludges were stored in associated sludge drying beds. The sludge drying beds were active until June 1987 when plating operations were discontinued, and discharge from the WWTP was re-routed to the sanitary sewer system. As part of the closure activities of the drying beds, a monofill landfill was constructed and closed to the North of the Site at the RACER Former Coldwater Road Landfill (Landfill).

The facility was decommissioned and demolished between November 1999 and January 2001. Since the demolition of the facility, the Site has been leased and used for materials storage and management. Since

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demolition, numerous soil and groundwater sampling activities have been undertaken to evaluate the presence of hazardous substances on-Site. To date no unacceptable exposures have been identified.

2. Sampling Event Summary

In accordance with the October 7, 2016 sampling plan, PFAS sampling was completed on November 29 and 30, 2016. Sampling was complete in coordination with the O'Brien & Gere Engineers, Inc.(OBG); OBG is the consultant overseeing remedial efforts at the Landfill and WWTP, on behalf of RACER. Coordination between the sites was completed in order to fully evaluate the extent of impacts, if any, across the entire former Facility. Sampling was completed as a combined team of GHD and OBD staff in an effort to minimize the variation in sampling processes between the sites.

Four groundwater samples were collected from four existing monitoring wells at the Site (shallow: MW-4-02, MW-18-13, MW-19-13 and deep: MW-16-10). Shallow groundwater samples were collected using standard low flow procedures. Deep groundwater samples were collected using standard volumetric purging procedures. A peristaltic pump (for shallow wells) and a stainless steel inertial pump (for deep wells) were used for purging and sampling. Only new HDPE and silicon tubing was used in the sampling process. The pumps utilized for the PFAS sampling were selected as they did not contain Teflon, LDPE, or Viton components (common sources of PFAS sample interference). The sampling procedures were intended to prevent sampling method contamination of groundwater samples. The following Quality Control Samples were collected and submitted for analysis: two rinse/equipment blanks (one of each sampling method), one field blank, and one duplicate (per site).

MDEQ was on-Site on November 29, 2016 to observe sampling procedures and to collect a split sample of the Landfill Sump D and a rinse blank of the low flow sampling equipment.

All GHD samples were submitted to TestAmerica Laboratories, Inc in West Sacramento, California for Method 537 (modified) analyses; a list of sample parameters analyzed is presented on Figure 1.

Purging records for the four wells located on the Site along with completed PFAS sampling checklists are presented in Attachment A. The results of sampling completed at the Landfill are discussed under separate cover.

3. Screening Values/Criteria

As part of the evaluation of PFAS results, the following screening criteria will be used for comparison:

1. MDEQ Generic Cleanup Criteria Proposed Rule Revisions (September 29, 2016), Residential Drinking Water Criteria for PFOA (89 ng/L) and PFOS (80 ng/L).
2. MDEQ Generic Cleanup Criteria Proposed Rule Revisions (September 29, 2016), Nonresidential Drinking Water Criteria for PFOA (280 ng/L) and PFOS (660 ng/L).

MDEQ Groundwater/Surface water interface criteria were not evaluated for the Site as there are no surface water features with reasonable proximity of the Site. No screening criteria are available for the remaining PFAS parameters analyzed.

4. Results and Discussion

A summary of the sampling results are present in Table 1 and a summary of detections is presented on Figure 1. The data validation report, along with the laboratory analytical report, is presented in Attachment B.

Three shallow (perched) groundwater samples were collected from Site wells:

- At MW-4-02, 3 of the 18 parameters analyzed were detected; however, all detections were below the screening criteria.
- At MW-18-13, 6 of the 18 parameters analyzed were detected; however all detections were below the screening criteria.
- At MW-19-13, 9 of the 18 parameters analyzed were detected; however all detections were below the screening criteria.

Although PFAS are present in the shallow groundwater at the Site, all detections were reported below applicable screening criteria and sample locations were selected to bias sample towards locations were elevated concentrations would have been anticipated.

One deep (drift aquifer) groundwater sample was collected on-Site at MW-16-10; a duplicate sample was also collected at this location. Only 1 of the 18 parameters analyzed was detected and only in one of the two samples. In addition, the result was qualified as estimated as the result was below the laboratory reporting limit.

5. Conclusions and Recommendations

The following can be concluded based on the results of the PFAS sampling:

1. No PFAS were detected on-Site above screening criteria.
2. No impacts to deep groundwater at the downgradient property boundary were observed.
3. Shallow groundwater concentrations at the Site are stable as plating operations ceased in 1987.
4. Sampling methods did not contribute to concentrations of PFAs detected at the Site.
5. Sampling locations were selected to evaluate locations most likely to contribute to off-Site contaminant migration.

Based on the conclusions of the PFAS sampling at the Site, no further evaluation of PFAS at the Site is recommended.

Should you have any questions on the above, please do not hesitate to contact us.

Sincerely,

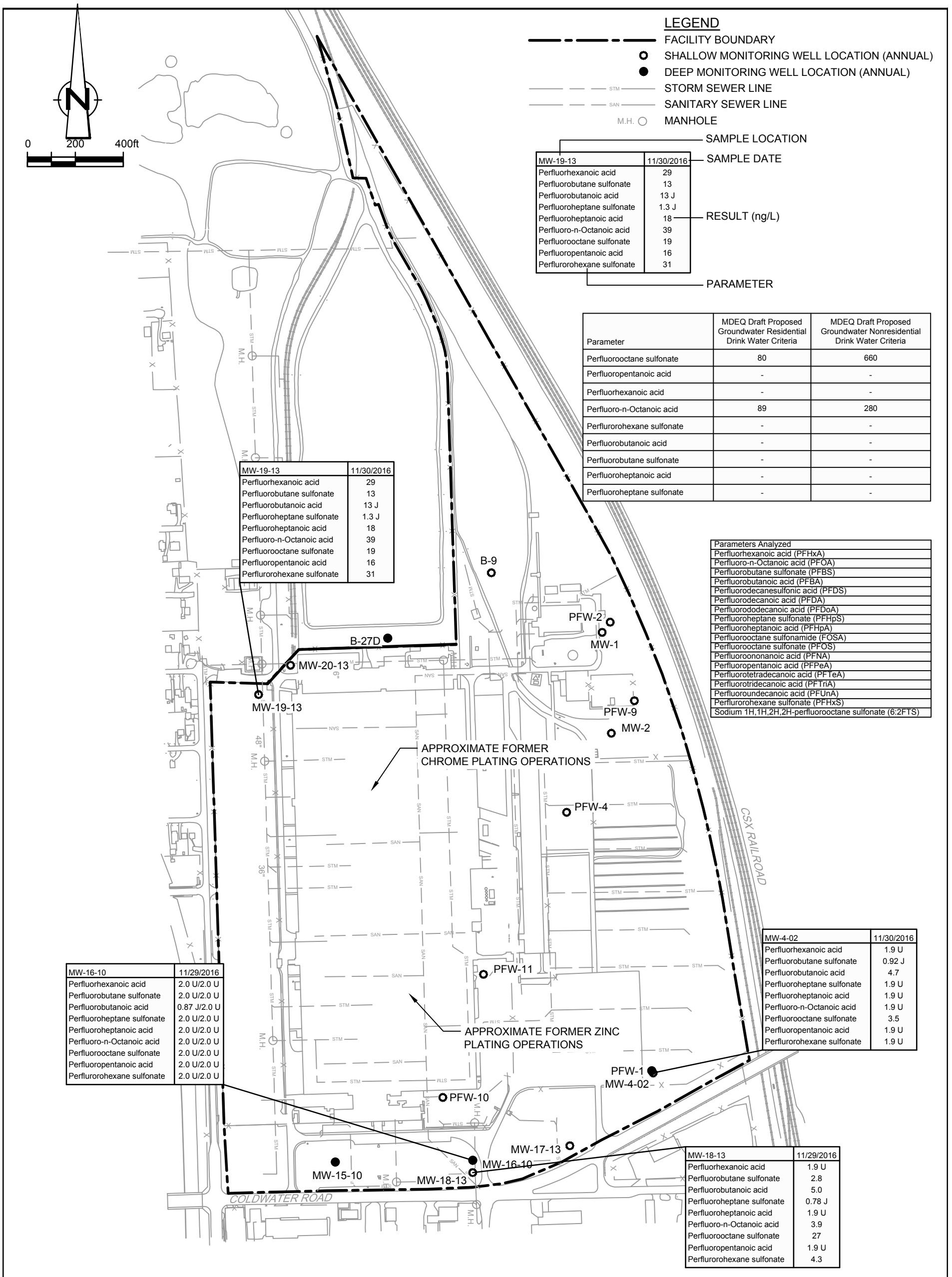
GHD

Michael R. Tomka, P.E.

RC/kf/24

Encl.

cc: Dave Favero/Grant Trigger, RACER
Joe Rogers/ John McCabe, MDEQ



Parameter	MDEQ Draft Proposed Groundwater Residential Drink Water Criteria	MDEQ Draft Proposed Groundwater Nonresidential Drink Water Criteria
Perfluorooctane sulfonate	80	660
Perfluoropentanoic acid	-	-
Perfluorhexanoic acid	-	-
Perfluoro-n-Octanoic acid	89	280
Perflurorohexane sulfonate	-	-
Perfluorobutanoic acid	-	-
Perfluorobutane sulfonate	-	-
Perfluoroheptanoic acid	-	-
Perfluoroheptane sulfonate	-	-

Parameters Analyzed
Perfluorhexanoic acid (PFHxA)
Perfluoro-n-Octanoic acid (PFOA)
Perfluorobutane sulfonate (PFBS)
Perfluorobutanoic acid (PFBA)
Perfluorodecanesulfonic acid (PFDS)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluoroheptane sulfonate (PFHpS)
Perfluoroheptanoic acid (PFHpA)
Perfluorooctane sulfonamide (FOSA)
Perfluorooctane sulfonate (PFOS)
Perfluorononanoic acid (PFNA)
Perfluoropentanoic acid (PFPeA)
Perfluorotetradecanoic acid (PFTeA)
Perfluorotridecanoic acid (PFTriA)
Perfluoroundecanoic acid (PFUnA)
Perflurorohexane sulfonate (PFHxS)
Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2FTS)

MW-16-10	11/29/2016
Perfluorhexanoic acid	2.0 U/2.0 U
Perfluorobutane sulfonate	2.0 U/2.0 U
Perfluorobutanoic acid	0.87 J/2.0 U
Perfluoroheptane sulfonate	2.0 U/2.0 U
Perfluoroheptanoic acid	2.0 U/2.0 U
Perfluoro-n-Octanoic acid	2.0 U/2.0 U
Perfluorooctane sulfonate	2.0 U/2.0 U
Perfluoropentanoic acid	2.0 U/2.0 U
Perflurorohexane sulfonate	2.0 U/2.0 U

MW-4-02	11/30/2016
Perfluorhexanoic acid	1.9 U
Perfluorobutane sulfonate	0.92 J
Perfluorobutanoic acid	4.7
Perfluoroheptane sulfonate	1.9 U
Perfluoroheptanoic acid	1.9 U
Perfluoro-n-Octanoic acid	1.9 U
Perfluorooctane sulfonate	3.5
Perfluoropentanoic acid	1.9 U
Perflurorohexane sulfonate	1.9 U

MW-18-13	11/29/2016
Perfluorhexanoic acid	1.9 U
Perfluorobutane sulfonate	2.8
Perfluorobutanoic acid	5.0
Perfluoroheptane sulfonate	0.78 J
Perfluoroheptanoic acid	1.9 U
Perfluoro-n-Octanoic acid	3.9
Perfluorooctane sulfonate	27
Perfluoropentanoic acid	1.9 U
Perflurorohexane sulfonate	4.3

figure 1

GROUNDWATER MONITORING PFAS DETECTION SUMMARY
FORMER PEREGRINE (US), INC. COLDWATER ROAD FACILITY
Genesee Township, Michigan

NOTE:
THIS DRAWING IS FOR REFERENCE ONLY AND IS NEITHER COMPLETE NOR TO EXACTING SCALE.

