



SUBMITTED TO:
Alaska Department of
Transportation & Public
Facilities
2301 Peger Road
Fairbanks, Alaska 99709



BY:
Shannon & Wilson, Inc.
2355 Hill Rd
Fairbanks, Alaska 99709

(907) 479-0600
www.shannonwilson.com

REVISION 1

SUMMARY
Gustavus PFAS 2019 Site
Characterization
GUSTAVUS, ALASKA



PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Submitted To: Alaska Department of Transportation & Public Facilities
2301 Peger Road
Fairbanks, Alaska 99709

Attn: Samantha Cummings

Subject: REVISION 1 SUMMARY, GUSTAVUS PFAS 2019 SITE
CHARACTERIZATION, GUSTAVUS, ALASKA

Shannon & Wilson prepared this report as a summary of our site characterization services to date in Gustavus, Alaska. The services were conducted on behalf of the Alaska Department of Transportation & Public Facilities (DOT&PF). Our scope of services was specified in our Work Plan dated July 2019 and authorized on September 17, 2019 by DOT&PF under our Professional Services Agreement Number 25-19-1-013 Per- and Polyfluoroalkyl Substance (PFAS) Related Environmental & Engineering Services.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or we may be of further service, please contact us.

Sincerely,

SHANNON & WILSON, INC.

Craig Beebe
Geologist
Role: Primary Author

Kristen Freiburger, Associate
Senior Chemist
Role: Project Manager

Christopher Darrah, C.P.G., CPESC
Vice President
Role: Contract Manager

CONTENTS

- 1 Introduction 1
 - 1.1 Purpose and Objectives 1
 - 1.2 Background 1
 - 1.3 Geology and Hydrology 3
 - 1.4 Contaminants of Concern and Action Levels 3
 - 1.5 Scope of Services 5
 - 1.6 Summary of Previous Work 6
- 2 Field Activities 6
 - 2.1 Surface Water Sampling 7
 - 2.2 Soil Borings 7
 - 2.3 Monitoring Wells 8
 - 2.4 Temporary Well Points 9
 - 2.5 Sediment and Surface Soil Sampling 10
 - 2.6 Hydraulic Gradient and Well Survey 11
 - 2.7 Investigation-derived Waste 11
 - 2.8 Deviations from the Work Plan 11
- 3 Analytical Results 13
 - 3.1 Groundwater Samples 13
 - 3.2 Surface Water Samples 13
 - 3.3 Soil Samples 14
 - 3.3.1 Subsurface Soil Samples 14
 - 3.3.2 Surface Soil Samples 14
 - 3.3.3 Sediment Soil Samples 15
 - 3.4 Soil IDW Samples 15
 - 3.5 GAC Confirmation Samples 16
- 4 Updated Conceptual Site Model 16
 - 4.1 Description of Potential Receptors 16
 - 4.2 Potential Exposure Pathways 16
 - 4.2.1 Soil 16
 - 4.2.2 Groundwater 16

4.2.3 Surface Water and Biota17

5 Discussion and Recommendations.....17

5.1 Comparison to Regulatory Limits and Discussion.....17

5.2 Recommendations.....19

6 References21

Exhibits

Exhibit 1-1: South end of runway 02/20 facing the Chilkat Mountains.....3

Exhibit 1-2: Applicable Regulatory Action Levels5

Exhibit 2-1: Example of surface water sample location.....7

Exhibit 2-2: Monitoring well development; visually checking turbidity.....9

Exhibit 2-3: New fire-training location.....10

Exhibit 3-1: Collecting surface soil sample near *Culvert 2*.....15

Exhibit 3-2: Soil IDW storage drums.....15

Exhibit 5-1: Asphalt cracks in known release area at north end of runway 02/20.....18

Tables

Table 1: Groundwater Elevations

Table 2: Summary of Gustavus Airport Site Characterization Groundwater Analytical Results

Table 3: Summary of Gustavus Airport Site Characterization Surface Water Analytical Results

Table 4: Summary of Gustavus Site Characterization Soil Boring Analytical Results

Table 5: Summary of Gustavus Site Characterization Surface Soil and Sediment Analytical Results

Table 6: Summary of Gustavus Airport Site Characterization GAC Confirmation Sample Analytical Results

Figures

Figure 1: Site Map

Figure 2: Site Characterization Water Results

Figure 3: Site Characterization Soil Results

Figure 4: Groundwater Gradient and Well Monitoring Network

Appendices

Appendix A: Boring Logs

Appendix B: Field Forms

Appendix C: Laboratory Reports

Appendix D: QA/QC Summary and DEC LDRCs

Appendix E: Updated Conceptual Site Model

Appendix F: Ecoscoping Form

Important Information

ACRONYMS

AAC	Alaska Administrative Code
ADONA	4,8-dioxa-3H-perfluorononanoic acid
AFFF	aqueous film-forming foam
bgs	below ground surface
°C	degrees Celsius
COC	chain of custody
CSM	conceptual site model
CUL	cleanup levels
DEC	Alaska Department of Environmental Conservation
DO	dissolved oxygen
DOT&PF	Alaska Department of Transportation & Public Facilities
DQO	data quality objective
DRM	Alaska Department of Administration Division of Risk Management
EPA	U.S. Environmental Protection Agency
GAC	granular activated carbon
GST	Gustavus Airport Terminal
HDPE	high-density polyethylene
HFPO-DA	hexafluoropropylene oxide dimer acid
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
LHA	Lifetime Health Advisory
LOQ	limit of quantification
mg/L	milligrams per liter
mV	millivolts
MS/MSD	matrix spike/matrix spike duplicate
N-EtFOSAA	N-ethyl perfluorooctane sulfonamidoacetic acid
N-MeFOSAA	N-methyl perfluorooctane sulfonamidoacetic acid
NPS	National Park Service
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFTeA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnA	perfluoroundecanoic acid
ppt	parts per trillion
QA/QC	quality assurance/quality control

ACRONYMS

RPD	relative percent difference
SSHHP	site safety and health plan
TWP	temporary well point
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µS	microSiemens
YSI	multiprobe water quality meter
11Cl-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid

1 INTRODUCTION

Shannon & Wilson, Inc. has prepared this report to document our site characterization activities near the Gustavus Airport (GST) in Gustavus, Alaska in October 2019. The GST is an active, Alaska Department of Environmental Conservation (DEC) listed contaminated site due to the presence of per- and polyfluoroalkyl substances (PFAS) in groundwater and surface water (File Number 1507.38.017, Hazard ID 26904).

This report was prepared for the Alaska Department of Transportation & Public Facilities (DOT&PF) in accordance with the terms and conditions of our contract, relevant DEC guidance documents, and 18 Alaska Administrative Code (AAC) 75.335.

1.1 Purpose and Objectives

Our project objectives were to sample surface soil, subsurface soil, sediment, surface water, and groundwater in and around the GST to better understand the extent of PFAS contamination resulting from the historic use of fire-fighting foam by the DOT&PF. Our project goals were to identify PFAS source areas and evaluate the horizontal and vertical extent of contamination on the GST property and in the offsite aquifers and surface-water drainage channels.

1.2 Background

The GST terminal is located at 1 Airport Way in Gustavus, Alaska. The property is owned by the DOT&PF, who also owns multiple adjacent parcels. The geographic coordinates of the GST terminal are latitude 58.4252, longitude -135.7074.

The DOT&PF Crash and Fire Rescue program used aqueous film forming foam (AFFF) for training, systems testing, and emergency response at the GST for many years. Areas of potential use include the DOT&PF Crash and Fire Rescue building, near the intersection of runways 02/20 and 11/29 as well as near the southeast end of runway 11/29 (Figure 1, Site Map). The precise timeline and locations of AFFF use at the GST are unknown.

AFFF contains PFAS, a category of persistent organic compounds considered emerging contaminants. Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two PFAS commonly found at sites where AFFFs were used. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of increasing concern to environmental and health agencies. The U.S. Environmental Protection Agency (EPA) published a Lifetime Health Advisory (LHA) level for PFOS and PFOA in drinking water in

May 2016 of 70 parts per trillion (ppt) for the sum of PFOS and PFOA. The DEC Contaminated Sites Program published groundwater-cleanup levels for PFOS and PFOA in November 2016 of 400 ppt for each compound. Prior to the publication of these levels, there were no state-level cleanup levels established for PFAS.

On May 4, 2018 DEC informed DOT&PF the airport terminal well and National Park Service (NPS) Water System well were at risk for PFAS contamination. On June 27, 2018, DOT&PF sampled both drinking-water supply wells for the presence of PFAS. The analytical results were received on July 30, 2018. The airport terminal well contained levels of PFAS exceeding the EPA's LHA level. The NPS well had detections of several PFAS less than the EPA's LHA level. DOT&PF and the Alaska Department of Administration Division of Risk Management (DRM) contacted Shannon & Wilson regarding the Gustavus results. We began private-well search and sampling efforts in August 2018.

On August 20, 2018, the DEC published a Technical Memorandum outlining a new action level for the sum of 5 PFAS (PFOS, PFOS, perfluorohexane sulfonate [PFHxS], perfluoroheptanoate [PFHpA], and perfluorononanoate [PFNA]) in drinking water. The action levels proposed in the August 2018 Technical Memorandum were submitted as proposed regulation. PFAS projects for the State of Alaska adopted the proposed regulatory action level from August 2018 to March 2019, although the proposed regulation was not formally adopted.

The initial response and private-well sampling in Gustavus referenced the sum of 5 PFAS action level for the purposes of assessing drinking-water well contamination. Private-water wells used for drinking and/or cooking with concentrations for the sum of 5 PFAS exceeding 65 ppt were provided with an alternative drinking-water source.

On April 9, 2019 DEC issued an update to the August 20, 2018 Technical Memorandum rescinding the previous action level and realigning with EPA's LHA. The memo notes "In order to align state actions to the recently announced EPA plans, DEC will use the EPA LHA (PFOS+PFOA above 0.07 µg/L) as the Action Level. Any new testing for PFAS will be for PFOS and PFOA only."

On October 2, 2019 DEC issued a second update to the August 20, 2018 Technical Memorandum stating, "Any new testing for PFAS will report the full suite of PFAS compounds analyzed by the appropriate EPA Method." EPA Method 537.1 includes the suite of 18 PFAS outlined in section 1.4 below.

1.3 Geology and Hydrology

The GST sampling area lies in a glacial outwash plain. The plain is bounded by the Chilkat Mountain Range to the northeast, Glacier Bay to the northwest and the Icy Strait to the south. Fluvial deposits are found with increasing frequency near the shoreline. Due to a high rate of glacial isostatic rebound, high silt concentrations are also observed closer to the shoreline.



Exhibit 1-1: South end of runway 02/20 facing the Chilkat Mountains.

Our knowledge of subsurface geology and hydrology in the investigation area is based on observations we made during drilling and information related to us by a local well driller. Our investigation noted the sampling area is mostly comprised of fluvial and marine sediments. The soil profile generally consists of water-bearing, interbedded sand and silt underlain by a silty clay or clay confining layer. The confining layer was observed at varying depths ranging from approximately 13 to 45 feet below ground surface (bgs).

The depth to the water table ranged from 0.33 feet bgs to 8.75 feet bgs on the east side of the Salmon River. At the well cluster by City Hall, the water table ranged from 13.75 to 13.80 feet bgs. Table 2 presents the well-survey information, depth-to-water measurements, and calculated water-table elevations.

1.4 Contaminants of Concern and Action Levels

The primary contaminants of concern are PFOS and PFOA.

On April 9, 2019, DEC issued an amendment to its August 20, 2018 Technical Memorandum to align the states action level with the EPA LHA of 70 ppt for the sum of PFOS and PFOA.

On October 2, 2019, DEC published a Technical Memorandum amending the April 9, 2019 Technical Memorandum and adding additional PFAS analytes to the testing requirements. The action level remains 70 ppt for the sum of PFOS and PFOA. However, the following list of 18 PFAS are to be analyzed for at PFAS sites.

- PFOS
- PFOA
- PFHpA
- PFNA
- PFHxS
- perfluorobutanesulfonic acid (PFBS)
- perfluorodecanoic acid (PFDA)
- perfluorododecanoic acid (PFDoA)
- perfluorohexanoic acid (PFHxA)
- perfluorotetradecanoic acid (PFTeA)
- perfluorotridecanoic acid (PFTrDA)
- perfluoroundecanoic acid (PFUnA)
- hexafluoropropylene oxide dimer acid (HFPO-DA)
- N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)
- N-methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)
- 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)
- 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CL-PF3ONS)
- 4,8-dioxa-3H-perfluorononanoic acid (ADONA)

The current drinking-water action level based on the current DEC Technical Memorandum and the current DEC groundwater cleanup levels for PFOS and PFOA based on Tables B1 and C from 18 AAC 75 are summarized below in Exhibit 1-2.

Exhibit 1-2: Applicable Regulatory Action Levels

Media	Compound	Level
Drinking water	PFOS + PFOA	70 ppt ¹
Groundwater	PFOS	400 ppt ²
Groundwater	PFOA	400 ppt ²
Soil	PFOS	3.0 µg/kg ³
Soil	PFOA	1.7 µg/kg ³

Notes:

ppt is equivalent to nanograms per liter (ng/L)

µg/kg = micrograms per kilogram

1 Drinking-water action level reported in DEC October 2019 Technical Memorandum.

2 DEC groundwater-cleanup level is reported in micrograms per liter (ug/L) in 18 AAC 75.345, Table C.

3 DEC migration-to-groundwater soil-cleanup levels are reported in 18 AAC 75.341, Table B1.

1.5 Scope of Services

Our scope of services summarized in this report includes implementation of our July 2019 Work Plan. Prior to beginning field activities, the Work Plan was approved by the DEC.

Our activities included:

- collection of 14 surface soil samples, with additional surface soil samples collected from two potential AFFF release locations;
- collection of 10 samples from surface water near the GST;
- installation and sampling of 8 temporary well points;
- installation and sampling of 15 monitoring wells at 12 locations (some locations include two wells screened at different depths);
- groundwater elevation survey to estimate groundwater flow direction and gradient;
- laboratory analysis for the above-listed samples; and
- evaluation and reporting of the analytical data.

This report was prepared for the exclusive use of the DOT&PF and its representatives. This work presents our professional judgment as to the conditions of the site. Information presented here is based on the sampling and analyses we performed. This report should not be used for other purposes without our approval or if any of the following occurs:

- Project details change, or new information becomes available, such as revised regulatory levels or the discovery of additional source areas.

- Conditions change due to natural forces or human activity at, under, or adjacent to the project site.
- Assumptions stated in this report have changed.
- If the site ownership or land use has changed.
- Regulations, laws, or cleanup levels change.
- If the site's regulatory status has changed.

If any of these occur, we should be retained to review the applicability of our recommendations. This report should not be used for other purposes without Shannon & Wilson's review. If a service is not specifically indicated in this report, do not assume it was performed.

1.6 Summary of Previous Work

To date, we have sampled a total of 113 private wells for PFAS analytes over several visits to Gustavus since August 2018. We also collected seven surface-water samples during the August 2018, September 2018 and March 2019 sampling events. In addition, we held several public-outreach meetings in conjunction with State of Alaska employees to inform residents about the project.

Private-well sample concentrations for the sum of PFOS and PFOA ranged from not-detected to 6,110 ppt for wells associated with the GST PFAS project. Private-well sampling areas were expanded until the concentration for the PFAS concentrations were below the applicable DEC regulatory level along the edges of the sample area. Private-water well depths are generally between 15-25 feet bgs based on information provided by the residents and the former local driller who installed most of the wells. No well-drilling or construction logs were available to confirm these depths. Our private-well sampling was able to approximate the impacted area of contamination in this depth range of the aquifer. However, we were not able to obtain samples from deeper levels of the aquifer due to the absence of available wells.

2 FIELD ACTIVITIES

This section summarizes the site characterization field activities performed during October of 2019. The following Shannon & Wilson personnel collected analytical samples for this project. These individuals are State of Alaska Qualified Samplers per 18 AAC 75.333[b] and 18 AAC 78.088[b].

- Cherissa Dukelow, Environmental Scientist

- Kristen Freiburger, Environmental Chemist
- Craig Beebe, Geologist

Our team is aware of the potential for cross-contamination of PFAS from numerous everyday items. We took appropriate precautions to prevent cross-contamination, including discontinuing the use of personal protective equipment and field supplies known to contain PFAS, using liner bags to contain samples before and after sample collection, hand washing, and donning a fresh pair of disposable nitrile gloves before sample collection. Additionally, samples were collected in laboratory-supplied, high-density polyethylene (HDPE) containers to prevent PFAS from adhering to the container.

2.1 Surface Water Sampling



Exhibit 2-1: Example of surface water sample location.

We collected ten surface-water analytical samples during the October 2019 sampling event. Samples were collected from drainage ditches and ponds around and near the airport. These samples were collected with the use of a dust-free, PFAS-free, new disposable clear plastic cups. Cups were submerged approximately 6 inches below the surface of the water body using a freshly gloved hand.

Sample water was then transferred directly to the sample bottle. Where possible, samples were collected from the mid-point of the water body. Refer to Figure 2 for surface-water sample locations. The samples were submitted for the analysis of 18 PFAS by EPA Method 537.1.

2.2 Soil Borings

We subcontracted Discovery Drilling, Inc. (Discovery) to advance soil borings at twelve locations between October 5, 2019 and October 12, 2019 (Figure 3). Prior to drilling activities, we requested utility locates from local utility providers using the Alaska Digline. Discovery used their 6217 DT drill rig to advance the borings. We collected nine subsurface soil analytical samples and one field duplicate from the two borings on the GST property near the "old" and "new" fire training areas. Samples were collected with a new stainless-steel spoon every five feet or at significant changes in lithology, in accordance with our Work Plan. Analytical samples were submitted for the suite of 18 PFAS and analyzed by EPA method 537.1. We observed groundwater ranging from 0.33 feet to 13.80 feet bgs and a

confining layer from approximately 13 to 45 feet bgs. Our boring logs are included in Appendix A, Boring Logs.

West of Wilson Road, the inferred surface of the confining layer generally slopes southwest, increasing in depth as the layer approaches the ocean. The groundwater table appears to follow the same general pattern in this area with a more west-southwest gradient north of Faraway Road (Figure 4). The confining layer is deeper in between Glen's Ditch Road and Moose Lane than on the edges of this area. From the available data, the groundwater table between Glen's Ditch Road and Moose Lane appears to flow in a more southerly direction. At the two soil borings on the airport property, the confining layer was encountered at 17.5 feet bgs near the new fire-training area and 13 feet bgs at the old fire-training area. In this area the groundwater table appears to flow east-southeast and southeast off the runway.

2.3 Monitoring Wells

Discovery installed fifteen monitoring wells between October 5 and October 12, 2019. Monitoring wells are co-located with soil boring locations, as shown on our soil boring logs (Figure 2). The monitoring well depths were dependent on the depth of the confining layer. Generally, where at least 36 feet between the water table and confining layer existed, two monitoring wells were installed at a given location, one spanning the water table, and one set immediately above the confining layer, except for location MW-2 next to the river. Two monitoring wells were installed at locations MW-1, MW-2, and MW-3; one monitoring well was installed at locations MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, and MW-12. This change to the scope was approved by DEC during drilling activities.

We installed two monitoring wells on site, and thirteen monitoring wells off site. Monitoring well depths range from fifteen to forty-six feet bgs. The approximate (rounded) depth of the monitoring well is denoted in the well name (i.e. MW-10-20 was installed at approximately 20 feet bgs).

No sooner than twenty-four hours after installation, the monitoring wells were developed using an inertial pump with a foot valve and surge block until purge water was clear.

Immediately following development, we purged the monitoring well using a peri-pump until water parameters stabilized or a total of three well volumes had been purged. We

measured these parameters

using a multiprobe water quality meter (YSI) and recorded pH, temperature in degrees Celsius ($^{\circ}\text{C}$), conductivity in microSiemens (μS), dissolved oxygen (DO) in milligrams per liter (mg/L), and redox potential in millivolts (mV) approximately once every three minutes until sample collection. The following values were used to indicate stability for a minimum of three consecutive readings: ± 0.1 pH, ± 3 percent $^{\circ}\text{C}$, ± 10 percent DO, ± 3 percent conductivity, and ± 10 mV redox. Water clarity (visual) was also recorded. Following parameter stabilization, we collected PFAS water samples using laboratory-supplied containers. Samples were submitted for analysis of 18 PFAS via EPA Method 537.1.

We discharged purge water to a 55-gallon drum, allowed the sediment to settle, and then used granular activated carbon (GAC) to filter the water before discharging to the ground surface.

Copies of the Monitoring Well Sampling Logs are included in Appendix B, Field Forms.

2.4 Temporary Well Points

Discovery installed eight temporary well points (TWP) using 1-inch diameter PVC casing. TWP locations were selected to fill in areas with potential data gaps from the private-well sampling efforts (Figure 2). The TWP were purged using a peri-pump and new, disposable PFAS-free tubing. Parameters (temperature, pH, conductivity, DO, and redox potential) were measured using a YSI and samples were collected following parameter stabilization, as defined in Section 2.3, or until 3 well volumes had been reached. The TWP groundwater samples were submitted for 18 PFAS analytes by EPA Method 537.1.



Exhibit 2-2: Monitoring well development; visually checking turbidity.

Sample logs for the TWP groundwater samples are included in Appendix B, Field Forms.

2.5 Sediment and Surface Soil Sampling

We collected 41 primary surface soil samples and 9 sediment samples between October 10 and October 14, 2019. Surface soil samples were collected along the active runway perimeters and at potential AFFF release locations. Samples were collected in a grid formation from the former fire-training pit. A grid was not possible in the new fire-training location, as most of the area is asphalted, as shown in Exhibit 2-3. We collected surface soil



Exhibit 2-3: New fire-training location.

samples from the edge of asphalt and near the outfall of three culverts directly in the drainage pathway leading from the asphalted area. We collected surface samples using a decontaminated hand trowel to dig to the target depth, then a new, disposable stainless-steel spoon to fill the laboratory-provided sample jars.

Sediment samples were collected at the same location as surface-water samples, except for location SW-19-05 (Figure 2). These locations were along runway drainage ditches, confluence of drainage ditches and along Glen's ditch. Collection of the sediment samples was completed using a decontaminated hand auger or decontaminated hand-trowel. Laboratory-provided sample jars were filled with the use of a disposable stainless-steel spoon. Care was taken to prevent large pieces of vegetation from entering the sample.

Sediment and surface soil samples were submitted for analysis of 18 PFAS by EPA Method 537.1. Samplings logs are available in Appendix B.

2.6 Hydraulic Gradient and Well Survey

Lounsbury and Associates, Inc. conducted a survey of the monitoring wells and TWP's beginning on October 15, 2019, measuring the well casing elevations and longitude/latitude of each location. We measured the depth to water from the well casing for each monitoring well and TWP on October 15, 2019. We calculated hydraulic gradient using the U.S. Environmental Protection Agency Online Hydraulic Gradient Calculator with well location coordinates, elevation, and depth-to-water values measured on October 15, 2019 as inputs. Results from the 2019 calculations indicate groundwater flow direction varies by location. Near the southern end of runway 11/29, calculations indicated groundwater flow direction is generally east-southeast with a heading of 108 degrees from north and a slope of 0.0015 vertical foot per horizontal foot (Figure 2). In the private-well sampling area north of Parker Drive, the flow direction is generally west-southwest with a heading of 256 degrees from north and a slope of 0.0042 vertical foot per horizontal foot. Within the private-well sampling area south of Parker Drive, the flow direction is generally south-southwest with a heading of 194 degrees from north and a slope of 0.0036 vertical foot per horizontal foot. Results of the survey are presented in Table 1.