Table 1

Analytical Results Summary - PFAS Sampling
Former Peregrine (US), Inc. Coldwater Road Facility
Genesee Township, Michigan

Sample Location:		MDEQ Draft Proposed Groundwater Residential Drink Water Criteria	MDEQ Draft Proposed Groundwater Nonresidential Drink Water Criteria	MW-4-02	MW-16-10	MW-16-10	MW-18-13	MW-19-13
Sample ID:				**GW-12636-113016-SSH-5216**	**GW-12636-112916-SSH-4916**	**GW-12636-112916-SSH-5016**	**GW-12636-112916-SSH-4716**	**GW-12636-113016-SSH-5316**
Sample Date:				**11/30/2016**	**11/29/2016**	**11/29/2016 (Duplicate)**	**11/29/2016**	**11/30/2016**
Parameters	**Units**							
Perfluorhexanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	29
Perfluorobutane sulfonate	ng/L	-	-	0.92 J	2.0 U	2.0 U	2.8	13
Perfluorobutanoic acid	ng/L	-	-	4.7	2.0 U	0.87 J	5.0	13 J
Perfluorodecanesulfonic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U
Perfluorodecanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U
Perfluorododecanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U
Perfluoroheptane sulfonate	ng/L	-	-	1.9 U	2.0 U	2.0 U	0.78 J	1.3 J
Perfluoroheptanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	18
Perfluoro-n-Octanoic acid	ng/L	89	280	1.9 U	2.0 U	2.0 U	3.9	39
Perfluorooctane sulfonamide	ng/L	-	-	1.9 UJ	2.0 UJ	2.0 UJ	1.9 UJ	1.9 UJ
Perfluorooctane sulfonate	ng/L	80	660	3.5	2.0 U	2.0 U	27	19
Perfluorononanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U
Perfluoropentanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	16
Perfluorotetradecanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U
Perfluorotridecanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U
Perfluoroundecanoic acid	ng/L	-	-	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U
Perflurorohexane sulfonate	ng/L	-	-	1.9 U	2.0 U	2.0 U	4.3	31
Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	ng/L	-	-	19 U	20 U	20 U	19 U	19 U
Total PFOA and PFOS	ng/L	-	-	3.5	2.0 U	2.0 U	30.9	58

Footnotes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.

Attachment A

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Former Pumping / Coldwater Date: 11/29/16

Ref. No.: 12636 Personnel: SSH

Monitoring Well Data:

Well No.: MW1813

Vapour PID (ppm): —

Measurement Point: TOC

Constructed Well Depth (m/ft):

Measured Well Depth (m/ft): 11.42

Depth of Sediment (m/ft): —

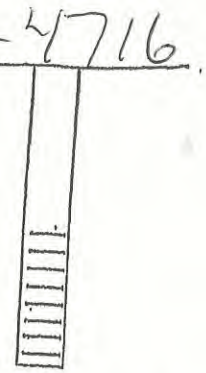
Saturated Screen Length (m/ft):

Depth to Pump Intake (m/ft)[1]: 10

Well Diameter, D (cm/in): 2

Well Screen Volume, V_s (L)[2]:

Initial Depth to Water (m/ft): 4.84



Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level[1] (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged[2]
			Precision Required[3]:	±3 %	µS/cm ±0.005 or 0.02[3]	±10%	±10 %	±0.1 Units	±10 mV		
1345		4.84									
1415		5.20		11.92	3200.2	3.94	0.38	7.03	45.5		
1420		5.22		11.89	3228.1	1.99	0.35	7.03	44.8		
1425		5.22		11.89	3234.1	2.09	0.34	7.03	43.8		
1430		5.22		11.89	3235.2	1.66	0.34	7.03	43.4		
1431	sample										
				DTB	11.42						

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s = \pi \times (r^2) \times L$ in mL, where r (r=D/2) and L are in cm. For Imperial units, $V_s = \pi \times (r^2) \times L \times (2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

PFCs

DISS + Totals

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Former Purgeine/Coldwater Rd   Date: 11/29/16   -4916

Ref. No.: [illegible]   Personnel: S. Hevemeyer

5016 dup

Monitoring Well Data:

Well No.: MW16-10

Vapour PID (ppm):

Measurement Point:

Constructed Well Depth (m/ft):

Measured Well Depth (m/ft):

Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):

Depth to Pump Intake (m/ft)(1): 4-5' from bottom

Well Diameter, D (cm/in): 2

Well Screen Volume, V_s (L)(2):

Initial Depth to Water (m/ft): 67.39

Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level(3) (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged(4)
Precision Required(5):				±3%	±0.005 or 0.01(5)	±10%	±10%	±0.1 Units	±10 mV		
1510		67.39									
1540		74.35		12.40	596.9	1000	0.02	7.65	-120.9		
1545		74.34		12.32	596.7	1000	0.01	7.65	-118.5		
1550		74.65		12.35	597.3	1000	0.01	7.65	-116.6		
1555		74.68		12.35	598.2	1000	0.01	7.65	-114.6		
1600				12.33	597.1		0.02	7.65	-114.3		
1601	sample										
1605	sample										

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s = \pi * (r^2) * L$ in mL, where r (r=D/2) and L are in cm. For Imperial units, $V_s = \pi * (r^2) * L * (2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

pump rate 150 ml/min

PFCs

[redacted]

MONITORING WELL RECORD FOR LOW-FLOW PURGING

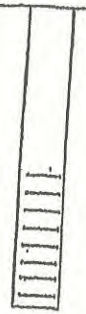
Project Data:

Project Name: Former Pumping/collection
Ref. No.: 12636
Date: 11/30/16
Personnel: S. Hawkins

Monitoring Well Data:

Well No.: MW402
Vapour PID (ppm): —
Measurement Point: TOC
Constructed Well Depth (m/ft):
Measured Well Depth (m/ft): 17.40
Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):
Depth to Pump Intake (m/ft)[1]:
Well Diameter, D (cm/in): 2
Well Screen Volume, V_s (L)[2]:
Initial Depth to Water (m/ft): 10.40



Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level[3] (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged[4]
			Precision Required[5]:	±3 %	±0.005 or 0.02[5]	±20 %	±10 %	±0.1 Units	±20 mV		
0935		10.40									
1005		13.10		14.29	880.5	3.36	4.65	6.99	73.5		
1010		13.27		14.31	899.0	2.11	3.96	6.99	70.2		
1015		13.42		14.36	909.5	1.62	3.77	7.01	68.5		
1020		13.50		14.35	904.8	1.87	3.74	7.01	67.6		
1025		13.59		14.36	906.7	1.59	3.76	7.02	67.1		
1026	Sample										
	DTB	17.38									

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.
(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s = \pi * (r^2) * L$ in mL, where r (r=D/2) and L are in cm. For Imperial units, $V_s = \pi * (r^2) * L * (2.54)^3$, where r and L are in inches
(3) The drawdown from the initial water level should not exceed 0.3 m (0.9 ft). The pumping rate should not exceed 600 mL/min.
(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.
(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

PFCs
DIS & T

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Former Purgatine / Coldwater Rd Date: 11/30/16 - 5316

Ref. No.: 12636 Personnel: S. Holzmeyer

Monitoring Well Data:

Well No.: MW-19-13

Vapour PID (ppm): —

Measurement Point: TOC

Constructed Well Depth (m/ft):

Measured Well Depth (m/ft): 20.18

Depth of Sediment (m/ft): —

Saturated Screen Length (m/ft):

Depth to Pump Intake (m/ft)(1): 19

Well Diameter, D (cm/in): 2

Well Screen Volume, V_s (L)(2):

Initial Depth to Water (m/ft): 13.23

Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level(3) (m/ft)	Temperature °C	Conductivity (mS/cm) uS/cm	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged(4)
Precision Required(5):				±3%	±0.005 or 0.01(5)	±10%	±10%	±0.1 Units	±10 mV		
1050		13.23									
1120		13.42									
1125		13.43		14.16	6731.6	0.83	0.24	6.99	56.1		
1130		13.43		14.13	6752.8	0.64	0.25	6.99	55.7		
1135		13.44		14.17	6758.9	0.68	0.24	6.99	55.5		
				14.16	6758.7	0.66	0.25	6.99	55.4		
1136	Sample										
	DTB	20.18									

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s = \pi (r^2) L$ in mL, where r (r=D/2) and L are in cm. For Imperial units, $V_s = \pi (r^2) L (2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing). No. of Well Screen Volumes Purged = Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

PFCs

Diss + Totals

MS/MSD

PFCs Sampling Checklist

Date: 11/29/16 GHD only

Weather (*temp./precipitation*): 40s, cloudy, windy Site Name: Former Peregrine/Coldwater Rd

Field Clothing and PPE: See below

- [x] No clothing or boots containing Gore-Tex™
- [x] All safety boots made from polyurethane and PVC
- [x] No materials containing Tyvek®
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning
- [x] Field crew has not applied unauthorized sunscreen or insect repellant

Field Equipment:

- [ ] No Teflon® or LDPE containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-It Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene
- [x] Caps are unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] Wet weather gear made of polyurethane and PVC only

Equipment Decontamination:

- [ ] "PFC-free" water on-site for decontamination of sample equipment. No other water sources to be used.
- [ ] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Lead shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the site or removal of worker offsite until in compliance.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

Field Clothing: not sure on all unauthorized materials on site visitors
Field Equipment: LDPE tubing has been used to sample MWs in the past
Equipment Decon: only water onsite at time was regular DI water

Field Lead Name: Steve Hoevemeyer

Field Lead Signature: S. A. Hoevemeyer Time: 0830

PFCs Sampling Checklist

Date: 11/30/16

Weather (*temp./precipitation*): 40s, mix sun/clouds Site Name: Former Peregrine / Coldwater Rd

Field Clothing and PPE:

- [x] No clothing or boots containing Gore-Tex™
- [x] All safety boots made from polyurethane and PVC
- [x] No materials containing Tyvek®
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning
- [x] Field crew has not applied unauthorized sunscreen or insect repellant