2.7 Investigation-derived Waste

Soil generated from borings were contained in nineteen labeled 55-gallon drums and temporarily stored at the DOT&PF property. Pending DEC approval of the drum analytical results, soil will be disposed of by DOT&PF personnel on-site or shipped to a disposal facility. This report does not address the final disposal of the drums.

Purge water generated during groundwater sampling activities was filtered through our portable GAC system and disposed of to the ground surface. The GAC system consisted of three, sealed 5-gallon buckets containing GAC. The buckets were placed in series and fitted with a valve capable of adjusting the water flow through the GAC bucket, providing additional residence time, where needed. Water used to decontaminate the drill augers was also disposed of through the GAC system. Following the completion of groundwater sampling, the GAC was containerized in a labeled 55-gallon drum awaiting disposal.

2.8 Deviations from the Work Plan

In general, we conducted our services in accordance with the approved Work Plan. The following are deviations from the approved Work Plan.

- Immediately prior to our Gustavus visit, DEC released an update to their August 20, 2018 Technical Memorandum on October 2, 2019. Samples were analyzed for the suite of 18 analytes listed in the EPA Method 537.1, instead of for PFOS and PFOA only.

- Due to encountering considerable sand heave at shallow depths, augers were used to complete the deeper wells. With the use of augers and a wood plug we were able to mitigate the sand heave at depth.
- Due to the volume of soil cuttings, soil generated during monitoring well installation was stored in a combination of a five-gallon buckets and 55-gallon drums.
- To reduce the likelihood of damage from snowplows and other machinery, monitoring wells were completed with flush-mount monuments instead of stickup monuments.
- To reduce the potential for cross contamination, temporary well points were installed with one-inch schedule 40 PVC pipe instead of reusable SP15 steel rods.
- Our Work Plan called for collection of surface-water samples using a peristaltic pump and disposable tubing. Due to access issues at some of the locations, surface-water samples were collected with a new disposable, PFAS-free plastic cup. This method was used at each surface-water location for consistency.
- Our Work Plan stated an Eckmann Dredge would be used to collect sediment samples. Due to heavy vegetation and soil conditions, sediment samples were collected with the use of a hand-operated auger.
- Our Work Plan called for taking a daily field blank by pouring PFAS-free water into a sample bottle in the same location project samples were collected. Due to the limited availability of laboratory grade PFAS-free water, we dedicated the PFAS-free water to decontamination efforts and equipment blanks.
- Our Work Plan called for a grid-pattern sampling at the new AFFF training area (Figure 1) near the intersections of runway 11/29 and 02/20. The training area is located on pavement that is sloped towards several drains. After discussion with DEC, we sampled at culvert outfalls and the associated runoff ditches.
- Due to the relatively shallow depth of the confining layer at 9 of the 12 planned well-cluster locations, we installed only one of the two wells at each of those locations. In most of these cases the well screens would have overlapped by several feet if two wells had been installed. In the location where one monitoring well was installed, wells were completed with a screened interval of ten feet. With the exception of MW-12-10, where a 5-foot screen was installed due to the shallow confining layer.
- Due to falling temperatures and after discussion with DEC, a dry decontamination of drill rod and auger was used starting October 8, 2019. A lined pit was constructed to catch soil from rods and augers, which were heated until the metal was red hot and then brushed clean. The soil was containerized into a 55-gallon drum. Additionally, soil borings were drilled in the order of least contaminated to most contaminated (based on previous private well results) in order to minimize cross-contamination potential.

3 ANALYTICAL RESULTS

We submitted the analytical samples collected throughout this project to TestAmerica Laboratories, Inc. (TestAmerica) in West Sacramento, California, also referred to as Eurofins, for determination of PFAS using EPA Method 537.1. This method analyzes a suite of 18 PFAS; we requested analysis of all 18 PFAS, as required by DEC's October 2, 2019 Technical Memorandum.

The analytical results are presented in Tables 2 through 6. The analytical laboratory reports and corresponding DEC Laboratory Data-Review Checklists (LDRCs) are included in Appendices C and D, respectively. Figures 2 and 3 also present analytical results with respect to DEC regulatory levels.

3.1 Groundwater Samples

The groundwater is a known drinking-water source in Gustavus. Groundwater results were compared to the drinking-water action level presented in DEC's October 2019 Technical Memorandum of 70 ppt for the sum of PFOA and PFOS.

We collected 23 analytical groundwater samples from 15 monitoring wells and 8 TWPs (Figure 2). PFOS and PFOA were detected in monitoring wells MW-9-30 and MW-12-10 above 70 ppt for the sum. Monitoring well MW-12-10 is located in the former fire training pit near the southern end of runway 11/29. Monitoring well MW-9-30 is located along Wilson Road, between Far Away Road and Gustavus Road.

Monitoring wells MW-10-20, MW-11-15, and TWP-08 contained PFOS+PFOA concentrations below (but within 25 percent of) the 70 ppt action level. The following monitoring wells were not reported to contain detectable concentrations of PFOS or PFOA: MW-1-15, MW-1-40, MW-2-30, MW-4-20, MW-5-20, MW-6-20, TWP-01, TWP-03, and TWP-04.

Analytical results for the monitoring well and TWP groundwater samples are summarized in Table 2.

3.2 Surface Water Samples

Private wells in Gustavus are largely comprised of shallow (15-25 feet bgs) likely affected by surface-water infiltration. In the absence of a DEC surface-water cleanup level, we compared the surface water results to the 70 ppt drinking-water action level presented in DEC's October 2019 Technical Memorandum.

We collected 10 analytical surface water samples within or near the airport property (Figure 2). PFOS and PFOA were detected above the action level in surface water samples SW-19-03, SW-19-06, SW-19-07, and SW-19-10 four samples. Of these four surface-water locations, two samples (SW-19-06 and SW-19-10) were collected from drainage ditches on either side of the southern end of runway 11/29, SW-19-03 was collected from the drainage ditch just north of Moose Ln and SW-19-07 was collected from the slough near the southern end of runway 02/20, locally referred to as the "duck pond."

Analytical results for the surface water samples are summarized in Table 3.

3.3 Soil Samples

Soil results were compared to 18 AAC 75 Table B1 Method Two – Soil Cleanup Levels (Migration to Groundwater [MTGW] values) of 3.0 µg/kg for PFOS and 1.7 µg/kg PFOA.

3.3.1 Subsurface Soil Samples

We collected 9 analytical samples from the two on-site soil borings (SB-11 and SB-12; Figure 3). PFOS was detected above the DEC MTGW soil cleanup level in the samples collected from the top two feet of both borings. SB-12 is located in the former ("old") fire training burn pit near the southern end of runway 11/29. SB-11 is across a drainage ditch from the "new" fire training area near the north end of runway 02/20.

Analytical sample results for the subsurface soil samples are summarized in Table 4.

3.3.2 Surface Soil Samples

We collected 26 surface soil samples and 3 field duplicates along the two runways and from within the former fire training pit (locations SS-19-01 through SS-19-29; Figure 3). PFOS was detected above the MTGW soil cleanup level in eight project samples and two field duplicates (SS-19-02, SS-19-05, SS-19-06, SS-19-08, SS-19-12, SS-19-13, SS-19-14, SS-19-17, SS-19-18, and SS-19-19).

We also collected surface-soil samples from culverts and drainage outfalls in the direct drainage pathway from the "new" fire training area (locations *SS-19-30* through *SS-19-32* and *Culvert-1* through *Culvert-3*). Each of these locations exceeded the PFOS MTGW cleanup level by twenty times or greater. The outfall samples also exceed PFOA MTGW for samples *SS-19-30*, *SS-19-31*, *Culvert 1* and *Culvert 3*.



Exhibit 3-1: Collecting surface soil sample near *Culvert 2*.

Analytical sample results for the surface soil samples are summarized in Table 5.

3.3.3 Sediment Soil Samples

We collected nine primary sediment samples (one at each surface water location, except for *SW-19-05*) from drainage ditches on and near the airport property (Figure 2). Due to the absence of a sediment cleanup level, we compared sediment concentrations to the DEC MTGW soil cleanup levels for PFOS and PFOA. PFOS was detected above the MTGW soil cleanup level in three sediment samples (*SW-19-03*, *SW-19-06*, and *SW-19-08*); PFOA was not detected above the MTGW soil cleanup level in the sediment samples. The sediment samples with PFOS exceedances are in drainage ditches diverting water from the "new" and "old" fire training areas.

Analytical sample results for the sediment samples are summarized in Table 5.

3.4 Soil IDW Samples

We collected analytical samples from each 55-gallon drum containing soil derived from investigation activities. None of the analytical results were above DEC cleanup levels; however, the drums do contain soil from locations where the analytical results exceed DEC cleanup levels.



Exhibit 3-2: Soil IDW storage drums.

Additionally, Drum 15 contains the spent GAC used for filtrating purged groundwater. A separate letter report will be submitted to DOT&PF and DEC presenting the analytical results and discussing disposal options. The drums will be disposed of accordingly, following DEC approval. DEC approval will be obtained prior to moving or disposing of the soil drums using the DEC Transport, Treatment, and Disposal form.

3.5 GAC Confirmation Samples

GAC confirmation water samples were collected following the development of MW-8-20 (GAC #1) and MW-12-10 (GAC #2). Trace levels of PFOS was detected in sample GAC #2. GAC treatment of purge water and decontamination water is considered successful.

Analytical sample results for the GAC confirmation samples are summarized in Table 6.

4 UPDATED CONCEPTUAL SITE MODEL

We revisited the preliminary conceptual site model (CSM) presented in our Work Plan. The DEC CSM scoping form and graphic form are presented in Appendix E. Per DEC's request, we also completed an ecoscoping form which is presented in Appendix F.

4.1 Description of Potential Receptors

We consider commercial/industrial workers, site visitors, construction workers, subsistence hunters and consumers, farmers/gardeners, and residents to be current or future potential receptors.

4.2 Potential Exposure Pathways

Potential human exposure pathways include inhalation of fugitive dust; direct contact with contaminated sediment; and incidental soil and groundwater ingestion. Additionally, ingestion of wild and farmed foods may be a human exposure pathway as PFOS and PFOA are bioaccumulative (DEC; 2017).

4.2.1 Soil

Incidental ingestion may be a potential direct-contact exposure pathway for soil. Direct contact with the contaminated surface and subsurface soil at the site is unlikely at present. However, future excavation at the site may result in ingestion of soil by commercial workers, site visitors, residents, or construction workers. Contaminated surface soil can become entrained in fugitive dust, which could be a current exposure pathway for site workers, visitors, and nearby residents.

4.2.2 Groundwater

Ingestion of groundwater is an exposure pathway, as several private wells near the GST have been found to have PFAS contamination that exceeds state regulatory levels. Private-

wells near the GST are generally shallow, at about 15 – 25 feet bgs. We understand setting wells in a deeper, uncontaminated aquifer is not an option in Gustavus.

4.2.3 Surface Water and Biota

Surface water, while unlikely to be an exposure pathway because PFAS is not readily absorbed through the skin, is contributing to groundwater contamination by moving contaminants off-site. Animals are known to use the area where a previous surface-water sample showed contamination. Due to the bioaccumulative risk of PFAS, biota is considered a potential pathway for exposure. Our site assessment activities are not designed to assess the biota exposure pathway. However, we understand the State of Alaska is conducting sampling at various PFAS sites to investigate this pathway.

5 DISCUSSION AND RECOMMENDATIONS

We present here our discussion relevant to PFAS in groundwater, surface water and soil at and near the GST property.

5.1 Comparison to Regulatory Limits and Discussion

PFOS was frequently the highest detected PFAS in the analytical samples. Analytical results for the project samples are presented in Tables 2 through 5.

Of the 15 monitoring-well and TWP groundwater samples, monitoring wells MW-9-30 (offsite) and MW-12-10 (onsite) had PFAS concentrations exceeding the action level of 70 ppt for the sum of PFOS and PFOA. MW-9-30 is along Wilson Road in a known area of groundwater contamination, based on private-well results. MW-12-10 is in the former ("old") fire training pit near the southern end of runway 11/29. Additionally, monitoring wells MW-10-20, MW-11-15, and TWP-08 contained PFOS and/or PFOA concentrations below, but within 25 percent of, the 70 ppt action level.

Surface-water concentrations exceeded the action level of 70 ppt for the sum of PFOS and PFOA at locations SW-19-03, SW-19-06, SW-19-07, and SW-19-10 (Figure 2). Location SW-19-06, SW-19-07, and SW-19-08 are repeat sample locations for the August 2018 samples SW-2002, SW-2001, and SW-2000, respectively. Information for these samples is presented in our summary report *August 2018 to November 2018 Private Well Sampling - Revision 1*, dated April 2019. The highest concentration observed during both sampling events is observed in the samples collected from the drainage outfall near the former fire training pit at the southern end of runway 11/29. The second highest concentrations observed during both sampling

events is observed in samples *SW-19-07* and *SW-2001* collected from the slough north of the 02/20 runway, also referred to by the local community as the "duck pond."

During our October 2019 sampling event, we observed water moving from the "duck pond" into the drainage channel known as Glen's Ditch. The ditch meets a drainage channel from the airport at location *SW-19-08* (Figure 2) and flows south to the Icy Strait. Slightly lower concentrations of PFOS and PFOA are observed in *SW-19-04* compared to *SW-19-08*, located downstream of *SW-19-08*. Concentrations in *SW-19-03* are similar to concentrations reported for the airport terminal well located near the drainage ditch. However, private wells located on Moose Lane and monitoring well MW-7-20 are also in the area of the *SW-19-03* ditch but do not have measurable PFOS and PFOA concentrations or have trace-level concentrations.

In the absence of federal or state regulatory values for PFAS contaminants in sediment, we reference the most stringent soil cleanup level (MTGW) for comparing to sediments. We are unable to address if the MTGW is sufficiently sensitive (protective of human health) for addressing sediment concentrations. However, we understand DEC obtained the organic carbon partition coefficient (K_{oc}) values used for calculating the MTGW soil cleanup level for PFOS and PFOA from a peer-reviewed study of PFAS surfactants on sediment. PFOS was detected above the MTGW soil cleanup level in three sediment samples (*SW-19-03*, *SW-19-06*, and *SW-19-08*); PFOA was not detected above the MTGW soil cleanup level in the sediment samples. The sediment samples with PFOS exceedances are in drainage ditches diverting water from the "new" and "old" fire training areas.

Reviewing the data from site characterization activities in conjunction with previous private well samples suggests surface water has one of the largest influences on transporting PFAS off the GST. Conversations with a long-time resident who resides nearby the airport property indicated AFFF training may have occurred near or at the "duck pond" area.

We observed several pathways for PFAS to enter the surface water drainage ditches and/or groundwater from the "new" fire training area. Several cracks are present in the asphalt, as shown in Exhibit 5-1. Additionally, water and other liquids from this area are gravity fed into a drainage system that releases its contents at three culvert outfalls into a drainage ditch. The highest concentrations of PFOS and PFOA reported in soil samples collected for this project were in surface soil samples collect near



Exhibit 5-1: Asphalt cracks in known release area at north end of runway 02/20.

the three culverts. We understand DOT&PF plans to reconstruct the airport apron in this area in the upcoming field season/s.

Contributions to the groundwater from the "duck pond" and drainage ditches leading from the "new" fire training area are likely the biggest contributor to private-well contamination west of the airport.

5.2 Recommendations

Based on our previous work and our current site characterization we recommend the DOT&PF to continue:

- investigating the impact and flow of surface water;
- attempting to locate potential AFFF source areas;
- working with the DEC and DHSS to educate the public regarding the potential health effects of exposure to PFAS-containing water; and
- refraining from discharging PFAS-containing AFFF to the ground, surface water bodies or groundwater from ARFF training areas, equipment testing, or emergency response, where possible.

We also recommend:

- expanding the monitoring-well network, specifically on airport property and near the DOT&PF building and airport terminal wells;
- collecting analytical samples from the current monitoring-well network on a quarterly basis for a minimum of one year;
- further investigating the groundwater elevations and gradient along the portions of Gustavus Road that runs southwest to northeast from the airport terminals (Figure 4);
- completing a soil management plan for the construction work planned near the "new" fire training area;
- further investigating surface-water bodies originating at the airport and mapping the surface water/storm drainage features to determine where stagnant water may infiltrate, based on site visits, and locally available information; and
- excavating surface soils with concentrations exceeding the DEC MTGW soil cleanup levels.

Our recommendations are based on:

- Groundwater conditions inferred through private-well, monitoring-well, temporary-well-point and surface-water samples collected from August 27, 2018 through October 15, 2019.
- Soil conditions observed on, near and downgradient of the GST.

- The results of testing performed on soil and water samples we collected from the private wells, monitoring wells, temporary well points and surface water on, near, and downgradient from the GST.
- Publicly available literature and data we reviewed for this project, including USGS, 2018.
- Our understanding of the project and information provided by the DOT&PF, DRM, and other members of the project team.
- The limitations of our approved scope described in our Work Plan dated July 2019 and August 2019 Proposed Scope of Services.

The information included in this report is based on limited sampling and should be considered representative of the times and locations at which the sampling occurred. Regulatory agencies may reach different conclusions than Shannon & Wilson. We have prepared and included in, "Important Information about your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of this report.

6 REFERENCES

- Alaska Department of Environmental Conservation (DEC), 2017, 18 AAC 75: Oil and other hazardous substances pollution control: Juneau, Alaska, July, available: <http://dec.alaska.gov/commish/regulations/>.
- Alaska Department of Environmental Conservation (DEC), 2017, 18 AAC 75.341 Table C, Groundwater-Cleanup Levels.
- Alaska Department of Environmental Conservation (DEC), 2017, Guidance on Developing Conceptual Site Models.
- Alaska Department of Environmental Conservation (DEC), 2017, Field Sampling Guidance: Juneau, Alaska, DEC Division of Spill Prevention and Response, Contaminated Sites Program, August, available: http://dec.alaska.gov/spar/csp/guidance_forms/csguidance.htm.
- Alaska Department of Environmental Conservation (DEC), 2017, Site characterization work plan and reporting guidance for investigation of contaminated sites: Juneau, Alaska, DEC Division of Spill Prevention and Response, Contaminated Sites Program, March, available: http://dec.alaska.gov/spar/csp/guidance_forms/csguidance.htm.
- EPA, (2016, February 23). *EPA On-Line Tools for Site Assessment Calculation*. Retrieved from <https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/gradient4plus-ns.html>

Table 1 - Groundwater Elevations

Well Name	Elevation of Ground Surface	Elevation of Casing	Depth to Water	Elevation of Water	Northing	Easting
MW-1-15	19.27	19.05	7.15	11.90	2407620.248	2289623.196
MW-1-40	19.16	19.00	7.13	11.87	2407622.108	2289617.430
MW-2-20	23.69	23.30	13.36	9.94	2409261.801	2288614.798
MW-2-30	23.79	23.57	13.58	9.99	2409258.163	2288614.577
MW-3-15	23.26	22.93	8.42	14.51	2408922.502	2289839.256
MW-3-40	23.16	22.92	8.46	14.46	2408922.125	2289835.560
MW-4-20	25.22	25.02	1.21	23.81	2410099.560	2294867.055
MW-5-20	23.42	23.20	7.63	15.57	2410646.767	2289471.621
MW-6-20	29.39	29.23	7.16	22.07	2409731.495	2293028.194
MW-7-20	29.46	29.25	6.87	22.38	2411453.445	2295289.432
MW-8-20	27.58	27.38	4.60	22.78	2411196.613	2290886.673
MW-9-30	25.06	24.93	4.92	20.01	2409604.104	2290908.154
MW-10-20	25.62	25.68	3.40	22.28	2410131.794	2290923.201
MW-11-15	29.14	28.97	3.98	24.99	2413101.475	2294641.146
MW-12-10	19.24	19.28	0.31	18.97	2411546.696	2298074.245
TWP-01	28.82	31.77	7.84	23.93	2412506.535	2290957.722
TWP-02	26.59	29.31	9.09	20.22	2408890.820	2291623.826
TWP-03	26.49	29.73	7.72	22.01	2411344.367	2296587.940
TWP-04	25.01	28.09	8.52	19.57	2410284.712	2298006.999
TWP-05	24.67	27.48	6.53	20.95	2410861.435	2298646.126
TWP-06	33.51	38.14	10.00	28.14	2415555.178	2293139.200
TWP-07	29.67	31.16	1.82	29.34	2416890.076	2292829.369
TWP-08	27.09	31.95	8.29	23.66	2410607.399	2291564.030

Table 2 - Summary of Gustavus Airport Site Characterization Groundwater Analytical Results

Analytes	LHA	Units	MW-1-15	MW-1-40	MW-2-20	MW-2-30	MW-3-15	MW-3-40		MW-4-20
			10/10/19 17:41	10/10/19 14:47	10/11/19 15:45	10/11/19 14:40	10/12/19 15:02	MW-3-40	MW-103-40 (DUP)	10/10/19 10:00
								10/12/19 13:11	10/12/19 13:01	
Perfluorohexansulfonic acid (PFHxS)	—	ppt	1.1 J	<1.9	3.9	1.4 J	3.7	31	32	<1.9
Perfluorohexanoic acid (PFHxA)	—	ppt	<1.8	<1.9	4.6	<1.8	<1.8	5.3	5.2 J*	<1.9
Perfluoroheptanoic acid (PFHpA)	—	ppt	<1.8	<1.9	0.95 J	<1.8	<1.8	1.1 J	<1.9	<1.9
Perfluorononanoic acid (PFNA)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluorobutanesulfonic acid (PFBS)	—	ppt	<1.8	<1.9	<1.9	1.5 J	<1.8	3.2	2.9	<1.9
Perfluorodecanoic acid (PFDA)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluoroundecanoic acid (PFUnA)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluorododecanoic acid (PFDoA)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluorotridecanoic acid (PFTTrDA)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluorotetradecanoic acid (PFTTeA)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	ppt	<18	<19	<19	<18	<18	<19	<19	<19
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	ppt	<18	<19	<19	<18	<18	<19	<19	<19
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	ppt	<1.8	<1.9	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	ppt	<3.7	<3.8	<3.8	<3.7	<3.7	<3.7	<3.8	<3.8
Perfluorooctanesulfonic acid (PFOS)	70	ppt	<1.8	<1.9	3.8	<1.8	9.5	9.0 J*	8.5 J*	<1.9
Perfluorooctanoic acid (PFOA)	70	ppt	<1.8	<1.9	1.5 J	<1.8	<1.8	2.1	2.8	<1.9
LHA Combined (PFOS + PFOA)	70	ppt	n/a	n/a	5.3 J	n/a	9.5 ‡	11 J*	11 J*	n/a
LHA Combined (PFOS + PFOA) 2xDL	70	ppt	2.6 μ	2.6 μ	5.3	2.6 μ	11 μ	11 J*	11 J*	2.6 μ

ppt parts per trillion, equivalent to nanograms per liter
 EPA Environmental Protection Agency
 LHA Lifetime Health Advisory
 † EPA LHA level is 70 ppt for PFOS and PFOA combined.
 μ The summed concentration was calculated using a value two times the laboratory detection limit for non-detect analytes, per ADEC's March 2019 Technical Memorandum.
 < Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
Bold Detected concentration exceeds LHA level.
 DUP field-duplicate sample
 J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
 JH* Result considered estimated due to a QC failure, and is biased high. Flag applied by Shannon & Wilson, Inc.
 J* Result considered estimated due to a QC failure. Flag applied by Shannon & Wilson, Inc.
 B* Result is included in the same preparatory batch as a blank detection for the associated analyte. Flag applied by Shannon & Wilson, Inc.
 ‡ Minimum concentration, the LHA Combined concentration includes one or more result that is not detected greater than the MDL.
 — LHA level not established