Field Equipment:

- [ ] No Teflon® or LDPE containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-It Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene
- [x] Caps are unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] Wet weather gear made of polyurethane and PVC only

Equipment Decontamination:

- [ ] "PFC-free" water on-site for decontamination of sample equipment. No other water sources to be used.
- [ ] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Lead shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the site or removal of worker offsite until in compliance.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

Clothing: washed 4 times prior to initial wearing - 100% cotton
Equipment decon: used all new tubing in all MWs
Food: Other companies using site may have other food products

Field Lead Name: Steve Hoffmeyer

Field Lead Signature: [signature] Time: 0730

Attachment B

Memorandum

January 26, 2017

To:	Mike Tomka	Ref. No.:	012636-T09-03Y16
From:	Nancy Bergstrom/tl/174/Det	Tel:	734-453-5123

Subject: **Analytical Results and Full Validation**
PFC Groundwater Sampling
Racer-Peregrine Site
Genesee County, Michigan
November 2016

1. Introduction

This document details a validation of analytical results for groundwater samples collected in support of the PFC Groundwater Sampling at the Racer-Peregrine Site during November 2016. Samples were submitted to TestAmerica Laboratories, Inc., located in West Sacramento, California. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, raw data, chain of custody forms, calibration data, blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spike (MS) samples and field quality assurance/quality control (QA/QC) samples. The assessment of analytical and in-house data included checks for: data consistency (by observing comparability of duplicate analyses), adherence to accuracy and precision criteria, and transmittal errors.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

i) "Quality Assurance Project Plan (QAPP) for the RCRA Facility Investigation (RFI) at Former Peregrine (US), Inc. Coldwater Road Facility" May 15, 2000

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", United States Environmental Protection Agency (USEPA) 540/R-99-008, October 1999

Item ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in Table 3. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

GHD
14496 Sheldon Rd., Ste 200 Plymouth Michigan 48170 USA
T 734 453 5123 F 734 453 3792 W www.ghd.com

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (4 +/- 2°C).

3. Initial Calibration - Organic Analyses

3.1 LC/MS

To quantify perfluorinated hydrocarbons (PFC) of interest in samples, calibration of the LC/MS over a specific concentration range must be performed. Initially, a calibration curve consisting of a minimum of five concentration levels containing all compounds of interest is analyzed to characterize instrument response for each analyte over a specific concentration range. Linearity of the calibration curve and instrument sensitivity are evaluated against the following criteria:

i) For average response factor (RFa), the relative standard deviation (RSD) for all compounds quantitated by isotope dilution must be <35% for the curve to be valid

ii) For average response factor (RFa), the relative standard deviation (RSD) for all compounds quantitated by internal standard must be <50% for the curve to be valid

The initial calibration data for PFCs were reviewed. All compounds met the above criteria for sensitivity and linearity.

4. Continuing Calibration - Organic Analyses

4.1 LC/MS

To ensure that instrument calibration for PFC analyses is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed at the beginning of a run, the end of a run, and after every ten samples.

The following criteria were employed to evaluate continuing calibration data:

i) The recovery for the CCV standards must be equal to or within 60-140% for all compounds quantitated by isotope dilution and equal to or within 50-150% for all compounds quantitated by internal standard

ii) The recovery of the isotope dilution analytes (IDA) must be equal to or within 50-150%

Calibration standards were analyzed at the required frequency, and the results met the above criteria for instrument sensitivity and stability.

5. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

5.1 Organic Analyses

Table 4 presents the qualified sample results due to analyte concentrations in the method blanks. All remaining method blanks were non-detect or method blank detections were associated with investigative samples that reported non-detect concentrations.

6. Isotope Dilution Analytes (IDA)

IDA data were evaluated for all PFC sample analyses.

6.1 Organics Analyses

IDAs are isotopically labeled analogs of the analytes of interest added to the investigative and QC samples at the time of extraction. All results are then calculated as a ratio of the IDA responses.

The IDA recovery results for each sample were evaluated against the following criteria:

i) IDA recoveries must be within 25-150%

The recovery of IDA 13C8 FOSA was below the acceptance limits in all investigative and field QA/QC samples. In addition, the IDA 13C4 PFBA was recovered below the acceptance criteria in one investigative sample. Table 5 presents the qualified sample data due to outlying IDA recoveries. All remaining PFC IDA recoveries met the above criteria or outlying recoveries did not result in qualification.

7. Laboratory Control Sample Analyses

LCS and/or laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCS/LCSD were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

7.1 Organic Analyses

The LCS/LCSD contained all compounds of interest. The LCS recovery of one PFC exceeded the percent recovery criteria for one LCS. This analyte was not detected in the associated investigative samples and qualification was not required. All remaining LCS recoveries and RPDs were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

8. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision.

MS/MSD analyses were performed as specified in Table 1.

8.1 Organic Analyses

The MS/MSD samples were spiked with all compounds of interest. The MS/MSD recoveries of one PFC exceeded the percent recovery criteria for one MS/MSD sample. This analyte was not detected in the associated investigative sample and qualification was not required. All remaining percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

9. Field QA/QC Samples

The field QA/QC consisted of one field blank sample, one rinse blank sample, and one equipment blank sample.

9.1 Field, Rinse and Equipment Blank Sample Analysis

To assess field decontamination procedures, ambient conditions at the site, and cleanliness of sample containers, one field blank, one rinse blank and one equipment blank were submitted for analysis, as identified in Table 1.Perfluorotetradecanoic acid was detected in all blank samples, but all perfluorotetradecanoic acid detections in investigative samples were previously qualified due to method blank contamination. Further qualification of the investigative sample data was not required. All remaining results were non-detect for the analytes of interest.

9.2 Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, one field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criteria is one times the RL value for water samples.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

10. Analyte Reporting

The laboratory reported detected results down to the laboratory's method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the MDL were qualified as estimated (J) in Table 2 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the RL in Table 2.

11. Target Compound Identification

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra (if applicable) were evaluated according to the identification criteria established by the methods. The organic compounds reported adhered to the specified identification criteria.

12. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the specific qualifications noted herein.

Table 1

Sample Collection and Analysis Summary
PFC Groundwater Sampling
Racer - Peregrine Site
Genesee County, Michigan
November 2016

					Analysis/Parameters	
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**PFC**	**Comments**
TA-WS SDG No.: 240-66232-1						
GW-12636-112916-SSH-4716	MW-18-13	Water	11/29/2016	14:31	X	
RE-12636-112916-SSH-4816	-	Water	11/29/2016	15:00	X	RB
GW-12636-112916-SSH-4916	MW-16-10	Water	11/29/2016	16:01	X	
GW-12636-112916-SSH-5016	MW-16-10	Water	11/29/2016	16:05	X	FD (MW-16-10)
W-12636-113016-SSH-5116	-	Water	11/30/2016	09:00	X	FB
GW-12636-113016-SSH-5216	MW-4-02	Water	11/30/2016	10:26	X	MS/MSD
GW-12636-113016-SSH-5316	MW-19-13	Water	11/30/2016	11:36	X	
EQUIPMENT BLANK -1	-	Water	11/29/2016	11:30	X	EB

Notes:

RB	- Rinse Blank
FD	- Field Duplicate sample of sample in parenthesis
FB	- Field Blank
EB	- Equipment Blank
MS/MSD	- Matrix Spike/Matrix Spike Duplicate
PFC	- Perfluorinated Hydrocarbons
TA-WS	- TestAmerica Laboratories, Inc. - West Sacramento, California
SDG	- Sample Delivery Group

Table 2

Validated Analytical Summary Results
PFC Groundwater Sampling
RACER-Peregrine Site
Genesee County, Michigan
November 2016

Location ID:		MW-4-02	MW-16-10	MW-16-10	MW-18-13
Sample Name:		GW-12636-113016-SSH-5216	GW-12636-112916-SSH-4916	GW-12636-112916-SSH-5016	GW-12636-112916-SSH-4716
Sample Date:		11/30/2016	11/29/2016	11/29/2016	11/29/2016
Depth:		--	--	--	--
				Duplicate	
Parameters	**Unit**				
Semivolatile Organic Compounds					
Perfluorhexanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluoro-n-Octanoic acid	ng/L	1.9 U	2.0 U	2.0 U	3.9
Perfluorobutane sulfonate	ng/L	0.92 J	2.0 U	2.0 U	2.8
Perfluorobutanoic acid	ng/L	4.7	2.0 U	0.87 J	5.0
Perfluorodecanesulfonic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluorodecanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluorododecanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluoroheptane sulfonate	ng/L	1.9 U	2.0 U	2.0 U	0.78 J
Perfluoroheptanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluorooctane sulfonamide	ng/L	1.9 UJ	2.0 UJ	2.0 UJ	1.9 UJ
Perfluorooctane sulfonate	ng/L	3.5	2.0 U	2.0 U	27
Perfluorononanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluoropentanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluorotetradecanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluorotridecanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perfluoroundecanoic acid	ng/L	1.9 U	2.0 U	2.0 U	1.9 U
Perflurorohexane sulfonate	ng/L	1.9 U	2.0 U	2.0 U	4.3
Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	ng/L	19 U	20 U	20 U	19 U

Table 2

Validated Analytical Summary Results
PFC Groundwater Sampling
RACER-Peregrine Site
Genesee County, Michigan
November 2016

Location ID:	**MW-19-13**
Sample Name:	**GW-12636-113016-SSH-5316**
Sample Date:	**11/30/2016**
Depth:	**--**

Parameters	**Unit**	
Semivolatile Organic Compounds		
Perfluorhexanoic acid	ng/L	29
Perfluoro-n-Octanoic acid	ng/L	39
Perfluorobutane sulfonate	ng/L	13
Perfluorobutanoic acid	ng/L	13 J
Perfluorodecanesulfonic acid	ng/L	1.9 U
Perfluorodecanoic acid	ng/L	1.9 U
Perfluorododecanoic acid	ng/L	1.9 U
Perfluoroheptane sulfonate	ng/L	1.3 J
Perfluoroheptanoic acid	ng/L	18
Perfluorooctane sulfonamide	ng/L	1.9 UJ
Perfluorooctane sulfonate	ng/L	19
Perfluorononanoic acid	ng/L	1.9 U
Perfluoropentanoic acid	ng/L	16
Perfluorotetradecanoic acid	ng/L	1.9 U
Perfluorotridecanoic acid	ng/L	1.9 U
Perfluoroundecanoic acid	ng/L	1.9 U
Perflurorohexane sulfonate	ng/L	31
Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	ng/L	19 U

Notes:

U - Not detected at the associated reporting limit
J - Estimated concentration
UJ - Not detected; associated reporting limit is estimated

Table 3

Analytical Methods
PFC Groundwater Sampling
Racer - Peregrine Site
Genesee County, Michigan
November 2016

Parameter	Method	Matrix	Holding Time	
			Collection to Extraction (Days)	Collection or Extraction to Analysis (Days)
PFC	EPA 537 (Modified)	Water	7	40

Notes:

PFC - Perfluorinated Hydrocarbons

Method References:
EPA-MCAWW - "Methods for Chemical Analysis of Water and Waste," EPA-600/4-79-020, revised March 1983, with subsequent revisions

Table 4

Qualified Sample Results Due to Analyte Concentrations in the Method Blanks
PFC Groundwater Sampling
Racer - Peregrine Site
Genesee County, Michigan
November 2016

Parameter	Analyte	Analysis Date (mm/dd/yyyy)	Blank Result	Sample ID	Original Result	Qualified Result	Units
PFC	Perfluorotetradecanoic acid	12/22/2016	0.560 J	GW-12636-113016-SSH-5216	0.65 JB	1.9 U	ng/L
PFC	Perfluorotetradecanoic acid	12/22/2016	0.610 J	GW-12636-112916-SSH-4716	0.60 JB	1.9 U	ng/L
				RE-12636-112916-SSH-4816	0.31 JB	1.8 U	ng/L
				GW-12636-112916-SSH-4916	0.42 JB	2.0 U	ng/L
				GW-12636-112916-SSH-5016	0.50 JB	2.0 U	ng/L
				GW-12636-113016-SSH-5316	0.54 JB	1.9 U	ng/L
				EQUIPMENT BLANK -1	0.60 JB	1.9 U	ng/L
PFC	Perfluorotetradecanoic acid	12/22/2016	0.541 J	W-12636-113016-SSH-5116	0.87 JB	1.9 U	ng/L

Notes:

PFC - Perfluorinated Hydrocarbons
U - Not detected at the associated reporting limit
J - Estimated concentration
B - Laboratory qualifier - result detected in associated method blank

Table 5

Qualified Sample Data Due to Outlying Isotope Dilution Analyte Recoveries
PFC Groundwater Sampling
Racer - Peregrine Site
Genesee County, Michigan
November 2016

Parameter	Sample ID	IDA	IDA % Recovery	Control Limits % Recovery	Analyte	Qualified Result	Units
PFC	GW-12636-112916-SSH-4716	13C8 FOSA	7	25-150	Perfluorooctane Sulfonamide	1.9 UJ	ng/L
PFC	RE-12636-112916-SSH-4816	13C8 FOSA	4	25-150	Perfluorooctane Sulfonamide	1.8 UJ	ng/L
PFC	GW-12636-112916-SSH-4916	13C8 FOSA	6	25-150	Perfluorooctane Sulfonamide	2.0 UJ	ng/L
PFC	GW-12636-112916-SSH-5016	13C8 FOSA	11	25-150	Perfluorooctane Sulfonamide	2.0 UJ	ng/L
PFC	W-12636-113016-SSH-5116	13C8 FOSA	8	25-150	Perfluorooctane Sulfonamide	1.9 UJ	ng/L
PFC	GW-12636-113016-SSH-5216	13C8 FOSA	4	25-150	Perfluorooctane Sulfonamide	1.9 UJ	ng/L
PFC	GW-12636-113016-SSH-5316	13C8 FOSA	5	25-150	Perfluorooctane Sulfonamide	1.9 UJ	ng/L
PFC	EQUIPMENT BLANK -1	13C8 FOSA	3	25-150	Perfluorooctane Sulfonamide	1.9 UJ	ng/L
PFC	GW-12636-113016-SSH-5316	13C4 PFBA	14	25-150	Perfluorobutanoic Acid	13 J	ng/L

Notes:

J - Estimated concentration
UJ - Not detected; associated reporting limit is estimated
PFC - Perfluorinated Hydrocarbons
IDA - Isotope Dilution Analyte

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-24062-1
Client Project/Site: PFCs

For:
GHD Services Inc.
14496 Sheldon Road, Suite 200
Plymouth, Michigan 48170

Attn: Rawa Fleisher

Authorized for release by:
12/29/2016 3:08:54 PM

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

Table of Contents

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
*	LCS or LCSD is outside acceptance limits.
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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 ID: 320-24062-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt
The samples were received on 12/1/2016 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.9º C.

LCMS
Method(s) 537 (modified): The following samples were diluted due to the nature of the sample matrix: (320-23933-B-1-A), (320-23933-B-1-B MS) and (320-23933-B-1-C MSD). Elevated reporting limits (RLs) are provided.

Method(s) 537 (modified): Due to the high concentration of Perfluorobutanoic acid (PFBA), Perfluoroheptanoic acid (PFHpA), Perfluorohexanoic acid (PFHxA) and Perfluorooctanesulfonic acid (PFOS), 6:2FTS, Perfluorohexanesulfonic acid (PFHxS) and Perfluoropentanoic acid (PFPeA), the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 320-140894 and analytical batch 320-143551 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

Method(s) 537 (modified): Preparation batch 320-140698 was inadvertently extracted without M2-6:2FTS which is required to be added separately. As a result, 6:2FTS can not be quantitated. 320-24062-6 was re-extracted with all IDAs included; however, the Matrix Spike (MS) / Matrix Spike Duplicate (MSD) could not be re-extracted due to limited sample. GW-12636-113016-SSH-5216 (320-24062-6), GW-12636-113016-SSH-5216 (320-24062-6[MS]), GW-12636-113016-SSH-5216 (320-24062-6[MSD]), (LCS 320-140698/2-A) and (MB 320-140698/1-A)

Method(s) 537 (modified): The laboratory control sample (LCS), matrix spike (MS) and matrix spike duplicate (MSD) for preparation batch 320-140698 and analytical batch 320-143551 recovered outside control limits for the following analytes: Perfluorotetradecanoic acid (PFTeA). These analytes were biased high in the LCS, MS, MSD and were below the reporting limit (RL) in the associated samples; therefore, the data have been reported.

Method(s) 537 (modified): The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: GW-12636-112916-SSH-4716 (320-24062-1), RE-12636-112916-SSH-4816 (320-24062-2), GW-12636-112916-SSH-4916 (320-24062-3), GW-12636-112916-SSH-5016 (320-24062-4), W-12636-113016-SSH-5116 (320-24062-5), GW-12636-113016-SSH-5216 (320-24062-6), GW-12636-113016-SSH-5216 (320-24062-6[MS]), GW-12636-113016-SSH-5216 (320-24062-6[MSD]), GW-12636-113016-SSH-5316 (320-24062-7), EQUIPMENT BLANK -1 (320-24062-8), (LCS 320-140894/2-A), (LCSD 320-141114/3-A), (MB 320-140894/1-A), (320-23933-B-1-A), (320-23933-B-1-B MS) and (320-23933-B-1-C MSD). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s). All detection limits are below the lower calibration.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method(s) 3535: Due to the excessive amount of sediment in sample containers the aqueous portion of these samples was decanted to new containers prior to spiking and extraction. GW-12636-112916-SSH-4916 (320-24062-3) and GW-12636-112916-SSH-5016 (320-24062-4)

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-141114.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with this sample. As there were no additional bottles for the MS/MSD, the original batch contains the MS/MSD but were not fortified with the add on spikes.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Client Sample ID: GW-12636-112916-SSH-4716 — Lab Sample ID: 320-24062-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	5.0		1.9	0.43	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	3.9		1.9	0.71	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.60	J B	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.8		1.9	0.87	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.3		1.9	0.82	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic Acid (PFHpS)	0.78	J	1.9	0.67	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	27		1.9	1.2	ng/L	1		537 (modified)	Total/NA

Client Sample ID: RE-12636-112916-SSH-4816 — Lab Sample ID: 320-24062-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.31	J B	1.8	0.18	ng/L	1		537 (modified)	Total/NA

Client Sample ID: GW-12636-112916-SSH-4916 — Lab Sample ID: 320-24062-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.42	J B	2.0	0.20	ng/L	1		537 (modified)	Total/NA

Client Sample ID: GW-12636-112916-SSH-5016 — Lab Sample ID: 320-24062-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.87	J	2.0	0.45	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.50	J B	2.0	0.20	ng/L	1		537 (modified)	Total/NA

Client Sample ID: W-12636-113016-SSH-5116 — Lab Sample ID: 320-24062-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.87	J B	1.9	0.19	ng/L	1		537 (modified)	Total/NA

Client Sample ID: GW-12636-113016-SSH-5216 — Lab Sample ID: 320-24062-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	4.7		1.9	0.44	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.65	J F1 B *	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.92	J	1.9	0.87	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.5		1.9	1.2	ng/L	1		537 (modified)	Total/NA

Client Sample ID: GW-12636-113016-SSH-5316 — Lab Sample ID: 320-24062-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	13		1.9	0.44	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	16		1.9	0.95	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	29		1.9	0.76	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	18		1.9	0.77	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	39		1.9	0.72	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.54	J B	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	13		1.9	0.88	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	31		1.9	0.84	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic Acid (PFHpS)	1.3	J	1.9	0.69	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Client Sample ID: GW-12636-113016-SSH-5316 (Continued) — Lab Sample ID: 320-24062-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	19		1.9	1.2	ng/L	1		537 (modified)	Total/NA

Client Sample ID: EQUIPMENT BLANK -1 — Lab Sample ID: 320-24062-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.60	J B	1.9	0.19	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GW-12636-112916-SSH-4716

Lab Sample ID: 320-24062-1

Date Collected: 11/29/16 14:31

Matrix: Water

Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**5.0**		1.9	0.43	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluoropentanoic acid (PFPeA)	ND		1.9	0.93	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.74	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.76	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorooctanoic acid (PFOA)	**3.9**		1.9	0.71	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.62	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.42	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	0.71	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.55	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.9	0.52	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorotetradecanoic acid (PFTeA)	**0.60**	**J B**	1.9	0.19	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorobutanesulfonic acid (PFBS)	**2.8**		1.9	0.87	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorohexanesulfonic acid (PFHxS)	**4.3**		1.9	0.82	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluoroheptanesulfonic Acid (PFHpS)	**0.78**	**J**	1.9	0.67	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorooctanesulfonic acid (PFOS)	**27**		1.9	1.2	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	1.1	ng/L		12/06/16 17:40	12/22/16 11:38	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.9	0.60	ng/L		12/06/16 17:40	12/22/16 11:38	1
6:2FTS	ND		19	3.6	ng/L		12/06/16 17:40	12/22/16 11:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*7*	*	*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C4 PFBA	*29*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C2 PFHxA	*96*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C4 PFOA	*103*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C5 PFNA	*97*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C2 PFDA	*93*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C2 PFUnA	*99*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C2 PFDoA	*102*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
18O2 PFHxS	*119*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C4 PFOS	*133*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C4-PFHpA	*107*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
13C5 PFPeA	*77*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*
M2-6:2FTS	*128*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:38*	*1*

Client Sample ID: RE-12636-112916-SSH-4816

Lab Sample ID: 320-24062-2

Date Collected: 11/29/16 15:00

Matrix: Water

Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.8	0.41	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluoropentanoic acid (PFPeA)	ND		1.8	0.89	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.71	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.72	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.67	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.59	ng/L		12/06/16 17:40	12/22/16 11:46	1