Table 2 - Summary of Gustavus Airport Site Characterization Groundwater Analytical Results

Analytes	MW-5-20	MW-6-20	MW-7-20	MW-8-20	MW-9-30	MW-10-20	MW-11-15		MW-12-10	TWP-01
	10/11/19 18:10	10/12/19 17:47	10/13/19 11:29	10/13/19 18:09	10/13/19 13:47	10/13/19 16:04	MW-11-15 10/14/19 11:29	MW-111-15 (DUP) 10/14/19 11:19	10/14/19 13:27	10/11/19 13:49
Perfluorohexansulfonic acid (PFHxS)	3.1	2.9	1.5 JH*	<1.9 B*	15 B	12	12 B	12 B	52 B	1.1 J
Perfluorohexanoic acid (PFHxA)	<1.9	<1.9	1.1 J	<1.9	5.5	5.6	18	18	17	<1.9
Perfluoroheptanoic acid (PFHpA)	<1.9	<1.9	0.56 J	<1.9	2.2	2.3	4.8	4.8	10	<1.9
Perfluorononanoic acid (PFNA)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	1.0 J	0.88 J	0.83 J	<1.9
Perfluorobutanesulfonic acid (PFBS)	0.31 J	<1.9	0.35 J	<1.9	1.2 J	0.75 J	1.2 J	1.3 J	3.1	<1.9
Perfluorodecanoic acid (PFDA)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	1.7 J	1.8 J	<1.9	<1.9
Perfluoroundecanoic acid (PFUnA)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	1.4 J	1.2 J	<1.9	<1.9
Perfluorododecanoic acid (PFDoA)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	0.68 J	0.68 J	<1.9	<1.9
Perfluorotridecanoic acid (PFTrDA)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Perfluorotetradecanoic acid (PFTeA)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Hexafluoropropylene oxide dimer acid (HFPO-DA)	<3.8	<3.8	<3.8	<3.9	<3.8	<3.8	<3.7	<3.7	<3.7	<3.7
Perfluorooctanesulfonic acid (PFOS)	<1.9	<1.9	1.3 J	0.81 J	97	49	39	38	180	<1.9
Perfluorooctanoic acid (PFOA)	<1.9	<1.9	1.4 J	<1.9	1.5 J	1.2 J	1.9	1.8 J	8.4	<1.9
LHA Combined (PFOS + PFOA)	n/a	n/a	2.7 J	0.81 J‡	99 J	50 J	41	40 J	188	n/a
LHA Combined (PFOS + PFOA) 2xDL	2.6 μ	2.7 μ	2.7	2.5 μ	99	50	41	40	188	2.6 μ

Table 2 - Summary of Gustavus Airport Site Characterization Groundwater Analytical Results

Analytes	TWP-02	TWP-03	TWP-04	TWP-05	TWP-06	TWP-07		TWP-08
	10/11/19 16:00	10/11/19 17:09	10/13/19 17:02	10/13/19 17:55	10/14/19 16:24	TWP-07	TWP-107 (DUP)	10/13/19 14:47
						10/14/19 17:15	10/14/19 17:05	
Perfluorohexansulfonic acid (PFHxS)	1.4 J	0.91 J	<2.0 B*	2.6 B	<1.9 B*	11 B	11 B	15 B
Perfluorohexanoic acid (PFHxA)	<1.9	<1.9	<2.0	0.62 J	<1.9	<1.9	<1.9	5.8
Perfluoroheptanoic acid (PFHpA)	<1.9	<1.9	<2.0	0.36 J	0.30 J	<1.9	<1.9	2.3
Perfluorononanoic acid (PFNA)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
Perfluorobutanesulfonic acid (PFBS)	<1.9	0.50 J	<2.0	0.23 J	<1.9	0.71 J	0.73 J	1.1 J
Perfluorodecanoic acid (PFDA)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
Perfluoroundecanoic acid (PFUnA)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
Perfluorododecanoic acid (PFDoA)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
Perfluorotridecanoic acid (PFTTrDA)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
Perfluorotetradecanoic acid (PFTeA)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	<19	<19	<20	<19	<19	<19	<19	<20
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	<19	<19	<20	<19	<19	<19	<19	<20
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	<2.0
Hexafluoropropylene oxide dimer acid (HFPO-DA)	<3.8	<3.8	<3.9	<3.7	<3.8	<3.8	<3.8	<3.9
Perfluorooctanesulfonic acid (PFOS)	2.0	<1.9	<2.0	1.4 J	0.57 J	1.5 J	1.5 J	22
Perfluorooctanoic acid (PFOA)	<1.9	<1.9	<2.0	<1.9	<1.9	<1.9	<1.9	1.3 J
LHA Combined (PFOS + PFOA)	2.0 ‡	n/a	n/a	1.4 J‡	0.57 J‡	1.5 J‡	1.5 J‡	23 J
LHA Combined (PFOS + PFOA) 2xDL	3.6 µ	2.6 µ	2.7 µ	3.0 µ	2.2 µ	3.1 µ	3.1 µ	23

Table 3 - Summary of Gustavus Airport Site Characterization Surface Water Analytical Results

Analyte	LHA	Units	SW-19-01	SW-19-02	SW-19-03	SW-19-04	SW-19-05	SW-19-06	SW-19-07	SW-19-08
			10/9/19 14:10	10/9/19 15:01	10/9/19 15:40	10/9/19 16:42	10/10/19 9:31	10/10/19 9:52	10/10/19 10:37	10/10/19 11:50
Perfluorohexansulfonic acid (PFHxS)	—	ppt	<1.9 B*	8.2	54	15	0.46 J	64	61	25
Perfluorohexanoic acid (PFHxA)	—	ppt	<1.9	4.1	16	8.5	<1.9	27	4.8	11
Perfluoroheptanoic acid (PFHpA)	—	ppt	0.40 J	1.4 J	3.8	3.7	0.61 J	7.1	1.6 J	5.6
Perfluorononanoic acid (PFNA)	—	ppt	<1.9	0.30 J*	0.37 J	<1.9	<1.9	1.1 J	<2.0	<1.9
Perfluorobutanesulfonic acid (PFBS)	—	ppt	<1.9	0.86 J	5.8	0.90 J	<1.9	7.8	1.9 J	1.2 J
Perfluorodecanoic acid (PFDA)	—	ppt	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9	<2.0	<1.9
Perfluoroundecanoic acid (PFUnA)	—	ppt	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9	<2.0	<1.9
Perfluorododecanoic acid (PFDoA)	—	ppt	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9	<2.0	<1.9
Perfluorotridecanoic acid (PFTrDA)	—	ppt	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9	<2.0	<1.9
Perfluorotetradecanoic acid (PFTeA)	—	ppt	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9	<2.0	<1.9
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	ppt	<19	<18	<18	<19	<19	<19	<20	<19
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	ppt	<19	<18	<18	<19	<19	<19	<20	<19
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	ppt	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9	<2.0	<1.9
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	ppt	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9	<2.0	<1.9
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	ppt	<1.9	<1.8	<1.8	<1.9	<1.9	<1.9	<2.0	<1.9
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	ppt	<3.9	<3.6	<3.7	<3.8	<3.8	<3.8	<4.0	<3.8
Perfluorooctanesulfonic acid (PFOS)	70	ppt	<1.9	41	220	49	0.53 J*	370 J*	120	61
Perfluorooctanoic acid (PFOA)	70	ppt	<1.9	1.5 J	5.1	1.5 J	<1.9	8.7	4.2	2.3
LHA Combined (PFOS + PFOA)	70	ppt	n/a	43 J	225	51 J	0.53 J*†	379 J*	124	63
LHA Combined (PFOS + PFOA) 2xDL	70	ppt	2.7 μ	43	225	51	2.1 J*μ	379 J*	124	63

ppt parts per trillion, equivalent to nanograms per liter

EPA Environmental Protection Agency

LHA Lifetime Health Advisory

† EPA LHA level is 70 ppt for PFOS and PFOA combined.

μ The summed concentration was calculated using a value two times the laboratory detection limit for non-detect analytes, per ADEC's March 2019 Technical Memorandum.

< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.

Bold Concentration exceeds LHA level.

DUP Field-duplicate sample

J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.

JH* Result considered estimated due to a QC failure, and is biased high. Flag applied by Shannon & Wilson, Inc.

J* Result considered estimated due to a QC failure. Flag applied by Shannon & Wilson, Inc.

B* Result is included in the same preparatory batch as a blank detection for the associated analyte. Flag applied by Shannon & Wilson, Inc.

‡ Minimum concentration, the LHA Combined concentration includes one or more result that is not detected greater than the MDL.

Table 3 - Summary of Gustavus Airport Site Characterization Surface Water Analytical Results

Analyte	SW-19-09	SW-19-10	
	10/10/19 12:50	SW-19-10 10/14/19 13:43	SW-19-11 (DUP) 10/14/19 13:30
Perfluorohexansulfonic acid (PFHxS)	2.5	38 B	38 B
Perfluorohexanoic acid (PFHxA)	<1.9	19	19
Perfluoroheptanoic acid (PFHpA)	0.28 J	7.3	7.5
Perfluorononanoic acid (PFNA)	<1.9	1.3 J	1.4 J
Perfluorobutanesulfonic acid (PFBS)	<1.9	3.2	3.2
Perfluorodecanoic acid (PFDA)	<1.9	0.36 J	0.47 J
Perfluoroundecanoic acid (PFUnA)	<1.9	<2.0	<1.9
Perfluorododecanoic acid (PFDoA)	<1.9	<2.0	<1.9
Perfluorotridecanoic acid (PFTrDA)	<1.9	<2.0	<1.9
Perfluorotetradecanoic acid (PFTeA)	<1.9	<2.0	<1.9
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	<19	<20	<19
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	<19	<20	<19
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	<1.9	<2.0	<1.9
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	<1.9	<2.0	<1.9
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.9	<2.0	<1.9
Hexafluoropropylene oxide dimer acid (HFPO-DA)	<3.9	<4.0	<3.8
Perfluorooctanesulfonic acid (PFOS)	<1.9	170	170
Perfluorooctanoic acid (PFOA)	<1.9	6.0	6.0
LHA Combined (PFOS + PFOA)	n/a	176	176
LHA Combined (PFOS + PFOA) 2xDL	2.7 μ	176	176

Table 4 - Summary of Gustavus Site Characterization Soil Boring Analytical Results

Analyte	Cleanup Level	Units	SB-11-1	SB-11-3.5	SB-11-12	SB-11-19	SB-12-0		SB-12-1.5	SB-12-7
			10/12/19 8:25	10/12/19 8:27	10/12/19 8:30	10/12/19 8:32	SB-12-0 10/12/19 10:10	SB-112-0 (DUP) 10/12/19 10:00	10/12/19 10:12	10/12/19 10:15
Perfluorohexansulfonic acid (PFHxS)	—	µg/kg	0.16 J	<0.30	0.29	0.049 J	2.3 J*	0.80 J*	0.95	0.063 J
Perfluorohexanoic acid (PFHxA)	—	µg/kg	0.26 J	<0.30	0.049 J	<0.26	4.4 J*	0.75 J*	0.28	<0.24
Perfluoroheptanoic acid (PFHpA)	—	µg/kg	0.24 J	<0.30	<0.23	<0.26	0.60 J*	0.15 J*	0.041 J	<0.24
Perfluorononanoic acid (PFNA)	—	µg/kg	0.12 J	<0.30	<0.23	<0.26	0.30 J*	0.094 J*	<0.23	<0.24
Perfluorobutanesulfonic acid (PFBS)	—	µg/kg	<0.28	<0.30	<0.23	<0.26	0.13 J*	0.055 J*	0.039 J	<0.24
Perfluorodecanoic acid (PFDA)	—	µg/kg	<0.28	<0.30	<0.23	<0.26	0.95 J*	0.22 J*	<0.23	<0.24
Perfluoroundecanoic acid (PFUnA)	—	µg/kg	0.056 J	<0.30	<0.23	<0.26	0.60	0.63 J*	<0.23	<0.24
Perfluorododecanoic acid (PFDoA)	—	µg/kg	<0.28	<0.30	<0.23	<0.26	0.22 J	0.34	<0.23	<0.24
Perfluorotridecanoic acid (PFTrDA)	—	µg/kg	<0.28	<0.30	<0.23	<0.26	<0.24	<0.24	<0.23	<0.24
Perfluorotetradecanoic acid (PFTeA)	—	µg/kg	<0.28	<0.30	<0.23	<0.26	0.15 J	0.094 J	<0.23	<0.24
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	µg/kg	<2.8	<3.0	<2.3	<2.6	<2.4	<2.4	<2.3	<2.4
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	µg/kg	<2.8	<3.0	<2.3	<2.6	<2.4	<2.4	<2.3	<2.4
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	µg/kg	<0.28	<0.30	<0.23	<0.26	<0.24	<0.24	<0.23	<0.24
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	µg/kg	<0.28	<0.30	<0.23	<0.26	<0.24	<0.24	<0.23	<0.24
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	µg/kg	<0.28	<0.30	<0.23	<0.26	<0.24	<0.24	<0.23	<0.24
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	µg/kg	<0.35	<0.37	<0.29	<0.32	<0.30	<0.30	<0.29	<0.30
Perfluorooctanesulfonic acid (PFOS)	3.0	µg/kg	3.6	<0.74	1.3	0.43 J	14	8.6	5.3	0.30 J
Perfluorooctanoic acid (PFOA)	1.7	µg/kg	<0.28	<0.30	<0.23	<0.26	1.9 J*	0.38 J*	0.14 J	<0.24

µg/kg micrograms per kilogram

< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.

J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.

J* Result considered estimated due to a QC failure. Flag applied by Shannon & Wilson, Inc.

Bold Detected concentration exceeds regulatory limit.

— Cleanup level not established

SB-XX-Y XX is boring number; Y is shallowest depth of analytical sample

Table 4 - Summary of Gustavus Site Characterization Soil Boring Analytical Results

Analyte	Cleanup Level	Units	SB-12-13	SB-12-17
			10/12/19 10:20	10/12/19 10:22
Perfluorohexansulfonic acid (PFHxS)	—	µg/kg	<0.22	<0.23
Perfluorohexanoic acid (PFHxA)	—	µg/kg	<0.22	<0.23
Perfluoroheptanoic acid (PFHpA)	—	µg/kg	<0.22	<0.23
Perfluorononanoic acid (PFNA)	—	µg/kg	<0.22	<0.23
Perfluorobutanesulfonic acid (PFBS)	—	µg/kg	<0.22	<0.23
Perfluorodecanoic acid (PFDA)	—	µg/kg	<0.22	<0.23
Perfluoroundecanoic acid (PFUnA)	—	µg/kg	<0.22	<0.23
Perfluorododecanoic acid (PFDoA)	—	µg/kg	<0.22	<0.23
Perfluorotridecanoic acid (PFTrDA)	—	µg/kg	<0.22	<0.23
Perfluorotetradecanoic acid (PFTeA)	—	µg/kg	<0.22	<0.23
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	µg/kg	<2.2	<2.3
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	µg/kg	<2.2	<2.3
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	µg/kg	<0.22	<0.23
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	µg/kg	<0.22	<0.23
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	µg/kg	<0.22	<0.23
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	µg/kg	<0.27	<0.29
Perfluorooctanesulfonic acid (PFOS)	3.0	µg/kg	<0.55	<0.58
Perfluorooctanoic acid (PFOA)	1.7	µg/kg	<0.22	<0.23

Table 5 - Summary of Gustavus Site Characterization Surface Soil and Sediment Analytical Results

Analyte	Cleanup Level	Units	SS-19-01	SS-19-02	SS-19-03	SS-19-04	SS-19-05	SS-19-06	SS-19-07	SS-19-08
			10/14/19 8:09	10/14/19 8:28	10/14/19 8:40	10/14/19 8:51	10/14/19 8:54	10/14/19 9:01	10/14/19 9:13	10/14/19 9:43
Perfluorohexansulfonic acid (PFHxS)	—	µg/kg	<0.21	0.25	0.063 J	0.038 J	2.2	0.32	0.043 J	0.54
Perfluorohexanoic acid (PFHxA)	—	µg/kg	<0.21	0.052 J	0.11 J	0.068 J	0.74	0.18 J	0.059 J	0.15 J
Perfluoroheptanoic acid (PFHpA)	—	µg/kg	<0.21	<0.21	0.18 J	0.088 J	0.29	0.17 J	0.097 J	0.13 J
Perfluorononanoic acid (PFNA)	—	µg/kg	<0.21	<0.21	0.16 J	0.070 J	0.23	0.16 J	0.075 J	0.12 J
Perfluorobutanesulfonic acid (PFBS)	—	µg/kg	<0.21	<0.21	<0.20	<0.21	0.070 J	<0.20	<0.21	<0.21
Perfluorodecanoic acid (PFDA)	—	µg/kg	<0.21	<0.21	0.10 J	0.050 J	0.99	1.2	0.047 J	0.20 J
Perfluoroundecanoic acid (PFUnA)	—	µg/kg	<0.21	<0.21	0.068 J	0.054 J	0.61	0.13 J	0.072 J	<0.21
Perfluorododecanoic acid (PFDoA)	—	µg/kg	<0.21	<0.21	<0.20	<0.21	0.34	<0.20	<0.21	0.075 J
Perfluorotridecanoic acid (PFTrDA)	—	µg/kg	<0.21	<0.21	<0.20	<0.21	0.062 J	<0.20	<0.21	<0.21
Perfluorotetradecanoic acid (PFTeA)	—	µg/kg	<0.21	<0.21	<0.20	<0.21	0.067 J	<0.20	<0.21	<0.21
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	µg/kg	<2.1	<2.1	<2.0	<2.1	<2.1	<2.0	<2.1	<2.1
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	µg/kg	<2.1	<2.1	<2.0	<2.1	<2.1	<2.0	<2.1	<2.1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	µg/kg	<0.21	<0.21	<0.20	<0.21	<0.21	<0.20	<0.21	<0.21
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	µg/kg	<0.21	<0.21	<0.20	<0.21	<0.21	<0.20	<0.21	<0.21
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	µg/kg	<0.21	<0.21	<0.20	<0.21	<0.21	<0.20	<0.21	<0.21
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	µg/kg	<0.26	<0.27	<0.25	<0.26	<0.26	<0.25	<0.26	<0.26
Perfluorooctanesulfonic acid (PFOS)	3.0	µg/kg	<0.52	3.8	0.53	<0.52	29 J*	3.3	0.26 J	8.9
Perfluorooctanoic acid (PFOA)	1.7	µg/kg	<0.21	<0.21	0.17 J	<0.21	0.71	0.20	<0.21	0.28

µg/kg micrograms per kilogram

< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.

J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.

JH* Result considered estimated due to a QC failure, and is biased high. Flag applied by Shannon & Wilson, Inc.

J* Result considered estimated due to a QC failure. Flag applied by Shannon & Wilson, Inc.

B* Result is included in the same preparatory batch as a blank detection for the associated analyte. Flag applied by Shannon & Wilson, Inc.

Bold Detected concentration exceeds regulatory limit.

DUP field-duplicate sample

— Cleanup level not established

Table 5 - Summary of Gustavus Site Characterization Surface Soil and Sediment Analytical Results

Analyte	Cleanup Level	Units	SS-19-09	SS-19-10	SS-19-11	SS-19-12	SS-19-13		SS-19-15	SS-19-16
			10/14/19 9:48	10/14/19 9:51	10/14/19 9:59	10/14/19 10:07	SS-19-13 10/14/19 10:13	SS-19-14 (DUP) 10/14/19 10:00	10/14/19 10:23	10/14/19 10:29
Perfluorohexansulfonic acid (PFHxS)	—	µg/kg	0.53	0.36	0.31	0.79	0.94	1.5	0.38	0.58
Perfluorohexanoic acid (PFHxA)	—	µg/kg	0.96	0.14 J	0.079 J	0.23 J	0.32	0.43	0.13 J	0.094 J
Perfluoroheptanoic acid (PFHpA)	—	µg/kg	1.8	0.099 J	0.091 J	0.11 J	0.085 J	0.11 J	0.087 J	0.053 J
Perfluorononanoic acid (PFNA)	—	µg/kg	0.93	0.10 J	0.050 J	0.079 J	0.079 J	0.089 J	0.047 J	<0.25
Perfluorobutanesulfonic acid (PFBS)	—	µg/kg	<0.25	<0.20	<0.22	<0.25	0.054 J	0.049 J	<0.25	0.037 J
Perfluorodecanoic acid (PFDA)	—	µg/kg	3.1	0.30	0.077 J	0.099 J	0.076 J	0.089 J	<0.25	0.034 J
Perfluoroundecanoic acid (PFUnA)	—	µg/kg	3.9	0.29	0.089 J	0.14 J	<0.25	<0.25	0.055 J	<0.25
Perfluorododecanoic acid (PFDoA)	—	µg/kg	1.3	0.11 J	<0.22	<0.25	<0.25	<0.25	<0.25	<0.25
Perfluorotridecanoic acid (PFTrDA)	—	µg/kg	<0.25	<0.20	<0.22	<0.25	<0.25	<0.25	<0.25	<0.25
Perfluorotetradecanoic acid (PFTeA)	—	µg/kg	0.13 J	<0.20	<0.22	0.082 J*	<0.25	<0.25	<0.25	<0.25
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	µg/kg	<2.5	<2.0	<2.2	<2.5	<2.5	<2.5	<2.5	<2.5
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	µg/kg	<2.5	<2.0	<2.2	<2.5	<2.5	<2.5	<2.5	<2.5
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	µg/kg	<0.25	<0.20	<0.22	<0.25	<0.25	<0.25	<0.25	<0.25
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	µg/kg	<0.25	<0.20	<0.22	<0.25	<0.25	<0.25	<0.25	<0.25
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	µg/kg	<0.25	<0.20	<0.22	<0.25	<0.25	<0.25	<0.25	<0.25
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	µg/kg	<0.31	<0.25	<0.27	<0.32	<0.31	<0.31	<0.31	<0.31
Perfluorooctanesulfonic acid (PFOS)	3.0	µg/kg	2.0	1.5	1.8	5.0	6.8	9.2	0.76	2.5
Perfluorooctanoic acid (PFOA)	1.7	µg/kg	1.0	0.35	0.12 J	0.29	0.22 J	0.27	0.13 J	0.17 J

Table 5 - Summary of Gustavus Site Characterization Surface Soil and Sediment Analytical Results