Client Sample ID: RE-12636-112916-SSH-4816

Lab Sample ID: 320-24062-2

Date Collected: 11/29/16 15:00

Matrix: Water

Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid (PFDA)	ND		1.8	0.40	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.67	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.53	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.8	0.50	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorotetradecanoic acid (PFTeA)	**0.31**	**J B**	1.8	0.18	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.83	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.78	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.64	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	1.1	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	1.1	ng/L		12/06/16 17:40	12/22/16 11:46	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.8	0.57	ng/L		12/06/16 17:40	12/22/16 11:46	1
6:2FTS	ND		18	3.4	ng/L		12/06/16 17:40	12/22/16 11:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*	*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C4 PFBA	*56*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C2 PFHxA	*49*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C4 PFOA	*56*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C5 PFNA	*59*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C2 PFDA	*75*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C2 PFUnA	*97*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C2 PFDoA	*109*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
18O2 PFHxS	*133*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C4 PFOS	*141*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C4-PFHpA	*50*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
13C5 PFPeA	*59*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*
M2-6:2FTS	*142*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:46*	*1*

Client Sample ID: GW-12636-112916-SSH-4916

Lab Sample ID: 320-24062-3

Date Collected: 11/29/16 16:01

Matrix: Water

Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		2.0	0.45	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.98	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.78	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.79	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.74	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.44	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	0.74	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorotridecanoic Acid (PFTriA)	ND		2.0	0.55	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorotetradecanoic acid (PFTeA)	**0.42**	**J B**	2.0	0.20	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.91	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.86	ng/L		12/06/16 17:40	12/22/16 11:53	1

Client Sample ID: GW-12636-112916-SSH-4916

Lab Sample ID: 320-24062-3
Date Collected: 11/29/16 16:01
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.71	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	1.2	ng/L		12/06/16 17:40	12/22/16 11:53	1
Perfluorooctane Sulfonamide (FOSA)	ND		2.0	0.63	ng/L		12/06/16 17:40	12/22/16 11:53	1
6:2FTS	ND		20	3.8	ng/L		12/06/16 17:40	12/22/16 11:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*6*	*	*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C4 PFBA	*52*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C2 PFHxA	*120*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C4 PFOA	*118*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C5 PFNA	*123*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C2 PFDA	*131*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C2 PFUnA	*132*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C2 PFDoA	*127*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
18O2 PFHxS	*132*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C4 PFOS	*139*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C4-PFHpA	*124*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
13C5 PFPeA	*110*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*
M2-6:2FTS	*130*		*25 - 150*	*12/06/16 17:40*	*12/22/16 11:53*	*1*

Client Sample ID: GW-12636-112916-SSH-5016

Lab Sample ID: 320-24062-4
Date Collected: 11/29/16 16:05
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.87**	**J**	2.0	0.45	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.97	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.77	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.79	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.73	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.64	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.43	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	0.73	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.57	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorotridecanoic Acid (PFTriA)	ND		2.0	0.54	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorotetradecanoic acid (PFTeA)	**0.50**	**J B**	2.0	0.20	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.90	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.70	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	1.2	ng/L		12/06/16 17:40	12/22/16 12:01	1
Perfluorooctane Sulfonamide (FOSA)	ND		2.0	0.63	ng/L		12/06/16 17:40	12/22/16 12:01	1
6:2FTS	ND		20	3.7	ng/L		12/06/16 17:40	12/22/16 12:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*11*	*	*25 - 150*	*12/06/16 17:40*	*12/22/16 12:01*	*1*
13C4 PFBA	*52*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:01*	*1*

Client Sample ID: GW-12636-112916-SSH-5016 — **Lab Sample ID: 320-24062-4**
Date Collected: 11/29/16 16:05 — **Matrix: Water**
Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	120		25 - 150	12/06/16 17:40	12/22/16 12:01	1
13C4 PFOA	119		25 - 150	12/06/16 17:40	12/22/16 12:01	1
13C5 PFNA	121		25 - 150	12/06/16 17:40	12/22/16 12:01	1
13C2 PFDA	128		25 - 150	12/06/16 17:40	12/22/16 12:01	1
13C2 PFUnA	126		25 - 150	12/06/16 17:40	12/22/16 12:01	1
13C2 PFDoA	116		25 - 150	12/06/16 17:40	12/22/16 12:01	1
18O2 PFHxS	125		25 - 150	12/06/16 17:40	12/22/16 12:01	1
13C4 PFOS	130		25 - 150	12/06/16 17:40	12/22/16 12:01	1
13C4-PFHpA	122		25 - 150	12/06/16 17:40	12/22/16 12:01	1
13C5 PFPeA	110		25 - 150	12/06/16 17:40	12/22/16 12:01	1
M2-6:2FTS	131		25 - 150	12/06/16 17:40	12/22/16 12:01	1

Client Sample ID: W-12636-113016-SSH-5116 — **Lab Sample ID: 320-24062-5**
Date Collected: 11/30/16 09:00 — **Matrix: Water**
Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.9	0.43	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluoropentanoic acid (PFPeA)	ND		1.9	0.93	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.74	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.76	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.71	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.62	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.42	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	0.71	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.55	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.9	0.52	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorotetradecanoic acid (PFTeA)	**0.87**	**J B**	1.9	0.19	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.87	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.82	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.9	0.67	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	1.2	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	1.1	ng/L		12/07/16 17:31	12/22/16 13:23	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.9	0.60	ng/L		12/07/16 17:31	12/22/16 13:23	1
6:2FTS	ND		19	3.6	ng/L		12/07/16 17:31	12/22/16 13:23	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	8	*	25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C4 PFBA	26		25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C2 PFHxA	25		25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C4 PFOA	34		25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C5 PFNA	40		25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C2 PFDA	50		25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C2 PFUnA	62		25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C2 PFDoA	74		25 - 150	12/07/16 17:31	12/22/16 13:23	1
18O2 PFHxS	115		25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C4 PFOS	118		25 - 150	12/07/16 17:31	12/22/16 13:23	1
13C4-PFHpA	30		25 - 150	12/07/16 17:31	12/22/16 13:23	1

Client Sample ID: W-12636-113016-SSH-5116

Lab Sample ID: 320-24062-5
Date Collected: 11/30/16 09:00
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	27		25 - 150	12/07/16 17:31	12/22/16 13:23	1
M2-6:2FTS	106		25 - 150	12/07/16 17:31	12/22/16 13:23	1

Client Sample ID: GW-12636-113016-SSH-5216

Lab Sample ID: 320-24062-6
Date Collected: 11/30/16 10:26
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**4.7**		1.9	0.44	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluoropentanoic acid (PFPeA)	ND		1.9	0.94	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.75	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.76	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.71	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.62	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.42	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	0.71	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.56	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.9	0.53	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorotetradecanoic acid (PFTeA)	**0.65**	**J F1 B ***	1.9	0.19	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorobutanesulfonic acid (PFBS)	**0.92**	**J**	1.9	0.87	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.83	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.9	0.68	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorooctanesulfonic acid (PFOS)	**3.5**		1.9	1.2	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	1.2	ng/L		12/05/16 19:37	12/22/16 10:08	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.9	0.61	ng/L		12/05/16 19:37	12/22/16 10:08	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	4	*	25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C4 PFBA	27		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C2 PFHxA	88		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C4 PFOA	104		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C5 PFNA	111		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C2 PFDA	111		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C2 PFUnA	125		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C2 PFDoA	115		25 - 150	12/05/16 19:37	12/22/16 10:08	1
18O2 PFHxS	115		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C4 PFOS	130		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C4-PFHpA	103		25 - 150	12/05/16 19:37	12/22/16 10:08	1
13C5 PFPeA	71		25 - 150	12/05/16 19:37	12/22/16 10:08	1

Method: 537 (modified) - Perfluorinated Hydrocarbons - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2FTS	ND		19	3.5	ng/L		12/07/16 17:31	12/22/16 13:31	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2FTS	153	*	25 - 150	12/07/16 17:31	12/22/16 13:31	1

Client Sample ID: GW-12636-113016-SSH-5316

Lab Sample ID: 320-24062-7
Date Collected: 11/30/16 11:36
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**13**		1.9	0.44	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluoropentanoic acid (PFPeA)	**16**		1.9	0.95	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorohexanoic acid (PFHxA)	**29**		1.9	0.76	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluoroheptanoic acid (PFHpA)	**18**		1.9	0.77	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorooctanoic acid (PFOA)	**39**		1.9	0.72	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.63	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.42	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	0.72	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.56	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.9	0.53	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorotetradecanoic acid (PFTeA)	**0.54**	**J B**	1.9	0.19	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorobutanesulfonic acid (PFBS)	**13**		1.9	0.88	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorohexanesulfonic acid (PFHxS)	**31**		1.9	0.84	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluoroheptanesulfonic Acid (PFHpS)	**1.3**	**J**	1.9	0.69	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorooctanesulfonic acid (PFOS)	**19**		1.9	1.2	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	1.2	ng/L		12/06/16 17:40	12/22/16 12:08	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.9	0.61	ng/L		12/06/16 17:40	12/22/16 12:08	1
6:2FTS	ND		19	3.7	ng/L		12/06/16 17:40	12/22/16 12:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*5*	*	*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C4 PFBA	*14*	*	*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C2 PFHxA	*76*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C4 PFOA	*97*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C5 PFNA	*110*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C2 PFDA	*118*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C2 PFUnA	*126*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C2 PFDoA	*121*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
18O2 PFHxS	*105*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C4 PFOS	*128*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C4-PFHpA	*90*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
13C5 PFPeA	*44*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*
M2-6:2FTS	*132*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:08*	*1*

Client Sample ID: EQUIPMENT BLANK -1

Lab Sample ID: 320-24062-8
Date Collected: 11/29/16 11:30
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.9	0.44	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluoropentanoic acid (PFPeA)	ND		1.9	0.95	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.75	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.77	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.72	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.63	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.42	ng/L		12/06/16 17:40	12/22/16 12:46	1

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Client Sample ID: EQUIPMENT BLANK -1
Date Collected: 11/29/16 11:30
Date Received: 12/01/16 09:50

Lab Sample ID: 320-24062-8
Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	ND		1.9	0.72	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.56	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorotridecanoic Acid (PFTriA)	ND		1.9	0.53	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorotetradecanoic acid (PFTeA)	**0.60**	**J B**	1.9	0.19	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.88	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.83	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.9	0.68	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	1.2	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	1.2	ng/L		12/06/16 17:40	12/22/16 12:46	1
Perfluorooctane Sulfonamide (FOSA)	ND		1.9	0.61	ng/L		12/06/16 17:40	12/22/16 12:46	1
6:2FTS	ND		19	3.7	ng/L		12/06/16 17:40	12/22/16 12:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*3*	*	*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C4 PFBA	*66*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C2 PFHxA	*114*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C4 PFOA	*114*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C5 PFNA	*131*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C2 PFDA	*140*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C2 PFUnA	*140*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C2 PFDoA	*124*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
18O2 PFHxS	*126*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C4 PFOS	*129*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C4-PFHpA	*124*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
13C5 PFPeA	*114*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*
M2-6:2FTS	*103*		*25 - 150*	*12/06/16 17:40*	*12/22/16 12:46*	*1*

Isotope Dilution Summary

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Method: 537 (modified) - Perfluorinated Hydrocarbons

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C8 FOSA (25-150)	3C4 PFBA (25-150)	3C2 PFHxA (25-150)	3C4 PFOA (25-150)	3C5 PFNA (25-150)	3C2 PFDA (25-150)	3C2 PFUnA (25-150)	3C2 PFDoA (25-150)
320-24062-1	GW-12636-112916-SSH-4716	7 *	29	96	103	97	93	99	102
320-24062-2	RE-12636-112916-SSH-4816	4 *	56	49	56	59	75	97	109
320-24062-3	GW-12636-112916-SSH-4916	6 *	52	120	118	123	131	132	127
320-24062-4	GW-12636-112916-SSH-5016	11 *	52	120	119	121	128	126	116
320-24062-5	W-12636-113016-SSH-5116	8 *	26	25	34	40	50	62	74
320-24062-6 - RE	GW-12636-113016-SSH-5216								
320-24062-6	GW-12636-113016-SSH-5216	4 *	27	88	104	111	111	125	115
320-24062-6 MS	GW-12636-113016-SSH-5216	3 *	28	95	104	105	108	110	114
320-24062-6 MSD	GW-12636-113016-SSH-5216	3 *	26	86	96	100	101	99	104
320-24062-7	GW-12636-113016-SSH-5316	5 *	14 *	76	97	110	118	126	121
320-24062-8	EQUIPMENT BLANK -1	3 *	66	114	114	131	140	140	124
LCS 320-140698/2-A	Lab Control Sample	62	126	118	125	125	135	129	125
LCS 320-140894/2-A	Lab Control Sample	10 *	133	128	135	134	141	137	128
LCS 320-141114/2-A	Lab Control Sample	30	131	121	133	137	140	138	128
LCSD 320-141114/3-A	Lab Control Sample Dup	18 *	128	122	132	135	141	137	133
MB 320-140698/1-A	Method Blank	75	132	123	133	137	144	142	138
MB 320-140894/1-A	Method Blank	13 *	136	126	137	134	145	138	130
MB 320-141114/1-A	Method Blank	25	113	106	119	121	121	119	108

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3O2 PFHxS (25-150)	3C4 PFOS (25-150)	3C4-PFHpA (25-150)	3C5 PFPeA (25-150)	M2-6:2FTS (25-150)			
320-24062-1	GW-12636-112916-SSH-4716	119	133	107	77	128			
320-24062-2	RE-12636-112916-SSH-4816	133	141	50	59	142			
320-24062-3	GW-12636-112916-SSH-4916	132	139	124	110	130			
320-24062-4	GW-12636-112916-SSH-5016	125	130	122	110	131			
320-24062-5	W-12636-113016-SSH-5116	115	118	30	27	106			
320-24062-6 - RE	GW-12636-113016-SSH-5216					153 *			
320-24062-6	GW-12636-113016-SSH-5216	115	130	103	71				
320-24062-6 MS	GW-12636-113016-SSH-5216	117	131	104	73				
320-24062-6 MSD	GW-12636-113016-SSH-5216	108	123	97	69				
320-24062-7	GW-12636-113016-SSH-5316	105	128	90	44	132			
320-24062-8	EQUIPMENT BLANK -1	126	129	124	114	103			
LCS 320-140698/2-A	Lab Control Sample	122	129	123	129				
LCS 320-140894/2-A	Lab Control Sample	132	142	129	135	117			
LCS 320-141114/2-A	Lab Control Sample	128	136	132	134	110			
LCSD 320-141114/3-A	Lab Control Sample Dup	128	135	128	134	114			
MB 320-140698/1-A	Method Blank	128	135	131	136				
MB 320-140894/1-A	Method Blank	130	138	131	139	118			
MB 320-141114/1-A	Method Blank	116	116	122	116	96			

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C2 PFHxA = 13C2 PFHxA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA

Isotope Dilution Summary

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS
13C4-PFHpA = 13C4-PFHpA
13C5 PFPeA = 13C5 PFPeA
M2-6:2FTS = M2-6:2FTS

Method: 537 (modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-140698/1-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140698

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		2.0	0.46	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.99	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.79	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.44	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	0.75	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorotridecanoic Acid (PFTriA)	ND		2.0	0.55	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorotetradecanoic acid (PFTeA)	0.560	J	2.0	0.20	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.71	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	1.2	ng/L		12/05/16 19:37	12/22/16 09:53	1
Perfluorooctane Sulfonamide (FOSA)	ND		2.0	0.64	ng/L		12/05/16 19:37	12/22/16 09:53	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*75*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C4 PFBA	*132*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C2 PFHxA	*123*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C4 PFOA	*133*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C5 PFNA	*137*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C2 PFDA	*144*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C2 PFUnA	*142*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C2 PFDoA	*138*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
18O2 PFHxS	*128*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C4 PFOS	*135*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C4-PFHpA	*131*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*
13C5 PFPeA	*136*		*25 - 150*	*12/05/16 19:37*	*12/22/16 09:53*	*1*

Lab Sample ID: LCS 320-140698/2-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140698

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	40.0	44.2		ng/L		111	74 - 138
Perfluoropentanoic acid (PFPeA)	40.0	42.2		ng/L		106	69 - 134
Perfluorohexanoic acid (PFHxA)	40.0	41.9		ng/L		105	70 - 136
Perfluoroheptanoic acid (PFHpA)	40.0	41.7		ng/L		104	63 - 135
Perfluorooctanoic acid (PFOA)	40.0	40.3		ng/L		101	63 - 141
Perfluorononanoic acid (PFNA)	40.0	42.4		ng/L		106	71 - 140
Perfluorodecanoic acid (PFDA)	40.0	38.9		ng/L		97	66 - 141
Perfluoroundecanoic acid (PFUnA)	40.0	41.1		ng/L		103	68 - 139
Perfluorododecanoic acid (PFDoA)	40.0	39.6		ng/L		99	71 - 139

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-140698/2-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140698

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotridecanoic Acid (PFTriA)	40.0	45.9		ng/L		115	51 - 139
Perfluorotetradecanoic acid (PFTeA)	40.0	55.0	*	ng/L		138	47 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	44.3		ng/L		125	55 - 147
Perfluorohexanesulfonic acid (PFHxS)	36.4	38.0		ng/L		104	58 - 138
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	42.1		ng/L		111	32 - 170
Perfluorooctanesulfonic acid (PFOS)	37.1	38.4		ng/L		103	47 - 162
Perfluorodecanesulfonic acid (PFDS)	38.6	39.7		ng/L		103	35 - 157
Perfluorooctane Sulfonamide (FOSA)	40.0	39.5		ng/L		99	59 - 163

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*62*		*25 - 150*
13C4 PFBA	*126*		*25 - 150*
13C2 PFHxA	*118*		*25 - 150*
13C4 PFOA	*125*		*25 - 150*
13C5 PFNA	*125*		*25 - 150*
13C2 PFDA	*135*		*25 - 150*
13C2 PFUnA	*129*		*25 - 150*
13C2 PFDoA	*125*		*25 - 150*
18O2 PFHxS	*122*		*25 - 150*
13C4 PFOS	*129*		*25 - 150*
13C4-PFHpA	*123*		*25 - 150*
13C5 PFPeA	*129*		*25 - 150*

Lab Sample ID: 320-24062-6 MS
Matrix: Water
Analysis Batch: 143551

Client Sample ID: GW-12636-113016-SSH-5216
Prep Type: Total/NA
Prep Batch: 140698

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	4.7		39.0	42.0		ng/L		96	74 - 138
Perfluoropentanoic acid (PFPeA)	ND		39.0	38.4		ng/L		98	69 - 134
Perfluorohexanoic acid (PFHxA)	ND		39.0	42.8		ng/L		110	70 - 136
Perfluoroheptanoic acid (PFHpA)	ND		39.0	42.1		ng/L		108	63 - 135
Perfluorooctanoic acid (PFOA)	ND		39.0	39.5		ng/L		101	63 - 141
Perfluorononanoic acid (PFNA)	ND		39.0	41.7		ng/L		107	71 - 140
Perfluorodecanoic acid (PFDA)	ND		39.0	40.0		ng/L		102	66 - 141
Perfluoroundecanoic acid (PFUnA)	ND		39.0	39.8		ng/L		102	68 - 139
Perfluorododecanoic acid (PFDoA)	ND		39.0	39.5		ng/L		101	71 - 139
Perfluorotridecanoic Acid (PFTriA)	ND		39.0	48.0		ng/L		123	51 - 139
Perfluorotetradecanoic acid (PFTeA)	0.65	J F1 B *	39.0	64.9	F1	ng/L		164	47 - 130

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: 320-24062-6 MS
Matrix: Water
Analysis Batch: 143551

Client Sample ID: GW-12636-113016-SSH-5216
Prep Type: Total/NA
Prep Batch: 140698

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	0.92	J	34.5	34.4		ng/L		97	55 - 147
Perfluorohexanesulfonic acid (PFHxS)	ND		35.5	36.7		ng/L		103	58 - 138
Perfluoroheptanesulfonic Acid (PFHpS)	ND		37.2	39.5		ng/L		106	32 - 170
Perfluorooctanesulfonic acid (PFOS)	3.5		36.2	42.0		ng/L		106	47 - 162
Perfluorodecanesulfonic acid (PFDS)	ND		37.6	40.0		ng/L		106	35 - 157
Perfluorooctane Sulfonamide (FOSA)	ND		39.0	38.8		ng/L		99	59 - 163

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C8 FOSA	*3*	*	*25 - 150*
13C4 PFBA	*28*		*25 - 150*
13C2 PFHxA	*95*		*25 - 150*
13C4 PFOA	*104*		*25 - 150*
13C5 PFNA	*105*		*25 - 150*
13C2 PFDA	*108*		*25 - 150*
13C2 PFUnA	*110*		*25 - 150*
13C2 PFDoA	*114*		*25 - 150*
18O2 PFHxS	*117*		*25 - 150*
13C4 PFOS	*131*		*25 - 150*
13C4-PFHpA	*104*		*25 - 150*
13C5 PFPeA	*73*		*25 - 150*

Lab Sample ID: 320-24062-6 MSD
Matrix: Water
Analysis Batch: 143551

Client Sample ID: GW-12636-113016-SSH-5216
Prep Type: Total/NA
Prep Batch: 140698