Analyte	Cleanup Level	Units	SS-19-17		SS-19-19	SS-19-20	SS-19-21	SS-19-22		SS-19-24
			SS-19-17	SS-19-18 (DUP)				SS-19-22	SS-19-23 (DUP)	
			10/14/19 10:34	10/14/19 10:20	10/14/19 10:46	10/14/19 12:16	10/14/19 12:28	10/14/19 12:35	10/14/19 12:00	10/14/19 12:49
Perfluorohexansulfonic acid (PFHxS)	—	µg/kg	0.86	0.78	2.4	<0.21	0.032 J*	0.033 J	<0.20	<0.23
Perfluorohexanoic acid (PFHxA)	—	µg/kg	0.34	0.38	0.27	<0.21	0.057 J	0.059 J*	0.051 J	<0.23
Perfluoroheptanoic acid (PFHpA)	—	µg/kg	0.074 J	0.069 J	0.072 J	<0.21	0.030 J	0.034 J	<0.20	<0.23
Perfluorononanoic acid (PFNA)	—	µg/kg	<0.26	<0.24	0.044 J	<0.21	<0.20	<0.20	<0.20	<0.23
Perfluorobutanesulfonic acid (PFBS)	—	µg/kg	<0.26	<0.24	0.055 J*	<0.21	<0.20	0.033 J	0.035 J*	<0.23
Perfluorodecanoic acid (PFDA)	—	µg/kg	0.062 J	0.073 J	0.073 J	<0.21	<0.20	<0.20	<0.20	<0.23
Perfluoroundecanoic acid (PFUnA)	—	µg/kg	0.060 J	0.061 J	0.091 J	<0.21	<0.20	<0.20	<0.20	<0.23
Perfluorododecanoic acid (PFDoA)	—	µg/kg	<0.26	<0.24	<0.24	<0.21	<0.20	<0.20	<0.20	<0.23
Perfluorotridecanoic acid (PFTrDA)	—	µg/kg	<0.26	<0.24	<0.24	<0.21	<0.20	<0.20	<0.20	<0.23
Perfluorotetradecanoic acid (PFTeA)	—	µg/kg	<0.26	<0.24	<0.24	<0.21	<0.20	<0.20	<0.20	<0.23
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	µg/kg	<2.6	<2.4	<2.4	<2.1	<2.0	<2.0	<2.0	<2.3
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	µg/kg	<2.6	<2.4	<2.4	<2.1	<2.0	<2.0	<2.0	<2.3
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	µg/kg	<0.26	<0.24	<0.24	<0.21	<0.20	<0.20	<0.20	<0.23
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	µg/kg	<0.26	<0.24	<0.24	<0.21	<0.20	<0.20	<0.20	<0.23
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	µg/kg	<0.26	<0.24	<0.24	<0.21	<0.20	<0.20	<0.20	<0.23
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	µg/kg	<0.32	<0.30	<0.30	<0.26	<0.25	<0.26	<0.25	<0.29
Perfluorooctanesulfonic acid (PFOS)	3.0	µg/kg	3.8	3.3	3.2	<0.52	<0.84 B*	<0.56 B*	<0.50 B*	<0.57 B*
Perfluorooctanoic acid (PFOA)	1.7	µg/kg	0.34	0.30	0.26	<0.21	<0.20	<0.20	<0.20	<0.23

Table 5 - Summary of Gustavus Site Characterization Surface Soil and Sediment Analytical Results

Analyte	Cleanup Level	Units	SS-19-25	SS-19-26	SS-19-27	SS-19-28	SS-19-29	SS-19-30	SS-19-31	SS-19-32
			10/14/19 12:59	10/14/19 13:06	10/14/19 13:18	10/14/19 13:26	10/14/19 13:38	10/14/19 14:50	10/14/19 15:12	10/14/19 14:47
Perfluorohexansulfonic acid (PFHxS)	—	µg/kg	<0.20	0.046 J	0.034 J	<0.20	0.045 J	17	12	17
Perfluorohexanoic acid (PFHxA)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	23	6.5	3.3
Perfluoroheptanoic acid (PFHpA)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	1.4	1.6	0.61
Perfluorononanoic acid (PFNA)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	0.48	0.72	<0.24
Perfluorobutanesulfonic acid (PFBS)	—	µg/kg	0.027 J	<0.21	<0.20	<0.20	<0.21	2.7	1.7	2.8
Perfluorodecanoic acid (PFDA)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	0.90	1.6	0.10 J
Perfluoroundecanoic acid (PFUnA)	—	µg/kg	<0.20	<0.21	0.036 J	<0.20	<0.21	1.7	1.6	0.19 J
Perfluorododecanoic acid (PFDoA)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	1.5	2.0	0.15 J
Perfluorotridecanoic acid (PFTrDA)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	0.86	1.1	0.098 J
Perfluorotetradecanoic acid (PFTeA)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	3.0	1.9	0.16 J
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	µg/kg	<2.0	<2.1	<2.0	<2.0	<2.1	<3.4	1.3 J	<2.4
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	µg/kg	<2.0	<2.1	<2.0	<2.0	<2.1	<3.4	<3.1	<2.4
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	<0.34	<0.31	<0.24
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	<0.34	<0.31	<0.24
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	<0.34	<0.31	<0.24
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	µg/kg	<0.25	<0.26	<0.25	<0.25	<0.26	<0.43	<0.39	<0.31
Perfluorooctanesulfonic acid (PFOS)	3.0	µg/kg	<0.51 B*	<0.87 B*	<0.50 B*	<0.50 B*	<0.75 B*	130 JH*	160 JH*	100 JH*
Perfluorooctanoic acid (PFOA)	1.7	µg/kg	<0.20	<0.21	<0.20	<0.20	<0.21	2.2	4.5	1.4

Table 5 - Summary of Gustavus Site Characterization Surface Soil and Sediment Analytical Results

Analyte	Cleanup Level	Units	Culvert 1	Culvert 2	Culvert 3	SW-19-01	SW-19-02	SW-19-03	SW-19-04	SW-19-06
			10/14/19 14:40	10/14/19 14:55	10/14/19 15:10	10/9/19 14:17	10/9/19 15:03	10/9/19 15:46	10/9/19 16:50	10/10/19 9:58
Perfluorohexansulfonic acid (PFHxS)	—	µg/kg	53	5.7	5.8	<0.28	0.049 JH*	0.31 JH*	0.13 JH*	0.13 J
Perfluorohexanoic acid (PFHxA)	—	µg/kg	23	3.2	1.5	<0.28	<0.25	0.18 J	<0.35	0.089 J
Perfluoroheptanoic acid (PFHpA)	—	µg/kg	1.8	<0.30	0.41	<0.28	<0.25	0.15 J	<0.35	0.041 J
Perfluorononanoic acid (PFNA)	—	µg/kg	<1.5	<0.30	0.24 J	<0.28	<0.25	0.11 J	<0.35	<0.27
Perfluorobutanesulfonic acid (PFBS)	—	µg/kg	12	<0.30	0.60	<0.28	<0.25	0.10 J	<0.35	<0.27
Perfluorodecanoic acid (PFDA)	—	µg/kg	0.43 J	<0.30	0.43	<0.28	<0.25	0.14 J	<0.35	0.058 J
Perfluoroundecanoic acid (PFUnA)	—	µg/kg	<1.5	<0.30	0.59	<0.28	<0.25	0.15 J	<0.35	<0.27
Perfluorododecanoic acid (PFDoA)	—	µg/kg	0.91 J	0.54	0.39	<0.28	<0.25	0.14 J	<0.35	<0.27
Perfluorotridecanoic acid (PFTrDA)	—	µg/kg	0.57 J	0.43 J*	0.33	<0.28	<0.25	0.13 J	<0.35	<0.27
Perfluorotetradecanoic acid (PFTeA)	—	µg/kg	1.6	0.79	0.49	<0.28	<0.25	0.16 J	<0.35	<0.27
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	µg/kg	<15	<3.0	<3.1	<2.8	<2.5	<2.6	<3.5	<2.7
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	µg/kg	<15	<3.0	<3.1	<2.8	<2.5	<2.6	<3.5	<2.7
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	µg/kg	<1.5	<0.30	<0.31	<0.28	<0.25	0.11 J	<0.35	<0.27
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	µg/kg	<1.5	<0.30	<0.31	<0.28	<0.25	0.081 J	<0.35	<0.27
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	µg/kg	<1.5	<0.30	<0.31	<0.28	<0.25	0.11 J	<0.35	<0.27
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	µg/kg	<1.9	<0.37	<0.39	<0.35	<0.31	<0.32 B*	<0.44	<0.34
Perfluorooctanesulfonic acid (PFOS)	3.0	µg/kg	520 JH*	69 JH*	63 JH*	0.30 J	<0.63	3.4	0.50 J	5.6
Perfluorooctanoic acid (PFOA)	1.7	µg/kg	3.9	0.87	1.5	<0.28	<0.25	0.14 J	<0.35	<0.27

Table 5 - Summary of Gustavus Site Characterization Surface Soil and Sediment Analytical Results

Analyte	Cleanup Level	Units	SW-19-07	SW-19-08	SW-19-09	SW-19-10	
			10/10/19 10:40	10/10/19 11:54	10/10/19 12:54	SW-19-10 10/14/19 13:50	SW-19-11 (DUP) 10/14/19 13:40
Perfluorohexansulfonic acid (PFHxS)	—	µg/kg	0.17 J	2.9	0.18 J	0.15 J	0.12 J
Perfluorohexanoic acid (PFHxA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	0.059 J
Perfluoroheptanoic acid (PFHpA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
Perfluorononanoic acid (PFNA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
Perfluorobutanesulfonic acid (PFBS)	—	µg/kg	<0.28	<1.1	<0.62	0.036 J*	<0.23
Perfluorodecanoic acid (PFDA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
Perfluoroundecanoic acid (PFUnA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
Perfluorododecanoic acid (PFDoA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
Perfluorotridecanoic acid (PFTrDA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
Perfluorotetradecanoic acid (PFTeA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	µg/kg	<2.8	<11	<6.2	<2.6	<2.3
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	µg/kg	<2.8	<11	<6.2	<2.6	<2.3
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	µg/kg	<0.36	<1.3	<0.77	<0.33	<0.29
Perfluorooctanesulfonic acid (PFOS)	3.0	µg/kg	1.7	13	1.6	<1.6 B*	<1.5 B*
Perfluorooctanoic acid (PFOA)	1.7	µg/kg	<0.28	<1.1	<0.62	<0.26	<0.23

Table 6 - Summary of Gustavus Airport Site Characterization GAC Confirmation Sample Analytical Results

Analyte	LHA	Units	GAC #1	GAC #2
			10/15/19 7:30	10/15/19 10:05
Perfluorohexansulfonic acid (PFHxS)	—	ppt	<1.9 B*	<1.9 B*
Perfluorohexanoic acid (PFHxA)	—	ppt	<1.9	<1.9
Perfluoroheptanoic acid (PFHpA)	—	ppt	<1.9	<1.9
Perfluorononanoic acid (PFNA)	—	ppt	<1.9	<1.9
Perfluorobutanesulfonic acid (PFBS)	—	ppt	<1.9	<1.9
Perfluorodecanoic acid (PFDA)	—	ppt	<1.9	<1.9
Perfluoroundecanoic acid (PFUnA)	—	ppt	<1.9	<1.9
Perfluorododecanoic acid (PFDoA)	—	ppt	<1.9	<1.9
Perfluorotridecanoic acid (PFTTrDA)	—	ppt	<1.9	<1.9
Perfluorotetradecanoic acid (PFTeA)	—	ppt	<1.9	0.50 J
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	—	ppt	<19	<19
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	—	ppt	<19	<19
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	—	ppt	<1.9	<1.9
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	—	ppt	<1.9	<1.9
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	—	ppt	<1.9	<1.9
Hexafluoropropylene oxide dimer acid (HFPO-DA)	—	ppt	<3.9	<3.8
Perfluorooctanesulfonic acid (PFOS)	70	ppt	<1.9	0.53 J
Perfluorooctanoic acid (PFOA)	70	ppt	<1.9	<1.9
LHA Combined (PFOS + PFOA)	70	ppt	n/a	0.53 J‡
LHA Combined (PFOS + PFOA) 2xDL	70	ppt	2.7 μ	2.2 μ

ppt parts per trillion, equivalent to nanograms per liter

LHA Lifetime Health Advisory

† EPA LHA level is 70 ppt for PFOS and PFOA combined.

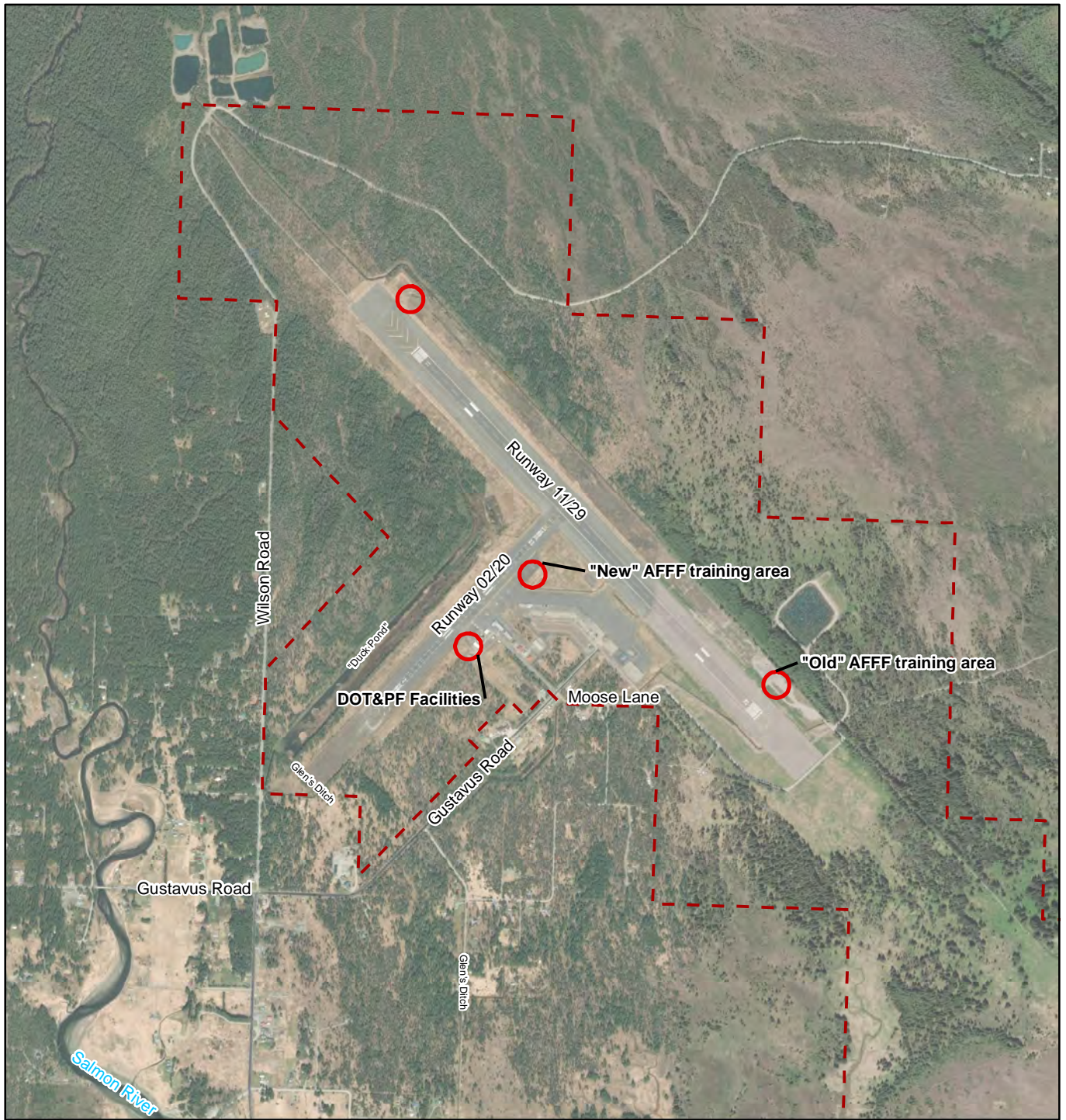
μ The summed concentration was calculated using a value two times the laboratory detection limit for non-detect analytes, per ADEC's March 2019 Technical Memorandum.

< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.

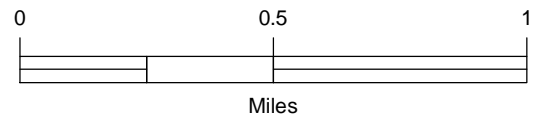
J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.

B* Result is included in the same preparatory batch as a blank detection for the associated analyte. Flag applied by Shannon & Wilson, Inc.

‡ Minimum concentration, the LHA Combined concentration includes one or more result that is not detected greater than the MDL.

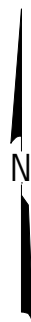


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

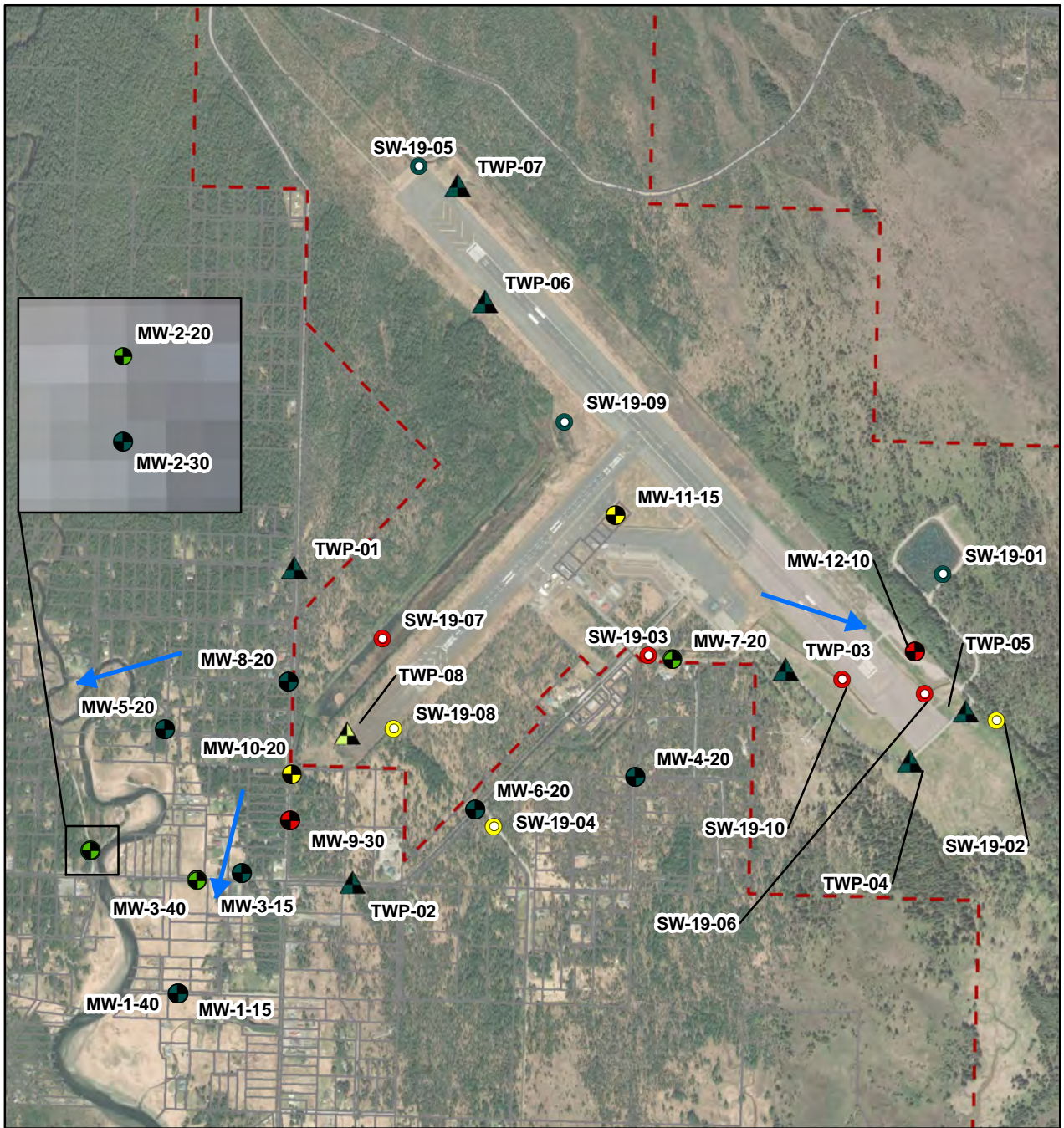


LEGEND

- - Airport Property Boundary
- Potential AFFF Use



Gustavus Airport PFAS Site Characterization Gustavus, Alaska	
SITE MAP	
April 2020	102599-008
SHANNON & WILSON, INC. <small>GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS</small>	
Figure 1	



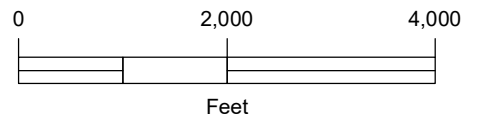
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

Analytical Results

- ≤2.0 ppt
- 2.1 to 17.4 ppt
- 17.5 to 34 ppt
- 35 to 69 ppt
- ≥70 ppt

- ⊕ Monitoring Well
- ▲ Temporary Well Point
- Surface Water Sample
- Airport Property Boundary
- Property Lines
- ← EPA Calculator Hydraulic Gradient



Gustavus Airport PFAS
Site Characterization
Gustavus, Alaska

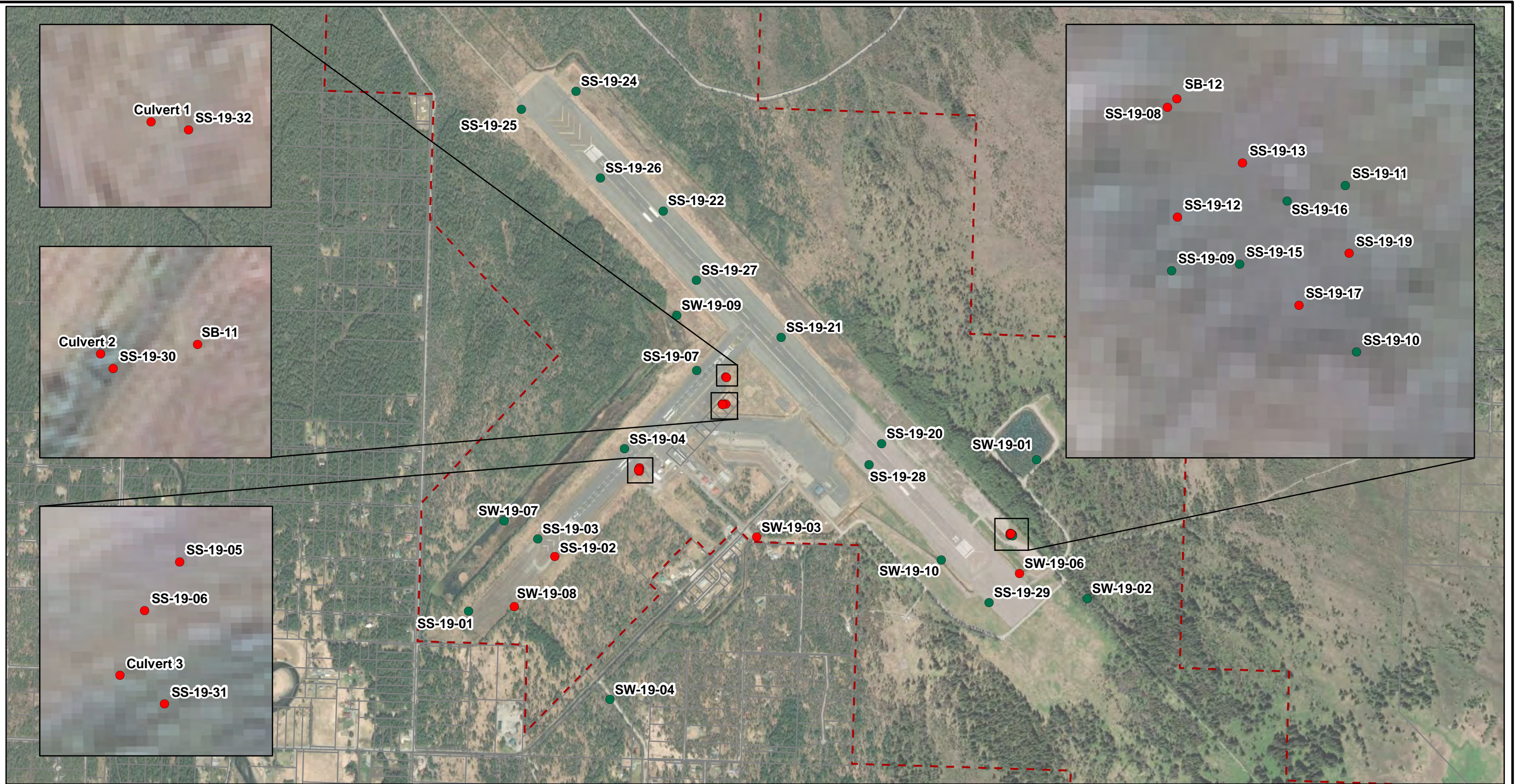
**SITE CHARACTERIZATION
WATER RESULTS**

April 2020

102599-008

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2

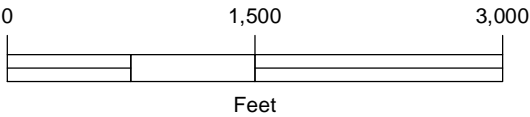


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

Analytical Results

- Below ADEC Cleanup Level
- Above ADEC Cleanup Level
- - - Airport Property Boundary
- Property Lines