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	4.7		38.1	43.6		ng/L		102	74 - 138	4	30
Perfluoropentanoic acid (PFPeA)	ND		38.1	38.8		ng/L		102	69 - 134	1	30
Perfluorohexanoic acid (PFHxA)	ND		38.1	41.4		ng/L		109	70 - 136	3	30
Perfluoroheptanoic acid (PFHpA)	ND		38.1	41.5		ng/L		109	63 - 135	1	30
Perfluorooctanoic acid (PFOA)	ND		38.1	41.8		ng/L		110	63 - 141	6	30
Perfluorononanoic acid (PFNA)	ND		38.1	41.8		ng/L		110	71 - 140	0	30
Perfluorodecanoic acid (PFDA)	ND		38.1	40.4		ng/L		106	66 - 141	1	30
Perfluoroundecanoic acid (PFUnA)	ND		38.1	41.3		ng/L		108	68 - 139	4	30
Perfluorododecanoic acid (PFDoA)	ND		38.1	41.0		ng/L		107	71 - 139	4	30
Perfluorotridecanoic Acid (PFTriA)	ND		38.1	48.3		ng/L		127	51 - 139	0	30
Perfluorotetradecanoic acid (PFTeA)	0.65	J F1 B *	38.1	66.2	F1	ng/L		172	47 - 130	2	30
Perfluorobutanesulfonic acid (PFBS)	0.92	J	33.7	35.1		ng/L		101	55 - 147	2	30
Perfluorohexanesulfonic acid (PFHxS)	ND		34.7	37.3		ng/L		108	58 - 138	2	30

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: 320-24062-6 MSD
Matrix: Water
Analysis Batch: 143551

Client Sample ID: GW-12636-113016-SSH-5216
Prep Type: Total/NA
Prep Batch: 140698

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanesulfonic Acid (PFHpS)	ND		36.3	40.0		ng/L		110	32 - 170	1	30
Perfluorooctanesulfonic acid (PFOS)	3.5		35.4	42.2		ng/L		109	47 - 162	1	30
Perfluorodecanesulfonic acid (PFDS)	ND		36.7	41.0		ng/L		111	35 - 157	2	30
Perfluorooctane Sulfonamide (FOSA)	ND		38.1	41.0		ng/L		108	59 - 163	6	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C8 FOSA	*3*	*	*25 - 150*
13C4 PFBA	*26*		*25 - 150*
13C2 PFHxA	*86*		*25 - 150*
13C4 PFOA	*96*		*25 - 150*
13C5 PFNA	*100*		*25 - 150*
13C2 PFDA	*101*		*25 - 150*
13C2 PFUnA	*99*		*25 - 150*
13C2 PFDoA	*104*		*25 - 150*
18O2 PFHxS	*108*		*25 - 150*
13C4 PFOS	*123*		*25 - 150*
13C4-PFHpA	*97*		*25 - 150*
13C5 PFPeA	*69*		*25 - 150*

Lab Sample ID: MB 320-140894/1-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140894

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		2.0	0.46	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.99	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.79	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.44	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	0.75	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorotridecanoic Acid (PFTriA)	ND		2.0	0.55	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorotetradecanoic acid (PFTeA)	0.610	J	2.0	0.20	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.71	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	1.2	ng/L		12/06/16 17:40	12/22/16 11:01	1
Perfluorooctane Sulfonamide (FOSA)	ND		2.0	0.64	ng/L		12/06/16 17:40	12/22/16 11:01	1
6:2FTS	ND		20	3.8	ng/L		12/06/16 17:40	12/22/16 11:01	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*13*	*	*25 - 150*	*12/06/16 17:40*	*12/22/16 11:01*	*1*

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: MB 320-140894/1-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140894

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	136		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C2 PFHxA	126		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C4 PFOA	137		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C5 PFNA	134		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C2 PFDA	145		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C2 PFUnA	138		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C2 PFDoA	130		25 - 150	12/06/16 17:40	12/22/16 11:01	1
18O2 PFHxS	130		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C4 PFOS	138		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C4-PFHpA	131		25 - 150	12/06/16 17:40	12/22/16 11:01	1
13C5 PFPeA	139		25 - 150	12/06/16 17:40	12/22/16 11:01	1
M2-6:2FTS	118		25 - 150	12/06/16 17:40	12/22/16 11:01	1

Lab Sample ID: LCS 320-140894/2-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140894

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	40.0	39.0		ng/L		97	74 - 138
Perfluoropentanoic acid (PFPeA)	40.0	37.2		ng/L		93	69 - 134
Perfluorohexanoic acid (PFHxA)	40.0	35.8		ng/L		89	70 - 136
Perfluoroheptanoic acid (PFHpA)	40.0	37.0		ng/L		92	63 - 135
Perfluorooctanoic acid (PFOA)	40.0	35.8		ng/L		90	63 - 141
Perfluorononanoic acid (PFNA)	40.0	37.0		ng/L		92	71 - 140
Perfluorodecanoic acid (PFDA)	40.0	35.5		ng/L		89	66 - 141
Perfluoroundecanoic acid (PFUnA)	40.0	32.7		ng/L		82	68 - 139
Perfluorododecanoic acid (PFDoA)	40.0	35.0		ng/L		87	71 - 139
Perfluorotridecanoic Acid (PFTriA)	40.0	34.9		ng/L		87	51 - 139
Perfluorotetradecanoic acid (PFTeA)	40.0	48.2		ng/L		121	47 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	39.1		ng/L		111	55 - 147
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.3		ng/L		91	58 - 138
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	35.5		ng/L		93	32 - 170
Perfluorooctanesulfonic acid (PFOS)	37.1	34.2		ng/L		92	47 - 162
Perfluorodecanesulfonic acid (PFDS)	38.6	33.9		ng/L		88	35 - 157
Perfluorooctane Sulfonamide (FOSA)	40.0	36.1		ng/L		90	59 - 163
6:2FTS	37.9	40.9		ng/L		108	60 - 140

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	10	*	25 - 150
13C4 PFBA	133		25 - 150
13C2 PFHxA	128		25 - 150

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-140894/2-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140894

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFOA	135		25 - 150
13C5 PFNA	134		25 - 150
13C2 PFDA	141		25 - 150
13C2 PFUnA	137		25 - 150
13C2 PFDoA	128		25 - 150
18O2 PFHxS	132		25 - 150
13C4 PFOS	142		25 - 150
13C4-PFHpA	129		25 - 150
13C5 PFPeA	135		25 - 150
M2-6:2FTS	117		25 - 150

Lab Sample ID: MB 320-141114/1-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 141114

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		2.0	0.46	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.99	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.79	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.44	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	0.75	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorotridecanoic Acid (PFTriA)	ND		2.0	0.55	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorotetradecanoic acid (PFTeA)	0.541	J	2.0	0.20	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.71	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	1.2	ng/L		12/07/16 17:31	12/22/16 13:01	1
Perfluorooctane Sulfonamide (FOSA)	1.43	J	2.0	0.64	ng/L		12/07/16 17:31	12/22/16 13:01	1
6:2FTS	ND		20	3.8	ng/L		12/07/16 17:31	12/22/16 13:01	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	25		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C4 PFBA	113		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C2 PFHxA	106		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C4 PFOA	119		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C5 PFNA	121		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C2 PFDA	121		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C2 PFUnA	119		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C2 PFDoA	108		25 - 150	12/07/16 17:31	12/22/16 13:01	1
18O2 PFHxS	116		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C4 PFOS	116		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C4-PFHpA	122		25 - 150	12/07/16 17:31	12/22/16 13:01	1
13C5 PFPeA	116		25 - 150	12/07/16 17:31	12/22/16 13:01	1

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: MB 320-141114/1-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 141114

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2FTS	96		25 - 150	12/07/16 17:31	12/22/16 13:01	1

Lab Sample ID: LCS 320-141114/2-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 141114

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	40.0	39.8		ng/L		99	74 - 138
Perfluoropentanoic acid (PFPeA)	40.0	36.7		ng/L		92	69 - 134
Perfluorohexanoic acid (PFHxA)	40.0	37.8		ng/L		95	70 - 136
Perfluoroheptanoic acid (PFHpA)	40.0	37.3		ng/L		93	63 - 135
Perfluorooctanoic acid (PFOA)	40.0	35.9		ng/L		90	63 - 141
Perfluorononanoic acid (PFNA)	40.0	36.4		ng/L		91	71 - 140
Perfluorodecanoic acid (PFDA)	40.0	37.3		ng/L		93	66 - 141
Perfluoroundecanoic acid (PFUnA)	40.0	32.4		ng/L		81	68 - 139
Perfluorododecanoic acid (PFDoA)	40.0	35.1		ng/L		88	71 - 139
Perfluorotridecanoic Acid (PFTriA)	40.0	38.3		ng/L		96	51 - 139
Perfluorotetradecanoic acid (PFTeA)	40.0	44.5		ng/L		111	47 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	39.6		ng/L		112	55 - 147
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.1		ng/L		91	58 - 138
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	35.5		ng/L		93	32 - 170
Perfluorooctanesulfonic acid (PFOS)	37.1	34.3		ng/L		92	47 - 162
Perfluorodecanesulfonic acid (PFDS)	38.6	33.5		ng/L		87	35 - 157
Perfluorooctane Sulfonamide (FOSA)	40.0	35.9		ng/L		90	59 - 163
6:2FTS	37.9	45.7		ng/L		121	60 - 140

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	30		25 - 150
13C4 PFBA	131		25 - 150
13C2 PFHxA	121		25 - 150
13C4 PFOA	133		25 - 150
13C5 PFNA	137		25 - 150
13C2 PFDA	140		25 - 150
13C2 PFUnA	138		25 - 150
13C2 PFDoA	128		25 - 150
18O2 PFHxS	128		25 - 150
13C4 PFOS	136		25 - 150
13C4-PFHpA	132		25 - 150
13C5 PFPeA	134		25 - 150
M2-6:2FTS	110		25 - 150

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCSD 320-141114/3-A
Matrix: Water
Analysis Batch: 143551

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 141114

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	40.0	44.6		ng/L		111	74 - 138	11	30
Perfluoropentanoic acid (PFPeA)	40.0	41.2		ng/L		103	69 - 134	11	30
Perfluorohexanoic acid (PFHxA)	40.0	41.7		ng/L		104	70 - 136	10	30
Perfluoroheptanoic acid (PFHpA)	40.0	42.3		ng/L		106	63 - 135	13	30
Perfluorooctanoic acid (PFOA)	40.0	40.5		ng/L		101	63 - 141	12	30
Perfluorononanoic acid (PFNA)	40.0	41.7		ng/L		104	71 - 140	13	30
Perfluorodecanoic acid (PFDA)	40.0	40.7		ng/L		102	66 - 141	9	30
Perfluoroundecanoic acid (PFUnA)	40.0	37.5		ng/L		94	68 - 139	15	30
Perfluorododecanoic acid (PFDoA)	40.0	39.6		ng/L		99	71 - 139	12	30
Perfluorotridecanoic Acid (PFTriA)	40.0	43.0		ng/L		107	51 - 139	12	30
Perfluorotetradecanoic acid (PFTeA)	40.0	52.0		ng/L		130	47 - 130	15	30
Perfluorobutanesulfonic acid (PFBS)	35.4	43.7		ng/L		123	55 - 147	10	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.9		ng/L		101	58 - 138	11	30
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	39.8		ng/L		104	32 - 170	11	30
Perfluorooctanesulfonic acid (PFOS)	37.1	38.5		ng/L		104	47 - 162	12	30
Perfluorodecanesulfonic acid (PFDS)	38.6	39.3		ng/L		102	35 - 157	16	30
Perfluorooctane Sulfonamide (FOSA)	40.0	39.7		ng/L		99	59 - 163	10	30
6:2FTS	37.9	39.2		ng/L		103	60 - 140	15	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C8 FOSA	*18*	*	*25 - 150*
13C4 PFBA	*128*		*25 - 150*
13C2 PFHxA	*122*		*25 - 150*
13C4 PFOA	*132*		*25 - 150*
13C5 PFNA	*135*		*25 - 150*
13C2 PFDA	*141*		*25 - 150*
13C2 PFUnA	*137*		*25 - 150*
13C2 PFDoA	*133*		*25 - 150*
18O2 PFHxS	*128*		*25 - 150*
13C4 PFOS	*135*		*25 - 150*
13C4-PFHpA	*128*		*25 - 150*
13C5 PFPeA	*134*		*25 - 150*
M2-6:2FTS	*114*		*25 - 150*

LCMS

Prep Batch: 140698

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24062-6	GW-12636-113016-SSH-5216	Total/NA	Water	3535	
MB 320-140698/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-140698/2-A	Lab Control Sample	Total/NA	Water	3535	
320-24062-6 MS	GW-12636-113016-SSH-5216	Total/NA	Water	3535	
320-24062-6 MSD	GW-12636-113016-SSH-5216	Total/NA	Water	3535	

Prep Batch: 140894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24062-1	GW-12636-112916-SSH-4716	Total/NA	Water	3535	
320-24062-2	RE-12636-112916-SSH-4816	Total/NA	Water	3535	
320-24062-3	GW-12636-112916-SSH-4916	Total/NA	Water	3535	
320-24062-4	GW-12636-112916-SSH-5016	Total/NA	Water	3535	
320-24062-7	GW-12636-113016-SSH-5316	Total/NA	Water	3535	
320-24062-8	EQUIPMENT BLANK -1	Total/NA	Water	3535	
MB 320-140894/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-140894/2-A	Lab Control Sample	Total/NA	Water	3535	

Prep Batch: 141114

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24062-5	W-12636-113016-SSH-5116	Total/NA	Water	3535	
320-24062-6 - RE	GW-12636-113016-SSH-5216	Total/NA	Water	3535	
MB 320-141114/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-141114/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-141114/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 143551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24062-1	GW-12636-112916-SSH-4716	Total/NA	Water	537 (modified)	140894
320-24062-2	RE-12636-112916-SSH-4816	Total/NA	Water	537 (modified)	140894
320-24062-3	GW-12636-112916-SSH-4916	Total/NA	Water	537 (modified)	140894
320-24062-4	GW-12636-112916-SSH-5016	Total/NA	Water	537 (modified)	140894
320-24062-5	W-12636-113016-SSH-5116	Total/NA	Water	537 (modified)	141114
320-24062-6	GW-12636-113016-SSH-5216	Total/NA	Water	537 (modified)	140698
320-24062-6 - RE	GW-12636-113016-SSH-5216	Total/NA	Water	537 (modified)	141114
320-24062-7	GW-12636-113016-SSH-5316	Total/NA	Water	537 (modified)	140894
320-24062-8	EQUIPMENT BLANK -1	Total/NA	Water	537 (modified)	140894
MB 320-140698/1-A	Method Blank	Total/NA	Water	537 (modified)	140698
MB 320-140894/1-A	Method Blank	Total/NA	Water	537 (modified)	140894
MB 320-141114/1-A	Method Blank	Total/NA	Water	537 (modified)	141114
LCS 320-140698/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	140698
LCS 320-140894/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	140894
LCS 320-141114/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	141114
LCSD 320-141114/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	141114
320-24062-6 MS	GW-12636-113016-SSH-5216	Total/NA	Water	537 (modified)	140698
320-24062-6 MSD	GW-12636-113016-SSH-5216	Total/NA	Water	537 (modified)	140698

Lab Chronicle

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Client Sample ID: GW-12636-112916-SSH-4716
Lab Sample ID: 320-24062-1
Date Collected: 11/29/16 14:31
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			264.7 mL	0.5 mL	140894	12/06/16 17:40	VPM	TAL SAC
Total/NA	Analysis	537 (modified)		1			143551	12/22/16 11:38	SBC	TAL SAC

Client Sample ID: RE-12636-112916-SSH-4816
Lab Sample ID: 320-24062-2
Date Collected: 11/29/16 15:00
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			277.8 mL	0.5 mL	140894	12/06/16 17:40	VPM	TAL SAC
Total/NA	Analysis	537 (modified)		1			143551	12/22/16 11:46	SBC	TAL SAC

Client Sample ID: GW-12636-112916-SSH-4916
Lab Sample ID: 320-24062-3
Date Collected: 11/29/16 16:01
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			252.6 mL	0.5 mL	140894	12/06/16 17:40	VPM	TAL SAC
Total/NA	Analysis	537 (modified)		1			143551	12/22/16 11:53	SBC	TAL SAC

Client Sample ID: GW-12636-112916-SSH-5016
Lab Sample ID: 320-24062-4
Date Collected: 11/29/16 16:05
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			255.1 mL	0.5 mL	140894	12/06/16 17:40	VPM	TAL SAC
Total/NA	Analysis	537 (modified)		1			143551	12/22/16 12:01	SBC	TAL SAC

Client Sample ID: W-12636-113016-SSH-5116
Lab Sample ID: 320-24062-5
Date Collected: 11/30/16 09:00
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			264.7 mL	0.5 mL	141114	12/07/16 17:31	VPM	TAL SAC
Total/NA	Analysis	537 (modified)		1			143551	12/22/16 13:23	SBC	TAL SAC

Client Sample ID: GW-12636-113016-SSH-5216
Lab Sample ID: 320-24062-6
Date Collected: 11/30/16 10:26
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			262.3 mL	0.5 mL	140698	12/05/16 19:37	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1			143551	12/22/16 10:08	SBC	TAL SAC

Lab Chronicle

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Client Sample ID: GW-12636-113016-SSH-5216

Lab Sample ID: 320-24062-6

Date Collected: 11/30/16 10:26
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	RE		269.5 mL	0.5 mL	141114	12/07/16 17:31	VPM	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			143551	12/22/16 13:31	SBC	TAL SAC

Client Sample ID: GW-12636-113016-SSH-5316

Lab Sample ID: 320-24062-7

Date Collected: 11/30/16 11:36
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			260 mL	0.5 mL	140894	12/06/16 17:40	VPM	TAL SAC
Total/NA	Analysis	537 (modified)		1			143551	12/22/16 12:08	SBC	TAL SAC

Client Sample ID: EQUIPMENT BLANK -1

Lab Sample ID: 320-24062-8

Date Collected: 11/29/16 11:30
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			260.6 mL	0.5 mL	140894	12/06/16 17:40	VPM	TAL SAC
Total/NA	Analysis	537 (modified)		1			143551	12/22/16 12:46	SBC	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-17
Arkansas DEQ	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-17
Connecticut	State Program	1	PH-0691	06-30-17
Florida	NELAP	4	E87570	06-30-17
Hawaii	State Program	9	N/A	01-31-17
Illinois	NELAP	5	200060	03-17-17
Kansas	NELAP	7	E-10375	10-31-17
Louisiana	NELAP	6	30612	06-30-17
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-17
New Jersey	NELAP	2	CA005	06-30-17
New York	NELAP	2	11666	04-01-17
Oregon	NELAP	10	4040	01-29-17
Pennsylvania	NELAP	3	68-01272	03-31-17
Texas	NELAP	6	T104704399	07-31-17
US Fish & Wildlife	Federal		LE148388-0	10-31-17
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-17
Virginia	NELAP	3	460278	03-14-17
Washington	State Program	10	C581	05-05-17
West Virginia (DW)	State Program	3	9930C	12-31-16 *
Wyoming	State Program	8	8TMS-L	01-29-17

* Certification renewal pending - certification considered valid.

Method Summary

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GHD Services Inc.
Project/Site: PFCs

TestAmerica Job ID: 320-24062-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-24062-1	GW-12636-112916-SSH-4716	Water	11/29/16 14:31	12/01/16 09:50
320-24062-2	RE-12636-112916-SSH-4816	Water	11/29/16 15:00	12/01/16 09:50
320-24062-3	GW-12636-112916-SSH-4916	Water	11/29/16 16:01	12/01/16 09:50
320-24062-4	GW-12636-112916-SSH-5016	Water	11/29/16 16:05	12/01/16 09:50
320-24062-5	W-12636-113016-SSH-5116	Water	11/30/16 09:00	12/01/16 09:50
320-24062-6	GW-12636-113016-SSH-5216	Water	11/30/16 10:26	12/01/16 09:50
320-24062-7	GW-12636-113016-SSH-5316	Water	11/30/16 11:36	12/01/16 09:50
320-24062-8	EQUIPMENT BLANK -1	Water	11/29/16 11:30	12/01/16 09:50

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

Chain of Custody Record

167065

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: M. Tomka	Site Contact: R. Chatfield	Date: 11/29/16	COC No: 167065
Company Name: GHD	Tel/Fax: 519 884 0510	Lab Contact: Pat Abe	Carrier: FedEx	2 of 2 COCs
Address: 14496 N. Sheldon Rd Ste 200	Analysis Turnaround Time			Sampler: S. Hoewemeyer
City/State/Zip: Plymouth MI 48170	☒ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 734 1453 15123	TAT if different from Below _____			Walk-in Client:
Fax:	☒ 2 weeks			Lab Sampling:
Project Name: Former Peregrine	☐ 1 week			
Site: SSOW 12636-0010	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFCs	Sample Specific Notes:
GW-12636-112916-SSH-4716	11/29/16	1431	G	GW	2	N	N	X	
RE-12636-112916-SSH-4816	"	1500	G	GW	2	N	N	X	
GW-12636-112916-SSH-4916	"	1661	G	GW	2	N	N	X	
GW-12636-112916-SSH-5016	"	1605	G	GW	2	N	N	X	
GW-12636-113016-SSH-5116	11/30/16	0900	G	GW	2	N	N	X	
GW-12636-113016-SSH-5216	"	1026	G	GW	4	N	Y	X	MS/MSD
GW-12636-113016-SSH-5316	"	1136	G	GW	2	N	N	X	

320-24062 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

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 & Comments:
PFAS/PFOS

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: 667419 | Cooler Temp. (°C): Obs'd: 2.8 Corr'd: 1.9 | Therm ID No.: 12

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	GHD	11/30/16 1600	[signature]	TAWS	12/1/16 0950
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 320-24062-1

Login Number: 24062
List Number: 1
Creator: Kellmann, Jill

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	66749
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	