Gustavus Airport PFAS
Site Characterization
Gustavus, Alaska

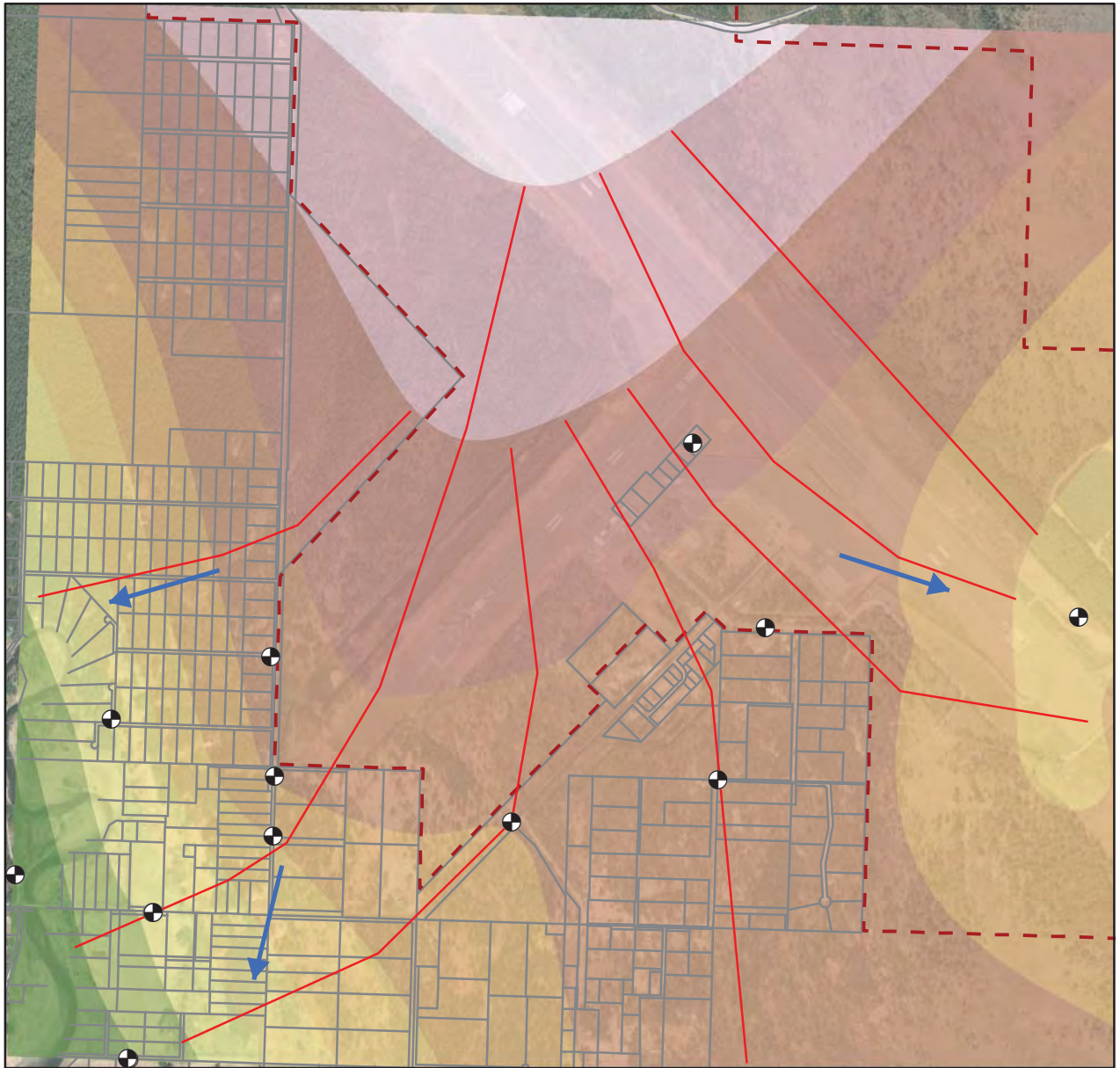
**SITE CHARACTERIZATION
SOIL RESULTS**

April 2020

102599-008

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 3



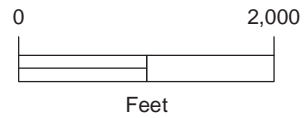
LEGEND

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Groundwater Elevations

- 10 - 12 feet
- 12 - 14 feet
- 14 - 16 feet
- 16 - 18 feet
- 16 - 20 feet
- 20 - 22 feet
- 22 - 24 feet
- 24 - 26 feet
- 26 - 28 feet
- 28 - 30 feet

- + Monitoring Well
- Airport Property Boundary
- Property Lines
- Interpolated Hydraulic Gradient
- ← EPA Calculator Hydraulic Gradient



Gustavus Airport
Gustavus, Alaska

GROUNDWATER GRADIENT AND WELL MONITORING NETWORK

April 2020

102599-008

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 4

Appendix A
Boring Logs

CONTENTS

- Soil Boring Logs

APPENDIX A: BORING LOGS

Shannon & Wilson, Inc. (S&W), uses a soil identification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following pages. Soil descriptions are based on visual-manual procedures (ASTM D2488) and laboratory testing procedures (ASTM D2487), if performed.

S&W INORGANIC SOIL CONSTITUENT DEFINITIONS

CONSTITUENT ²	FINE-GRAINED SOILS (50% or more fines) ¹	COARSE-GRAINED SOILS (less than 50% fines) ¹
Major	Silt, Lean Clay, Elastic Silt, ³ or Fat Clay	Sand or Gravel ⁴
Modifying (Secondary) Precedes major constituent	30% or more coarse-grained: Sandy or Gravelly ⁴	More than 12% fine-grained: Silty or Clayey ³
Minor Follows major constituent	15% to 30% coarse-grained: with Sand or with Gravel ⁴ 30% or more total coarse-grained and lesser coarse-grained constituent is 15% or more: with Sand or with Gravel ⁵	5% to 12% fine-grained: with Silt or with Clay ³ 15% or more of a second coarse-grained constituent: with Sand or with Gravel ⁵

¹All percentages are by weight of total specimen passing a 3-inch sieve.
²The order of terms is: *Modifying Major with Minor*.
³Determined based on behavior.
⁴Determined based on which constituent comprises a larger percentage.
⁵Whichever is the lesser constituent.

MOISTURE CONTENT TERMS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

STANDARD PENETRATION TEST (SPT) SPECIFICATIONS

Hammer:	140 pounds with a 30-inch free fall. Rope on 6- to 10-inch-diam. cathead 2-1/4 rope turns, > 100 rpm
	NOTE: If automatic hammers are used, blow counts shown on boring logs should be adjusted to account for efficiency of hammer.
Sampler:	10 to 30 inches long Shoe I.D. = 1.375 inches Barrel I.D. = 1.5 inches Barrel O.D. = 2 inches
N-Value:	Sum blow counts for second and third 6-inch increments. Refusal: 50 blows for 6 inches or less; 10 blows for 0 inches.
	NOTE: Penetration resistances (N-values) shown on boring logs are as recorded in the field and have not been corrected for hammer efficiency, overburden, or other factors.

PARTICLE SIZE DEFINITIONS

DESCRIPTION	SIEVE NUMBER AND/OR APPROXIMATE SIZE
FINES	< #200 (0.075 mm = 0.003 in.)
SAND Fine Medium Coarse	#200 to #40 (0.075 to 0.4 mm; 0.003 to 0.02 in.) #40 to #10 (0.4 to 2 mm; 0.02 to 0.08 in.) #10 to #4 (2 to 4.75 mm; 0.08 to 0.187 in.)
GRAVEL Fine Coarse	#4 to 3/4 in. (4.75 to 19 mm; 0.187 to 0.75 in.) 3/4 to 3 in. (19 to 76 mm)
COBBLES	3 to 12 in. (76 to 305 mm)
BOULDERS	> 12 in. (305 mm)

RELATIVE DENSITY / CONSISTENCY

COHESIONLESS SOILS		COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
< 4	Very loose	< 2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very dense	15 - 30	Very stiff
		> 30	Hard

WELL AND BACKFILL SYMBOLS

	Bentonite Cement Grout		Surface Cement Seal
	Bentonite Grout		Asphalt or Cap
	Bentonite Chips		Slough
	Silica Sand		Inclinometer or Non-perforated Casing
	Perforated or Screened Casing		Vibrating Wire Piezometer

PERCENTAGES TERMS^{1,2}

Trace	< 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

¹Gravel, sand, and fines estimated by mass. Other constituents, such as organics, cobbles, and boulders, estimated by volume.

²Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

Gustavus Work Plan Implementation
Gustavus, Alaska

SOIL DESCRIPTION AND LOG KEY
















April 2020

102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-1
Sheet 1 of 3

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)
 (Modified From USACE Tech Memo 3-357, ASTM D2487, and ASTM D2488)

MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL	TYPICAL IDENTIFICATIONS
COARSE-GRAINED SOILS <i>(more than 50% retained on No. 200 sieve)</i>	Gravels <i>(more than 50% of coarse fraction retained on No. 4 sieve)</i>	Gravel <i>(less than 5% fines)</i>	GW 	Well-Graded Gravel; Well-Graded Gravel with Sand
			GP 	Poorly Graded Gravel; Poorly Graded Gravel with Sand
		Silty or Clayey Gravel <i>(more than 12% fines)</i>	GM 	Silty Gravel; Silty Gravel with Sand
			GC 	Clayey Gravel; Clayey Gravel with Sand
	Sands <i>(50% or more of coarse fraction passes the No. 4 sieve)</i>	Sand <i>(less than 5% fines)</i>	SW 	Well-Graded Sand; Well-Graded Sand with Gravel
			SP 	Poorly Graded Sand; Poorly Graded Sand with Gravel
		Silty or Clayey Sand <i>(more than 12% fines)</i>	SM 	Silty Sand; Silty Sand with Gravel
			SC 	Clayey Sand; Clayey Sand with Gravel
FINE-GRAINED SOILS <i>(50% or more passes the No. 200 sieve)</i>	Silt and Clays <i>(liquid limit less than 50)</i>	Inorganic	ML 	Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
			CL 	Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
		Organic	OL 	Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
	Silt and Clays <i>(liquid limit 50 or more)</i>	Inorganic	MH 	Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
			CH 	Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
		Organic	OH 	Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor	PT 	Peat or other highly organic soils (see ASTM D4427)	

NOTE: No. 4 size = 4.75 mm = 0.187 in.; No. 200 size = 0.075 mm = 0.003 in.

NOTES

- Dual symbols (*symbols separated by a hyphen, i.e., SP-SM, Sand with Silt*) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart. Graphics shown on the logs for these soil types are a combination of the two graphic symbols (e.g., SP and SM).
- Borderline symbols (*symbols separated by a slash, i.e., CL/ML, Lean Clay to Silt; SP-SM/SM, Sand with Silt to Silty Sand*) indicate that the soil properties are close to the defining boundary between two groups.

Gustavus Work Plan Implementation
Gustavus, Alaska

**SOIL DESCRIPTION
AND LOG KEY**

April 2020

102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-1
Sheet 2 of 3

GRADATION TERMS

Poorly Graded	Narrow range of grain sizes present or, within the range of grain sizes present, one or more sizes are missing (Gap Graded). Meets criteria in ASTM D2487, if tested.
Well-Graded	Full range and even distribution of grain sizes present. Meets criteria in ASTM D2487, if tested.

CEMENTATION TERMS¹

Weak	Crumbles or breaks with handling or slight finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

PLASTICITY²

DESCRIPTION	VISUAL-MANUAL CRITERIA	APPROX. PLASTICITY INDEX RANGE
Nonplastic	A 1/8-in. thread cannot be rolled at any water content.	< 4
Low	A thread can barely be rolled and a lump cannot be formed when drier than the plastic limit.	4 to 10
Medium	A thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. A lump crumbles when drier than the plastic limit.	10 to 20
High	It takes considerable time rolling and kneading to reach the plastic limit. A thread can be rerolled several times after reaching the plastic limit. A lump can be formed without crumbling when drier than the plastic limit.	> 20

ADDITIONAL TERMS

Mottled	Irregular patches of different colors.
Bioturbated	Soil disturbance or mixing by plants or animals.
Diamict	Nonsorted sediment; sand and gravel in silt and/or clay matrix.
Cuttings	Material brought to surface by drilling.
Slough	Material that caved from sides of borehole.
Sheared	Disturbed texture, mix of strengths.

PARTICLE ANGULARITY AND SHAPE TERMS¹

Angular	Sharp edges and unpolished planar surfaces.
Subangular	Similar to angular, but with rounded edges.
Subrounded	Nearly planar sides with well-rounded edges.
Rounded	Smoothly curved sides with no edges.
Flat	Width/thickness ratio > 3.
Elongated	Length/width ratio > 3.

ACRONYMS AND ABBREVIATIONS

ATD	At Time of Drilling
Diam.	Diameter
Elev.	Elevation
ft.	Feet
FeO	Iron Oxide
gal.	Gallons
Horiz.	Horizontal
HSA	Hollow Stem Auger
I.D.	Inside Diameter
in.	Inches
lbs.	Pounds
MgO	Magnesium Oxide
mm	Millimeter
MnO	Manganese Oxide
NA	Not Applicable or Not Available
NP	Nonplastic
O.D.	Outside Diameter
OW	Observation Well
pcf	Pounds per Cubic Foot
PID	Photo-Ionization Detector
PMT	Pressuremeter Test
ppm	Parts per Million
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
rpm	Rotations per Minute
SPT	Standard Penetration Test
USCS	Unified Soil Classification System
q _u	Unconfined Compressive Strength
VWP	Vibrating Wire Piezometer
Vert.	Vertical
WOH	Weight of Hammer
WOR	Weight of Rods
Wt.	Weight

STRUCTURE TERMS¹

Interbedded	Alternating layers of varying material or color with layers at least 1/4-inch thick; singular: bed.
Laminated	Alternating layers of varying material or color with layers less than 1/4-inch thick; singular: lamination.
Fissured	Breaks along definite planes or fractures with little resistance.
Slickensided	Fracture planes appear polished or glossy; sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay.
Homogeneous	Same color and appearance throughout.

Gustavus Work Plan Implementation
Gustavus, Alaska

SOIL DESCRIPTION AND LOG KEY

April 2020

102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

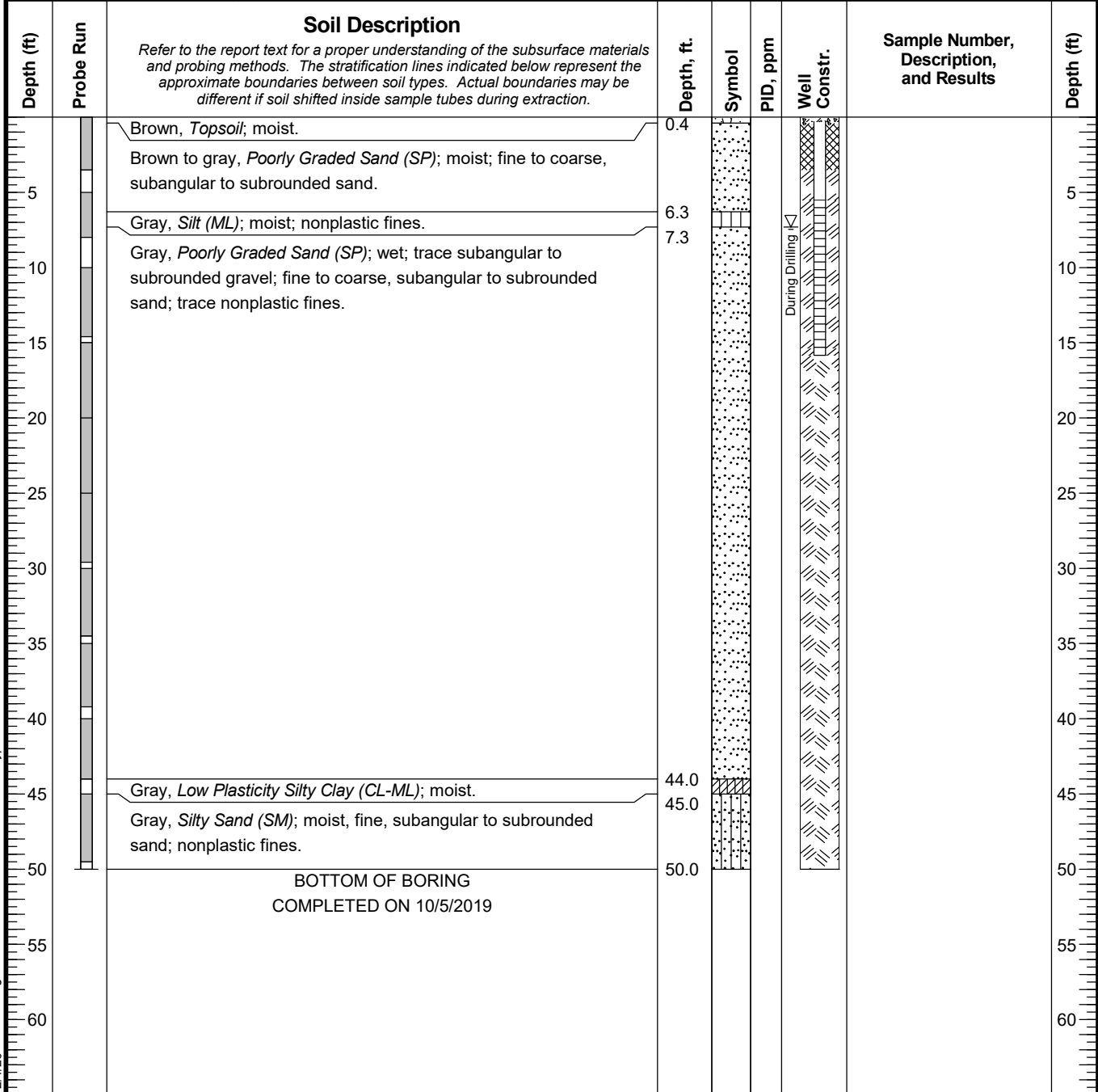
FIG. A-1
Sheet 3 of 3

¹Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

²Adapted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

LOG OF GEOPROBE

Date Started	10/5/19	Location	Bills Drive
Date Completed	10/5/19	Ground Elevation:	NA
Total Depth (ft)	50.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches






Typ: CAB
 Rev: DYM
 Log: CAB
 GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

- | | | |
|---|---|--|
|  2" Plastic Tube with Soil Recovery
Run No. |  Piezometer Screen and Sand Filter |  Ground Water Level ATD |
|---|---|--|

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-01-40 / MW-1-15

April 2020

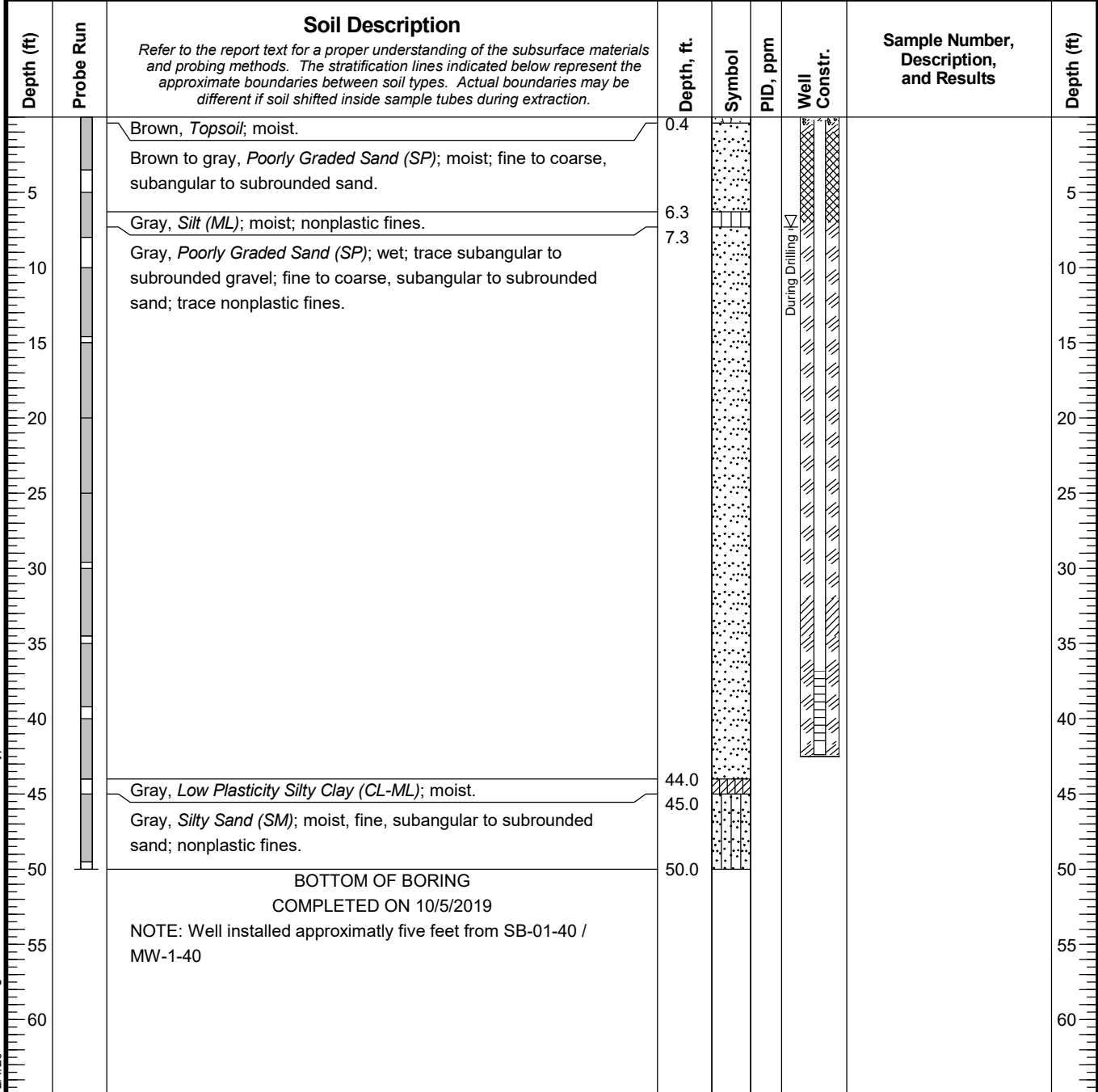
102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-2

LOG OF GEOPROBE

Date Started	10/5/19	Location	Bills Drive
Date Completed	10/5/19	Ground Elevation:	NA
Total Depth (ft)	50.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches



Typ: CAB
 Rev: DYM
 Log: CAB
 GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

- | | |
|---|-----------------------------------|
| 2" Plastic Tube with Soil Recovery
Run No. | Piezometer Screen and Sand Filter |
| 2" Plastic Tube - No Soil Recovery | Ground Water Level ATD |

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-01-40 / MW-1-40

April 2020

102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-3

LOG OF GEOPROBE

Date Started	10/5/19	Location	City Hall
Date Completed	10/5/19	Ground Elevation:	NA
Total Depth (ft)	35.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches

Depth (ft)	Probe Run	Soil Description	Depth, ft.	Symbol	PID, ppm	Well Constr.	Sample Number, Description, and Results	Depth (ft)
		Brown, <i>Topsoil</i> ; moist.	0.2					
		Brown to gray, <i>Poorly Graded Sand (SP)</i> ; moist; fine to coarse, subangular to subrounded sand. Interbedded 0.2 foot layer of <i>Silty Sand (SM)</i> at 2.8 feet bgs.						
5								5
		Gray, <i>Silt (ML)</i> ; wet; nonplastic fines.	9.5					10
10								10
		Gray, <i>Sandy Silt (ML)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines.	12.0					15
15								15
		Gray, <i>Poorly Graded Sand (SP)</i> ; wet; fine to coarse, subangular to subrounded sand.	15.4					20
20								20
		Gray, <i>Poorly Graded Sand with Silt (SP-SM)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines.	20.0					25
25								25
		Gray, <i>Poorly Graded Sand (SP)</i> ; wet; fine to coarse, subangular to subrounded sand; nonplastic fines; trace organics.	21.8					30
30								30
		Gray, <i>Poorly Graded Sand with Silt (SP-SM)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines; trace organics.	25.0					35
35								35
		Gray, <i>Silty Sand (SM)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines.	30.0					
		Gray, <i>Low Plasticity Silty Clay (CL-ML)</i> ; moist at 34 feet bgs.	33.4					
		BOTTOM OF BORING COMPLETED ON 10/5/2019	35.0					

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

2" Plastic Tube with Soil Recovery	Piezometer Screen and Sand Filter
2" Plastic Tube - No Soil Recovery	Ground Water Level ATD

Run No. 3

Gustavus Work Plan Implementation
Gustavus, Alaska

**LOG OF GEOPROBE
SB-02-50 / MW-2-20**

April 2020

102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-4

GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20 Log: CAB Rev: DYM Typ: CAB

LOG OF GEOPROBE

Date Started	10/5/19	Location	City Hall
Date Completed	10/5/19	Ground Elevation:	NA
Total Depth (ft)	35.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches

Depth (ft)	Probe Run	Soil Description	Depth, ft.	Symbol	PID, ppm	Well Constr.	Sample Number, Description, and Results	Depth (ft)
		Brown, <i>Topsoil</i> ; moist.	0.2					
		Brown to gray, <i>Poorly Graded Sand (SP)</i> ; moist; fine to coarse, subangular to subrounded sand. Interbedded 0.2 foot layer of <i>Silty Sand (SM)</i> at 2.8 feet bgs.						
5								5
		Gray, <i>Silt (ML)</i> ; wet; nonplastic fines.	9.5					10
10								10
		Gray, <i>Sandy Silt (ML)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines.	12.0					15
15								15
		Gray, <i>Poorly Graded Sand (SP)</i> ; wet; fine to coarse, subangular to subrounded sand.	15.4					20
20								20
		Gray, <i>Poorly Graded Sand with Silt (SP-SM)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines.	20.0					25
25								25
		Gray, <i>Poorly Graded Sand (SP)</i> ; wet; fine to coarse, subangular to subrounded sand; nonplastic fines; trace organics.	21.8					30
30								30
		Gray, <i>Poorly Graded Sand with Silt (SP-SM)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines; trace organics.	25.0					35
35								35
		Gray, <i>Silty Sand (SM)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines.	30.0					
		Gray, <i>Low Plasticity Silty Clay (CL-ML)</i> ; moist at 34 feet bgs.	33.4					
		BOTTOM OF BORING COMPLETED ON 10/5/2019 NOTE: Well installed approximately five feet from SB-02-50 / MW-2-20	35.0					

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

2" Plastic Tube with Soil Recovery	Piezometer Screen and Sand Filter
2" Plastic Tube - No Soil Recovery	Ground Water Level ATD

Run No. 3

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-02-50 / MW-2-30

April 2020

102599-008

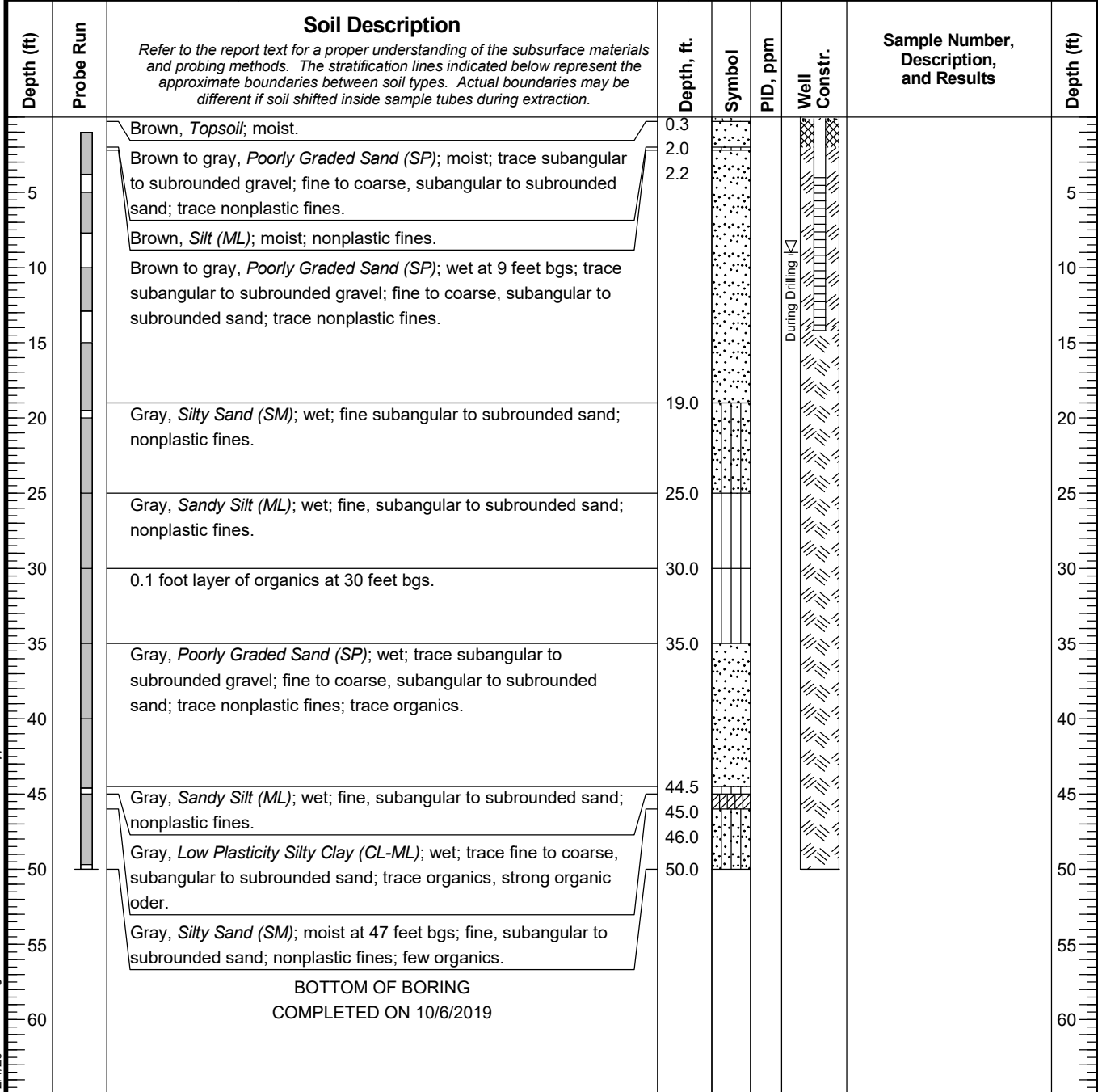
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-5

GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20 Log: CAB Rev: DYM Typ: CAB

LOG OF GEOPROBE

Date Started	10/6/19	Location	Community Center
Date Completed	10/6/19	Ground Elevation:	NA
Total Depth (ft)	50.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches



NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

2" Plastic Tube with Soil Recovery	Piezometer Screen and Sand Filter
2" Plastic Tube - No Soil Recovery	Ground Water Level ATD

Run No. 3

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-03-50 / MW-3-15

April 2020

102599-008

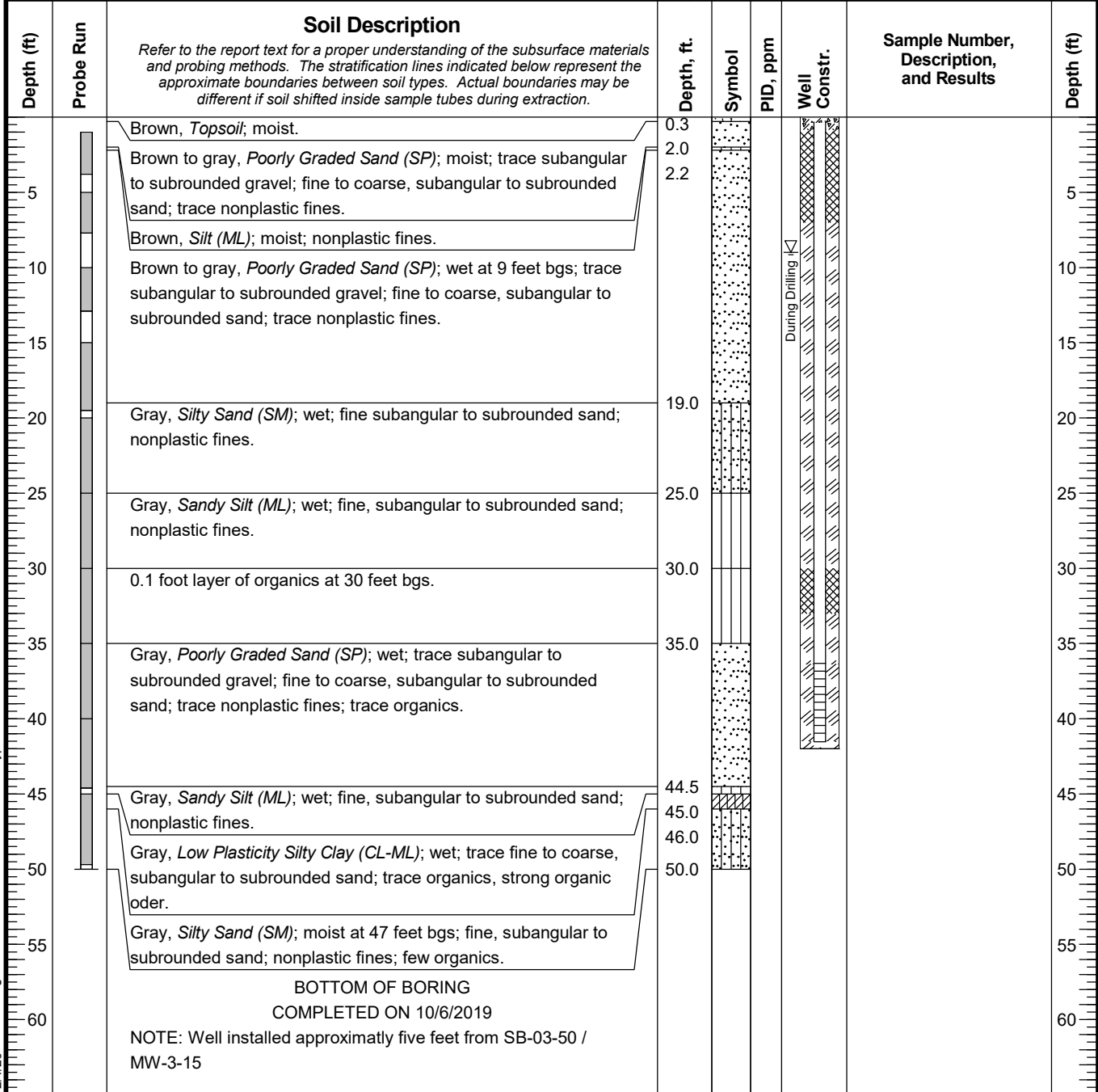
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-6

GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20
Typ: CAB
Rev: DYM
Log: CAB

LOG OF GEOPROBE





Date Started	10/6/19	Location	Community Center
Date Completed	10/6/19	Ground Elevation:	NA
Total Depth (ft)	50.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches



NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

 2" Plastic Tube - No Soil Recovery  2" Plastic Tube with Soil Recovery Run No.	 Piezometer Screen and Sand Filter  Ground Water Level ATD
---	---

Gustavus Work Plan Implementation
Gustavus, Alaska

**LOG OF GEOPROBE
SB-03-50 / MW-3-40**

April 2020

102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-7

GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20

LOG OF GEOPROBE

Date Started	10/7/19	Location	Same Old Road
Date Completed	10/7/19	Ground Elevation:	NA
Total Depth (ft)	30.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches

Depth (ft)	Probe Run	Soil Description	Depth, ft.	Symbol	PID, ppm	Well Constr.	Sample Number, Description, and Results	Depth (ft)
		Brown, <i>Topsoil</i> ; moist.	0.3					
		Brown, <i>Sandy Silt (ML)</i> ; moist; fine, subangular to subrounded sand; nonplastic fines.	1.0					
5		Brown to gray, <i>Poorly Graded Sand with Silt (SP-SM)</i> ; wet at 2.5 feet bgs; fine to coarse, subangular to subrounded sand; nonplastic fines. 0.2 foot layer of <i>Sandy Silty (SM)</i> at 2.3 feet bgs.	5.0					5
10		Gray, <i>Poorly Graded Sand (SP)</i> ; wet; trace subangular to subrounded gravel; fine to coarse subangular to subrounded sand; trace nonplastic fines.						10
15								15
20		Gray, <i>Silty Sand (SM)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines; trace organics.	20.0					20
25		Gray; <i>Low Plasticity Silty Clay (CL-ML)</i> ; wet; trace fine, subangular to subrounded sand.	23.0					25
		Gray, <i>Silty Sand (SM)</i> ; wet; fine subangular to subrounded sand; nonplastic fines; trace organics.	23.2					
		Gray, <i>Silty Sand (SM)</i> ; wet; fine subangular to subrounded sand; nonplastic fines; trace organics.	25.0					
		Gray, <i>Low Plasticity Silty Clay (CL-ML)</i> ; wet; few organics, strong organic odor present.	27.0					
30		Gray, <i>Silt with Sand (ML)</i> ; moist at 29 feet bgs; fine, subangular to subrounded sand; nonplastic fines.	30.0					30
BOTTOM OF BORING COMPLETED ON 10/7/2019								

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

2" Plastic Tube with Soil Recovery	Piezometer Screen and Sand Filter
2" Plastic Tube - No Soil Recovery	Ground Water Level ATD

Run No.

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-04-50 / MW-4-20

April 2020

102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-8

GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20
 Log: CAB
 Rev: DYM
 Typ: CAB

LOG OF GEOPROBE

Date Started	10/7/19	Location	White Drive
Date Completed	10/7/19	Ground Elevation:	NA
Total Depth (ft)	25.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches

Depth (ft)	Probe Run	Soil Description	Depth, ft.	Symbol	PID, ppm	Well Constr.	Sample Number, Description, and Results	Depth (ft)
		Brown, <i>Topsoil</i> ; moist.	0.2					
		Brown to gray, <i>Poorly Graded Sand (SP)</i> ; wet at 9 feet bgs; trace subangular to subrounded gravel; fine to coarse, subangular to subrounded sand; trace nonplastic fines.						
5								
		0.05 foot layer of <i>Clay (CL)</i> at 11.9 feet bgs.	11.9					
		Gray, <i>Silty Sand (SM)</i> ; wet; fine, subangular to subrounded sand; nonplastic fines.	15.0					
15								
		Gray, <i>Silty, Clayey Sand (SC-SM)</i> ; wet; fine sand; low plasticity fines.	20.0					
20								
		Gray, <i>Low Plasticity Silty Clay (CL-ML)</i> ; wet; little organics.	22.7					
25								
		Gray, <i>Silt (ML)</i> ; moist; nonplastic fines; trace organics.	24.7					
		BOTTOM OF BORING COMPLETED ON 10/7/2019	25.0					

Log: CAB
 Rev: DYM
 Typ: CAB
 GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

2" Plastic Tube - No Soil Recovery	Piezometer Screen and Sand Filter
2" Plastic Tube with Soil Recovery	Ground Water Level ATD

Run No. 3

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-05-50 / MW-5-20

April 2020

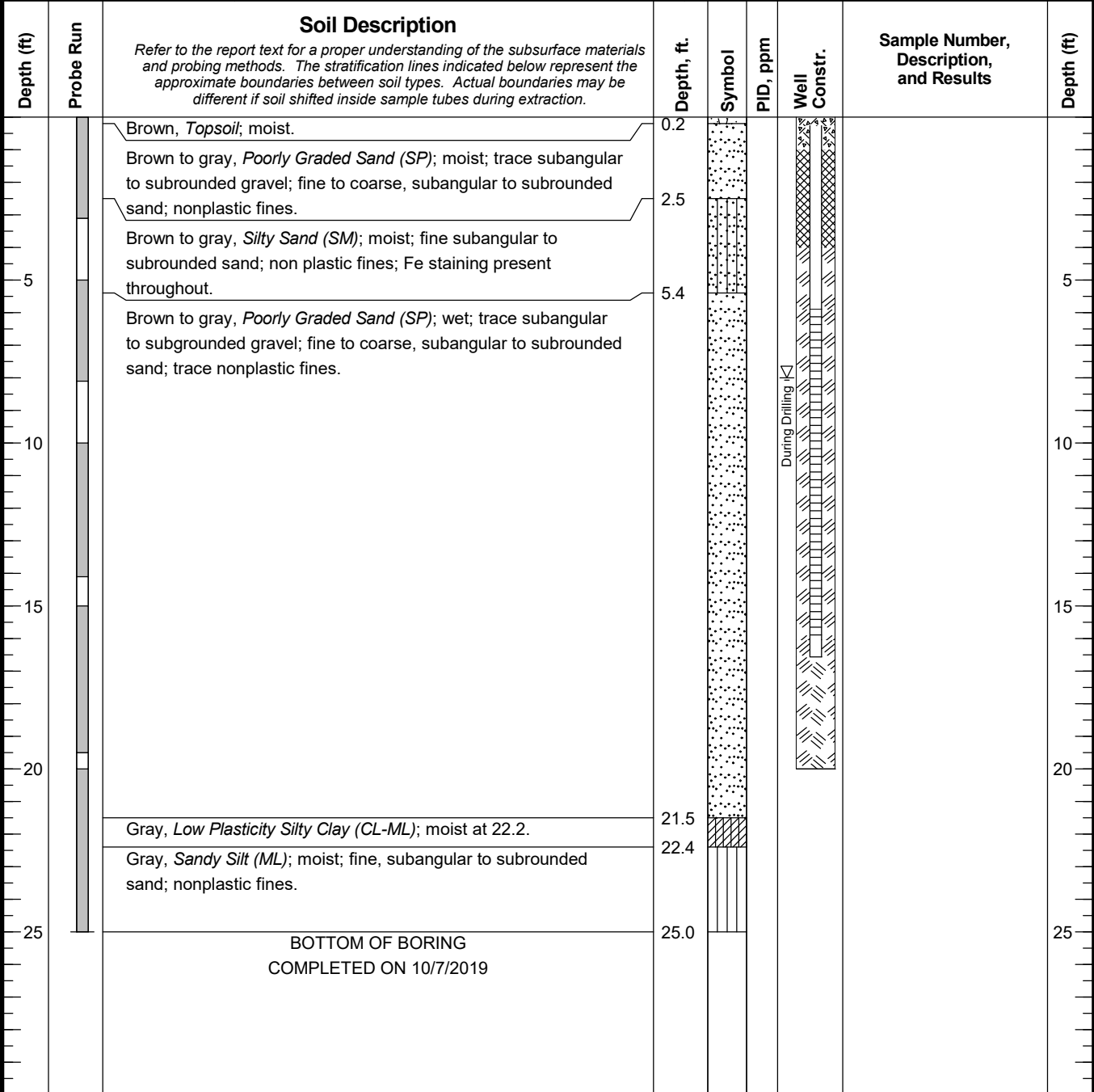
102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-9

LOG OF GEOPROBE

Date Started	10/7/19	Location	Gustavus Road and Glen's Ditch Road
Date Completed	10/7/19	Ground Elevation:	NA
Total Depth (ft)	25.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches



Typ: CAB
 Rev: DYM
 Log: CAB
 GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

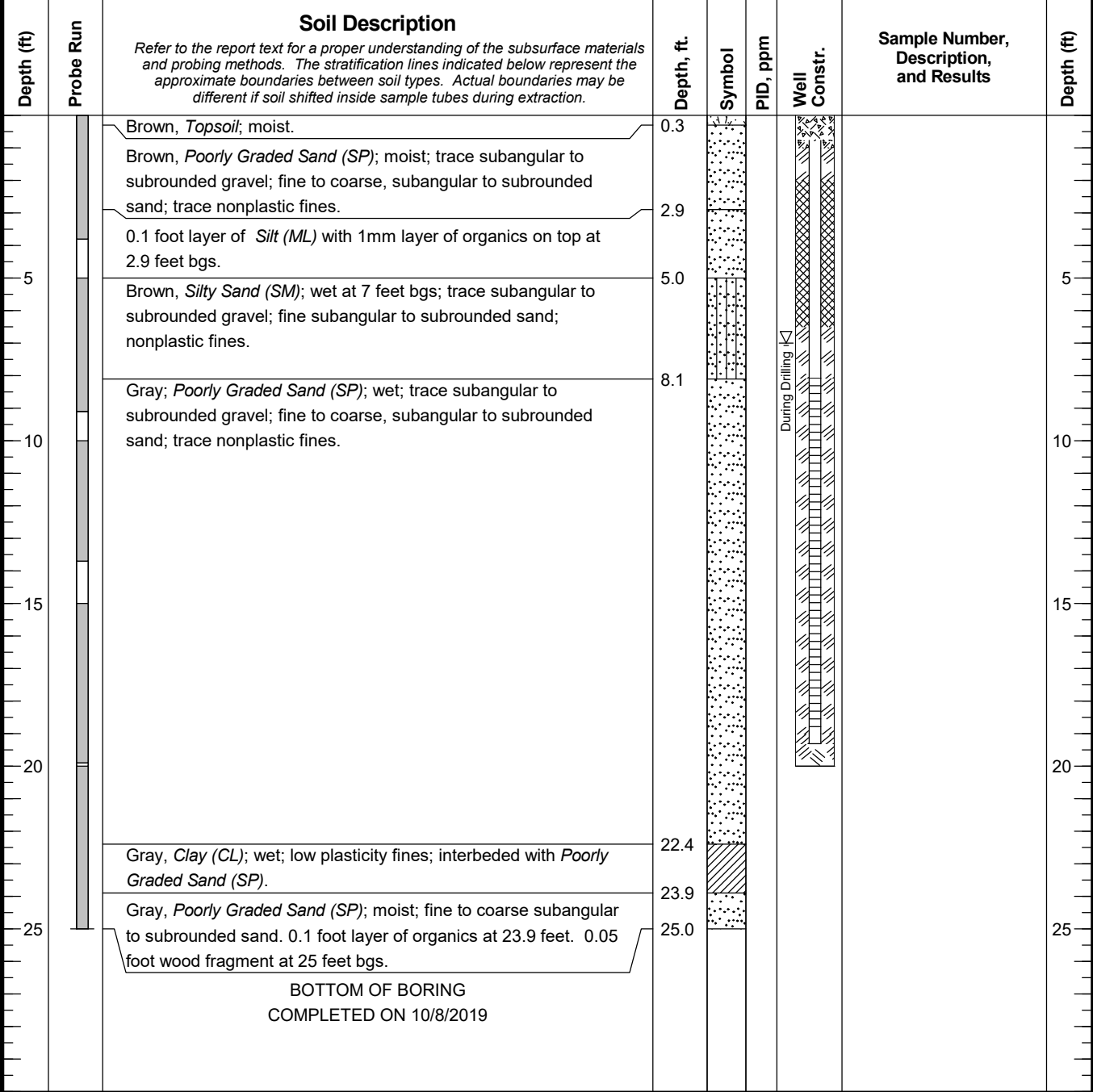
LEGEND

- | | | |
|---|---|--|
| 2" Plastic Tube - No Soil Recovery
2" Plastic Tube with Soil Recovery
Run No. | Piezometer Screen and Sand Filter
Ground Water Level ATD | |
|---|---|--|

Gustavus Work Plan Implementation Gustavus, Alaska	
LOG OF GEOPROBE SB-06-50 / MW-6-20	
April 2020	102599-008
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	Figure A-10

LOG OF GEOPROBE

Date Started	10/8/19	Location	Moose Lane
Date Completed	10/8/19	Ground Elevation:	NA
Total Depth (ft)	25.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches



NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

- | | | |
|---|-----------------------------------|------------------------|
| 2" Plastic Tube with Soil Recovery
Run No. | Piezometer Screen and Sand Filter | Ground Water Level ATD |
|---|-----------------------------------|------------------------|

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-07-50 / MW-7-20

April 2020

102599-008

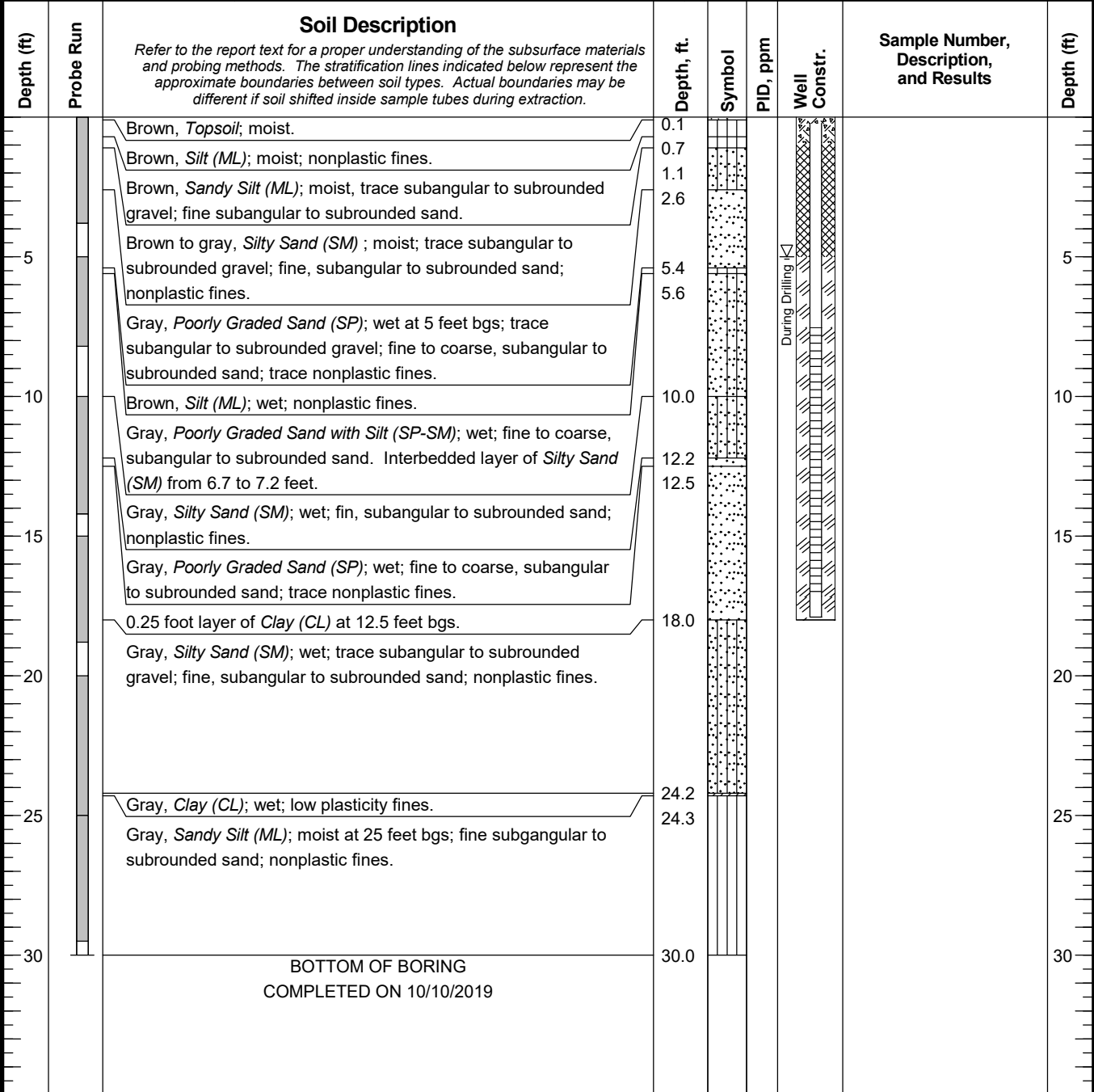
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-11

GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20
Typ: CAB
Rev: DYM
Log: CAB

LOG OF GEOPROBE

Date Started	10/10/19	Location	Parker Drive and Wilson Road
Date Completed	10/10/19	Ground Elevation:	NA
Total Depth (ft)	30.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches



NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

2" Plastic Tube with Soil Recovery Run No.	Piezometer Screen and Sand Filter	Ground Water Level ATD
---	-----------------------------------	------------------------

Gustavus Work Plan Implementation
Gustavus, Alaska

**LOG OF GEOPROBE
SB-08-50 / MW-8-20**

April 2020

102599-008

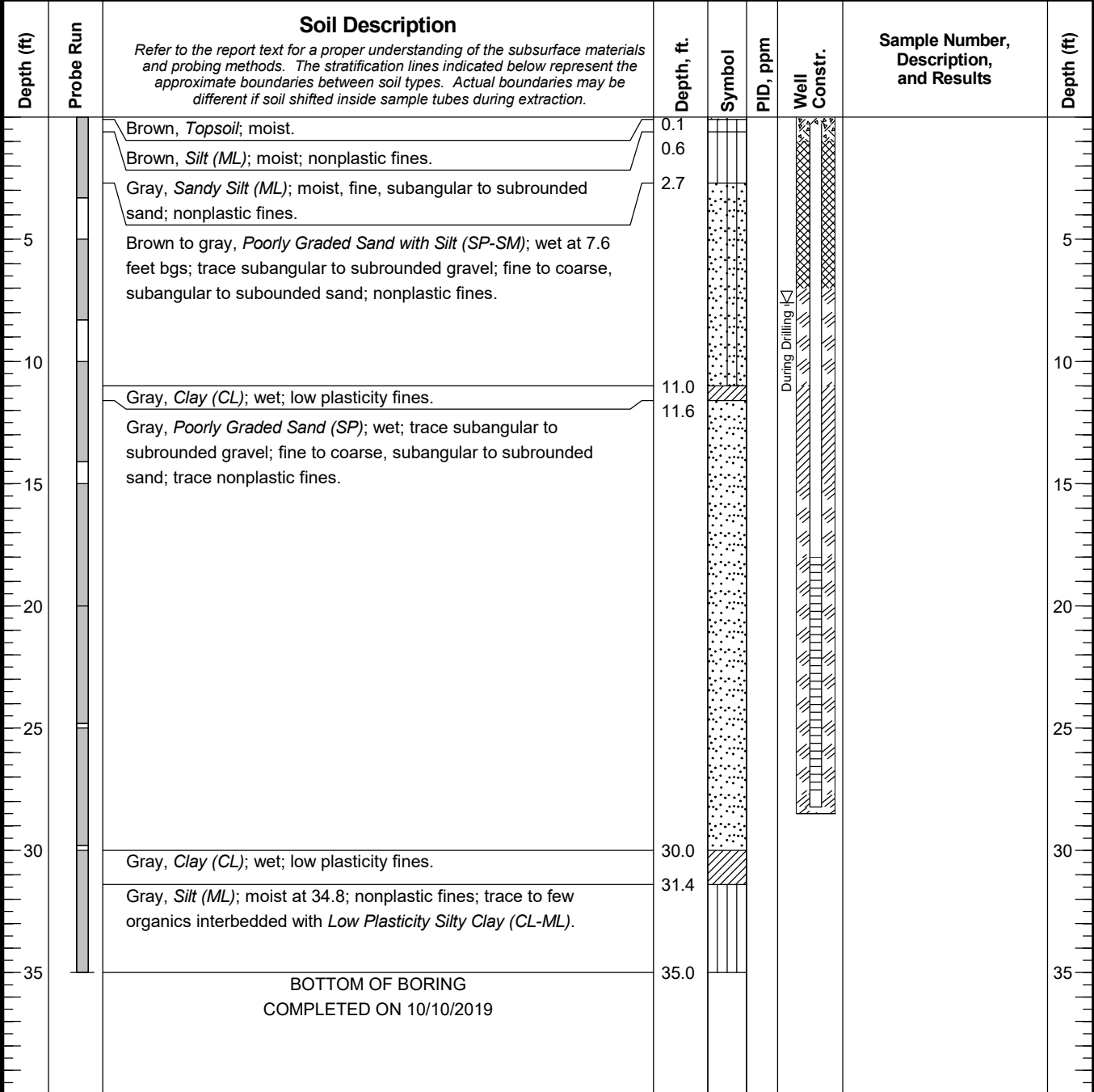
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-12

GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20
Log: CAB
Rev: DYM
Typ: CAB

LOG OF GEOPROBE

Date Started	10/10/19	Location	Wilson Road and Faraway Road	Ground Elevation:	NA
Date Completed	10/10/19			Typical Run Length	5 feet
Total Depth (ft)	35.0	Drilling Company:	Discovery Drilling	Hole Diameter:	2.25 inches



NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

2" Plastic Tube - No Soil Recovery	Piezometer Screen and Sand Filter
2" Plastic Tube with Soil Recovery	Ground Water Level ATD

Run No.

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-09-50 / MW-9-30

April 2020

102599-008

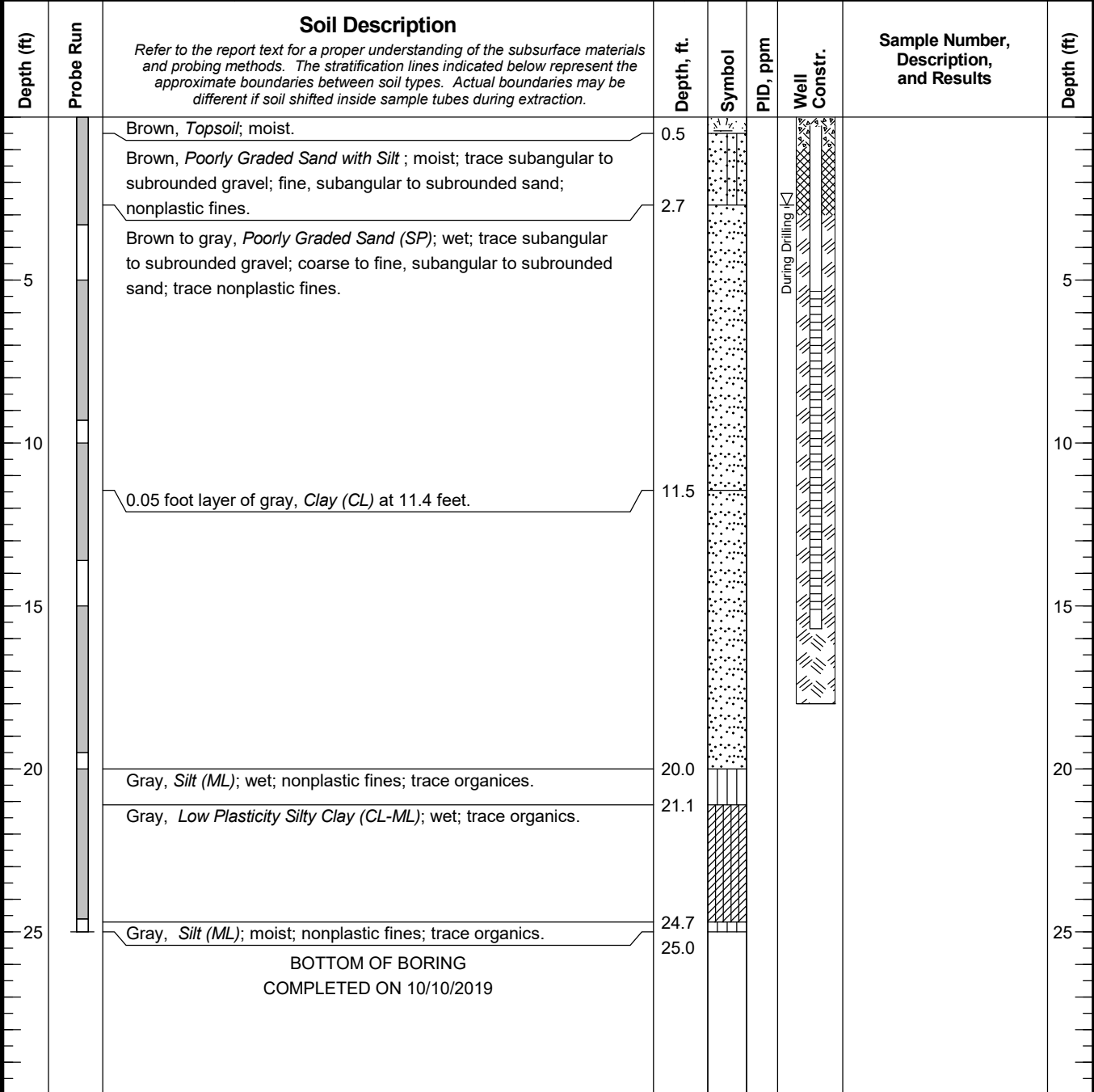
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-13

GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20
Log: CAB
Rev: DYM
Typ: CAB

LOG OF GEOPROBE

Date Started	10/10/19	Location	Wilson Road
Date Completed	10/10/19	Ground Elevation:	NA
Total Depth (ft)	25.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches



Typ: CAB
 Rev: DYM
 Log: CAB
 GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

	2" Plastic Tube - No Soil Recovery		Piezometer Screen and Sand Filter
	2" Plastic Tube with Soil Recovery		Ground Water Level ATD

Run No.

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-10-50 / MW-10-20

April 2020

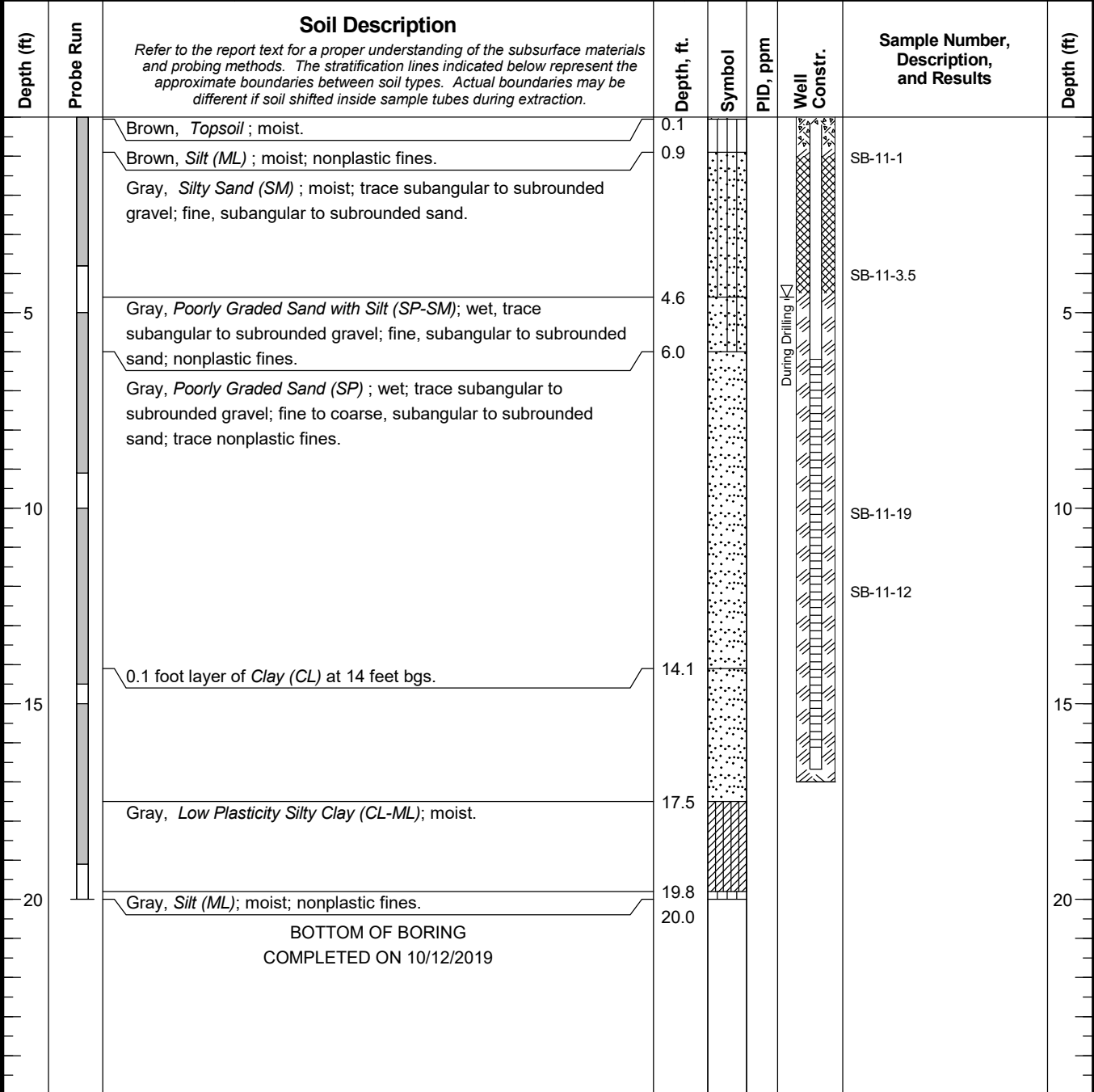
102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-14

LOG OF GEOPROBE

Date Started	10/12/19	Location	Near AWOS Station
Date Completed	10/12/19	Ground Elevation:	NA
Total Depth (ft)	20.0	Typical Run Length	5 feet
		Drilling Company:	Discovery Drilling
		Hole Diameter:	2.25 inches



Typ: CAB
 Rev: DYM
 Log: CAB
 GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

2" Plastic Tube - No Soil Recovery	Piezometer Screen and Sand Filter
2" Plastic Tube with Soil Recovery	Ground Water Level ATD

Run No. 3

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-11-50 / MW-11-15

April 2020

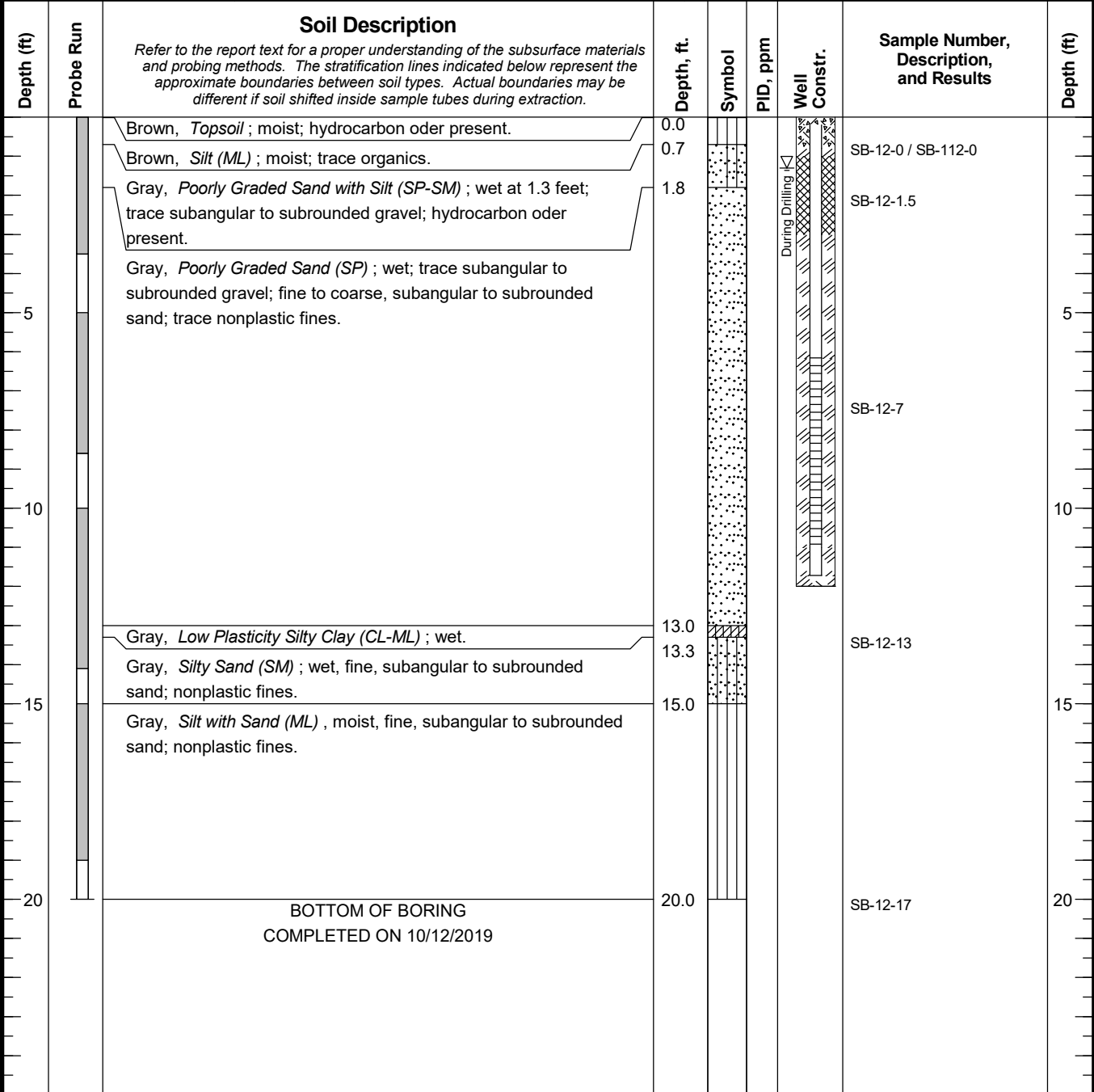
102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-15

LOG OF GEOPROBE

Date Started	10/12/19	Location	Former Fire Training Pit	Ground Elevation:	NA
Date Completed	10/12/19			Typical Run Length	5 feet
Total Depth (ft)	20.0	Drilling Company:	Discovery Drilling	Hole Diameter:	2.25 inches



Typ: CAB
 Rev: DYM
 Log: CAB
 GEOPROBE WELL: 102599-008.GPJ 21-20447.GPJ 2/4/20

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

- | | |
|---|---|
| 2" Plastic Tube with Soil Recovery
2" Plastic Tube - No Soil Recovery
Run No. | Piezometer Screen and Sand Filter
Ground Water Level ATD |
|---|---|

Gustavus Work Plan Implementation
Gustavus, Alaska

LOG OF GEOPROBE SB-12-50 / MW-12-10

April 2020

102599-008

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure A-16

Appendix B

Field Forms

CONTENTS

- Monitoring Well Development and Sampling Logs
- Temporary Well Point Sampling Logs
- Sample Logs
- Daily Field Logs

WELL DEVELOPMENT LOG

Owner-Client DOT & AF Well No. MW-12-10
 Location Gustavus, AK Project No. 102599-008
 Weather Mostly cloudy, 340's Date 10/14/19
 Development Personnel GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 10.74 11.50
 Depth to Water **Before** Development (feet below top of casing): 0.5
 Depth to Screen Top and Bottom (from Construction Log): Top: 6.16 Bottom: 11.00

Development Details

Feet of water in well ~~8.74~~ 11.00 Time pumping started 1222
 Gallons per foot 0.17 Flow rate (gal/min) ~0.5
 Gallons in well 1.97 Flow-rate measurement method:
 Surge method Surge block on end of tubing Time to fill 55 gal drum
 Pump used Wateria Time pumping ended 1312
 Tubing used (ft) ~20 Gallons Pumped ~20
 Disposal: Filter + GAC, then to ground surface

Depth to Water **After** Development (feet below top of casing): 0.5
 Total Depth of Well **After** Development (feet below top of casing): 11.99

Observations

Time	Water Clarity (Visual)	Time	Water Clarity (Visual)
1223	Opaque, grey-brown	1307	Slightly turbid, nearly clear
1226	Opaque, light grey-brown	1311	Clear
1231	Very silty, light grey-brown		
1237	"		
1241	"		
1244	Silty, grey		
1247	Very silty, grey		
1253	Somewhat turbid		
1257	"		
1304	"		

Began w/ tubing at 4 ft. above bottom of well

NOTES: ↑ removed tubing up in well 4 ft.
 • removed surge block, placed tubing 21 ft. from bottom of well.

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location GUSTAVUS, AK
 Sampling Personnel GCD
 Weather Conditions Mostly cloudy Air Temp. (°F) 40°

Project No. 102999-008
 Date 10/14/19
 Well MW-12-10
 Time started 1315
 Time completed 1345

Sample No. MW-12-10 Time 1327
 Duplicate — Time —
 Equipment Blank — Time —

Pump Peri pump
 Purging Method portable / dedicated pump Diameter and Type of Casing 2" PVC
 Pumping Start 1317 Approximate Total Depth of Well Below MP (ft.) —
 Purge Rate (gal./min.) 20.15 Measured Total Depth of Well Below MP (ft.) —
 Pumping End 1327 Depth to Water Below MP (ft.) —
 Depth to Ice (if frozen) Below MP (ft.) —
 Pump Set Depth Below MP (ft.) — Feet of Water in Well —
 KuriTec Tubing (ft.) — Gallons per foot 0.17
 TruPoly Tubing (ft.) — Gallons in Well —
 Purge Water Volume (gal.) —
 Purge Water Disposal Filtr + GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure
 Top-of-casing to monument (ft.) 0.2 Datalogger type n/a
 Monument to ground surface (ft.) 0 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes See development log for total purged and additional details

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

KCF

Well No. MW-12-10

WELL DEVELOPMENT LOG

Owner-Client DOT & PF Well No. MW-11-15
 Location GUSTAVUS Project No. 102599-008
 Weather Clear, 20's, Frosty Date 10/14/19
 Development Personnel GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 16.30
 Depth to Water **Before** Development (feet below top of casing): 3.84
 Depth to Screen Top and Bottom (from Construction Log): Top: 6.19 Bottom: 16.03

Development Details

Feet of water in well 12.46 Time pumping started 0819-10:13; 10:28-11:08
 Gallons per foot 0.17 Flow rate (gal/min) 20.5
 Gallons in well 2.12 Flow-rate measurement method: _____
 Surge method Surge block on end of tubing
 Pump used Waterro Time pumping ended 11:08
 Tubing used (ft) ~ 30 Gallons Pumped _____
 Disposal: FILTER + GAC, then to ground surface

Depth to Water **After** Development (feet below top of casing): _____
 Total Depth of Well **After** Development (feet below top of casing): _____

Observations

Began w/ tubing 4 ft. from bottom ↓

	Time	Water Clarity (Visual)		Time	Water Clarity (Visual)
	0820	Opaque, grey brown		0903	Silty, grey-brown
	0824	"		0905	"
↑	0829	Opaque; light grey brown	↑	0908	"
	0831	"	↑	0913	"
↑	0836	very silty, grey-brown	↑	0916	"
	0839	"	↑	0920	"
↑	0846	"	•	0925	Very silty, dark grey
↑	0849	"	•	0928	Very silty, grey brown
↑	0855	"	•	0951	Very turbid
↑	0900	"		1013	Somewhat turbid, stop pump

no change until

NOTES: ↑ = Moved tubing up in well 4 ft. (continued on reverse)
 • Removed surge block, placed tubing 4 ft. from bottom

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

Observations (continued)

<u>Time</u>	<u>Water Clarity (visual)</u>
10:29	Turbid
10:34	"
10:43	Somewhat turbid
10:49	"
10:52	Slightly turbid
10:55	"
10:59	"
11:06	"

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location EVSTAVUS, AK
 Sampling Personnel GCD
 Weather Conditions clear Air Temp. (°F) 20's

Project No. 102599-008
 Date 10/14/19
 Well MW-11-15
 Time started 11:08
 Time completed _____

Sample No. MW-11-15 Time 11:29
 Duplicate MW-11-115 Time 11:19
 Equipment Blank - Time -

Pump Peri pump
 Purging Method portable / dedicated pump
 Pumping Start 1113
 Purge Rate (gal./min.) 20.2
 Pumping End 1129

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) _____
 Measured Total Depth of Well Below MP (ft.) 16.26
 Depth to Water Below MP (ft.) 3.54
 Depth to Ice (if frozen) Below MP (ft.) _____
 Feet of Water in Well 12.72
 Gallons per foot 0.17
 Gallons in Well 2.16
 Purge Water Volume (gal.) _____

Pump Set Depth Below MP (ft.) ~15
 KuriTec Tubing (ft.) _____
 TruPoly Tubing (ft.) ~17
Silicone tubing = ~1/2 ft.

Purge Water Disposal Filter + GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps) _____

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.17
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational - N/A no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes See development log for total purged

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.
MW-11-15

KAT

WELL DEVELOPMENT LOG

Owner-Client DOTS PF Well No. MW-8-20
 Location Quistavus, AK Project No. 102592-008
 Weather Clear, 40's - 30's Date 10/13/19
 Development Personnel GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 17.74
 Depth to Water **Before** Development (feet below top of casing): 4.68
 Depth to Screen Top and Bottom (from Construction Log): Top: 7.32 Bottom: 17.66

Development Details

Feet of water in well 13.06 Time pumping started 1701
 Gallons per foot 0.17 Flow rate (gal/min) ~0.7
 Gallons in well 2.22 Flow-rate measurement method:
 Surge method Surge block on end of tubing Time to fill 55 gal drum 60% full
 Pump used Waterira Time pumping ended 1759
 Tubing used (ft) ~27 Gallons Pumped ~35
 Disposal: FIR + GAC, then purge to ground surface

Depth to Water **After** Development (feet below top of casing): _____
 Total Depth of Well **After** Development (feet below top of casing): _____

Observations

Time	Water Clarity (Visual)	Time	Water Clarity (Visual)
1703	opaque, grey	1743	opaque, grey
1708	opaque, light grey	1745	opaque, light grey
1712	"	1748	very salty, grey
1715	"	1751	Turbid
1721	"	1754	Nearly clear
1724	"		
1731	"		
1734	"		
1737	"		
1740	"		

Began w/ tubing at bottom of well
 ↓
 ↑
 ↑
 ↑
 ↑
 ↑
 ↑
 ↑
 ↑
 ↑

NOTES: ↑ = moved tubing up in well ~1 ft
 ○ = Removed surge block

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRR

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Gustavus, AK
 Sampling Personnel ACD
 Weather Conditions Clear Air Temp. (°F) 40's-30's

Project No. 102599-008
 Date 10/13/19
 Well MW-8-20
 Time started 17:55
 Time completed 18:40

Sample No. MW-8-20 Time 1809
 Duplicate - Time -
 Equipment Blank - Time -

Pump Per pump
 Purging Method portable / dedicated pump
 Pumping Start 1758
 Purge Rate (gal./min.) 10.2
 Pumping End 1809

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 17.62
 Depth to Water Below MP (ft.) 4.68
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 12.94
 Gallons per foot 0.17
 Gallons in Well 2.20
 Purge Water Volume (gal.) ~37 gal

Pump Set Depth Below MP (ft.) ~14
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~18
Silicone tubing = ~1/2 ft

Purge Water Disposal Filter + GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.17 Datalogger type n/a
 Monument to ground surface (ft.) 0 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes ~35 gallons pumped/purged with Waters pump during well development,
~22 gallons purged with per. pump

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. MW-8-20

WELL DEVELOPMENT LOG

Owner-Client: DOT & PF Well No. MW-7-20
 Location: GUSTAVUS, AK Project No. 102599-008
 Weather: Clear, 30's (Frosty) Date: 10/13/19
 Development Personnel: GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 18.79
 Depth to Water **Before** Development (feet below top of casing): 6.92
 Depth to Screen Top and Bottom (from Construction Log): Top: 8.47 Bottom: 18.51

Development Details

Feet of water in well: 11.87 Time pumping started: 0958
 Gallons per foot: 0.17 Flow rate (gal/min): ~ 0.8
 Gallons in well: 2.02 Flow-rate measurement method: Time to fill 55-gal drum
 Surge method: Surge block attached to end of tubing Time pumping ended: 1110
 Pump used: Waterio Gallons Pumped: 155
 Tubing used (ft): ~ 29 Disposal: Fill + GAC, then to ground surface

Depth to Water **After** Development (feet below top of casing): 6.92
 Total Depth of Well **After** Development (feet below top of casing): 18.89

Observations

Begin w/ tubing from bottom of well

Time	Water Clarity (Visual)
0958	Opague, light grey
1004	very silty light grey
1011	"
1012	"
1018	"
1024	Turbid, grey
1032	"
1043	"
1047	"
1058	"

Time	Water Clarity (Visual)
1102	Slightly turbid, newly clear
1109	"
1110	Newly clear

↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑

NOTES: ↑ = Moved tubing up in well ~ 1 ft
 • Removed surge block, placed tubing ~ 2 ft. from bottom

WELL CASING VOLUMES

Diameter of Well (ID-inches)	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location GUSTAVUS
 Sampling Personnel GCD
 Weather Conditions Clear Air Temp. (°F) 30.5

Project No. 102599-008
 Date 10/13/19
 Well MW-7-20
 Time started 1115
 Time completed 1150

Sample No. MW-7-20 Time 1129
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peri pump
 Purging Method portable / dedicated pump
 Pumping Start 1118
 Purge Rate (gal./min.) ~0.2
 Pumping End 1129

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 18.89
 Depth to Water Below MP (ft.) 6.92
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 11.97
 Gallons per foot 0.17
 Gallons in Well 2.03
 Purge Water Volume (gal.) ~55

Pump Set Depth Below MP (ft.) ~17.5
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~19

Purge Water Disposal Filter + GAC, then to ground surface

Monument Condition New
 Casing Condition New

Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.18
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes A Purged nearly 2 55-gal drum with water pump during well development, then ~2 gallons with peri pump

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.
MW-7-20

WELL DEVELOPMENT LOG

Owner-Client DOT & PF Well No. MW-9-30
 Location GUSTAVUS, AK Project No. 102599-008
 Weather Sunny, 30s-40s Date 10/13/19
 Development Personnel GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 28.22
 Depth to Water **Before** Development (feet below top of casing): 5.08
 Depth to Screen Top and Bottom (from Construction Log): Top: 18 Bottom: 27.44

Development Details

Feet of water in well 23.14 Time pumping started 1238
 Gallons per foot 0.17 Flow rate (gal/min) ~0.8
 Gallons in well 3.93 Flow-rate measurement method: bucket
 Surge method Surge block on end of tubing Pump used Watera
 Pump used Watera Time pumping ended 1322
 Tubing used (ft) ~38 Disposal: Fill + GAC, then to ground surface

Depth to Water **After** Development (feet below top of casing): 5.08
 Total Depth of Well **After** Development (feet below top of casing): 27.91

Observations

Time	Water Clarity (Visual)	Time	Water Clarity (Visual)
1238	Opaque, light grey	1309	Nearly clear, slightly turbid
1243	"	1321	Nearly clear
1248	Very silty, dark grey		
1255	Very silty, light grey		
~1301	Very silty, light grey		
1305	"		
1306	"		
1310	"		
1313	Very silty, light grey		
1316	Turbid		

NOTES: ↑ = Moved tubing up 1 ft. in well
 ○ = Removed surge block, placed tubing 1-2 ft. above bottom of well

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location GUSTAVUS, AK
 Sampling Personnel BCD
 Weather Conditions Sunny, 40's Air Temp. (°F) 40's

Project No. 102594-008
 Date 10/13/19
 Well MW-9-30
 Time started 1330
 Time completed _____

Sample No. MW-9-30 Time 1347
 Duplicate _____ Time _____
 Equipment Blank _____ Time _____

Pump Per. pump
 Purging Method portable / dedicated pump
 Pumping Start 1357
 Purge Rate (gal./min.) 20.2
 Pumping End 1347
 Pump Set Depth Below MP (ft.) _____
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) _____

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) _____
 Measured Total Depth of Well Below MP (ft.) 26.05 27.91
 Depth to Water Below MP (ft.) 5.08
 Depth to Ice (if frozen) Below MP (ft.) _____
 Feet of Water in Well 22.83
 Gallons per foot 0.17
 Gallons in Well _____
 Purge Water Volume (gal.) _____
 Purge Water Disposal Filter + GAG, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps) _____

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup Flushpoint
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.17
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational - N/A, no lock
- Well name legible on outside of well
- Evidence of frost-jacking No.

Notes _____

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.
MW-9-30

WELL DEVELOPMENT LOG

Owner-Client DOT & PF Well No. MW-10-20
 Location Gustavus Project No. 102599-008
 Weather Clear, 40's Date 10/13/19
 Development Personnel BCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 15.70
 Depth to Water **Before** Development (feet below top of casing): 3.44
 Depth to Screen Top and Bottom (from Construction Log): Top: 5.07 Bottom: 14.91

Development Details

Feet of water in well 12.26 Time pumping started 1453
 Gallons per foot 0.17 Flow rate (gal/min) 10.8
 Gallons in well 2.09 Flow-rate measurement method: Estimated from previous, and amount of time to fill drum
 Surge method Surge block on end of tubing Time pumping ended 1544
 Pump used Waters Gallons Pumped ~600
 Tubing used (ft) ~25 Disposal: Fill + BAC, then to ground surface

Depth to Water **After** Development (feet below top of casing): 15.44
 Total Depth of Well **After** Development (feet below top of casing): 3.44

Observations

	Time	Water Clarity (Visual)		Time	Water Clarity (Visual)
	1455	opaque, dark grey		1533	sooty, grey
	1500	very silty, light grey		1537	Turbid
	1500			1543	very clear
	1504	opaque, dark grey			
	1508	opaque, grey			
	1511	"			
	1516	very silty, dark grey			
	1521	"			
	1524	"			
	1527	very silty, light grey			

NOTES: ↑ = moved tubing up in well ~1 ft.

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

MONITORING WELL SAMPLING LOG

Owner/Client Dot & PF
 Location Gustavus, AK
 Sampling Personnel BCD
 Weather Conditions Clear Air Temp. (°F) 40°

Project No. 102599-008
 Date 10/13/11
 Well MW-10-20
 Time started 1545
 Time completed _____

Sample No. MW-10-20 Time 1604
 Duplicate _____ Time _____
 Equipment Blank _____ Time _____

Pump Peripump
 Purging Method portable / dedicated pump
 Pumping Start 1554
 Purge Rate (gal./min.) ~0.2
 Pumping End 1604

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) _____
 Measured Total Depth of Well Below MP (ft.) 15.44
 Depth to Water Below MP (ft.) 3.44
 Depth to Ice (if frozen) Below MP (ft.) _____
 Feet of Water in Well 12
 Gallons per foot 0.17
 Gallons in Well 2.04
 Purge Water Volume (gal.) ~63*

Pump Set Depth Below MP (ft.) ~14
 KuriTec Tubing (ft.) _____
 TruPoly Tubing (ft.) ~16
 Silicone tubing = ~1/2 ft.

Purge Water Disposal Filter GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.21
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no well
- Well name legible on outside of well No
- Evidence of frost-jacking _____

Notes * ~60 purged with Waterloo pump during well development, and ~2 gallons with peripump

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. MW-10-20

WELL DEVELOPMENT LOG

Owner-Client DOT SPF Well No. MW-6-20
 Location Gustavus Project No. 102579-008
 Weather Partly cloudy Date 10/12/19
 Development Personnel BCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 16.22
 Depth to Water **Before** Development (feet below top of casing): 7.16
 Depth to Screen Top and Bottom (from Construction Log): Top: 5.89 Bottom: 15.73

Development Details

Feet of water in well 9.06 Time pumping started 1626
 Gallons per foot 0.17 Flow rate (gal/min) ~ 21 gal/min
 Gallons in well 1.54 Flow-rate measurement method: Estimated based on previous
 Surge method Surge block attached to end of tubing Time pumping ended 1729
 Pump used Waterira Gallons Pumped 140
 Tubing used (ft) 224 Disposal: Filter + GAC buckets, then to ground surface

→ 20.7 gal/min
 timing now first to fill 55-gal drum

Depth to Water **After** Development (feet below top of casing): 7.17
 Total Depth of Well **After** Development (feet below top of casing): 16.21

Observations

	Time	Water Clarity (Visual)
	1627	opaque, grey
	1632	very silty, grey
↑	1633	opaque, grey
	1636	"
↑	1640	very silty, grey
	1643	opaque dark grey
	1647	very silty, grey
↑	1649	opaque, grey
	1651	very silty, grey
↑	1654	"

	Time	Water Clarity (Visual)
↑	1655	very silty, dark grey
	1659	"
↑	1705	"
↑	1708	"
↑	1711	"
	1714	very silty, light grey
•	1718	very silty, dark grey
	1721	Turbid
	1723	Slightly turbid
	1728	Nearly clear, slightly turbid

Began w/ tubing 1 ft. from bottom of well

NOTES: ↑ = Moved tubing up in well ~ 1 ft.
 • Removed surge block, placed tubing ~ 1-2 ft. from bottom

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Gustavus
 Sampling Personnel GCD
 Weather Conditions Partly Cloudy Air Temp. (°F) 46°

Project No. 102599-008
 Date 10/12/19
 Well MW-6-20
 Time started 1730
 Time completed 1815

Sample No. MW-6-20 Time 1747
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peri pump
 Purging Method portable / dedicated pump
 Pumping Start 1734
 Purge Rate (gal./min.) 2.2
 Pumping End 1747
 Pump Set Depth Below MP (ft.) ~15
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~30 / 7

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 16.21
 Depth to Water Below MP (ft.) 7.17
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well -
 Gallons per foot 0.17
 Gallons in Well 9.04
 Purge Water Volume (gal.) ~42
 Purge Water Disposal Filter + GAC buckets, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0 Datalogger type n/a
 Monument to ground surface (ft.) 0.22 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational - N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes _____

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.
MW-6-20

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI F Circle one: Parameters stabilized or >3 well volumes purged
 Sample Observations _____
 Notes _____

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1736	8.6	3.20	364.4	6.94	103.4	Slightly turbid, nearly clear
1738	8.8	1.48	372.5	7.00	96.7	"
1741	8.7	1.22	370.3	7.02	42.7	"
1744	8.7	1.08	364.2	7.04	89.8	Nearly clear
1747	8 sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
<input checked="" type="checkbox"/>	<u>PEA-5</u>			<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

KRF

Well No.
MW-6-20

WELL DEVELOPMENT LOG

Owner-Client DOT & PF Well No. MW-3-40
 Location Gustavus Project No 102599-008
 Weather Mostly cloudy, occasional rain Date 10/16/19
 Development Personnel GCO

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 41.21
 Depth to Water **Before** Development (feet below top of casing): 8.73
 Depth to Screen Top and Bottom (from Construction Log): Top: 36.00 Bottom: 40.84

Development Details

Feet of water in well 32.48 Time pumping started 1216
 Gallons per foot 0.17 Flow rate (gal/min) ~1 gal/min
 Gallons in well 5.62 Flow-rate measurement method:
 Surge method Surge block attached to end of tubing Estimated from prior measured rate
 Pump used Waterco Time pumping ended 1246
 Tubing used (ft) ~55 Gallons Pumped ~35
 Disposal: Filter + GAC buckets, then to ground surface

Depth to Water **After** Development (feet below top of casing): 8.74
 Total Depth of Well **After** Development (feet below top of casing): 41.65

Observations

Began w/
tubing at
4ft. from Bot

Time	Water Clarity (Visual)
1217	Began clear, then dark opaque grey, then opaque light grey
1221	Very silty dark grey
1223	"
1227	Opaque grey
1230	Silty grey
1237	"
1239	"
1240	Turbid, grey brown

Time	Water Clarity (Visual)
1242	Somewhat silty, grey
1245	Slightly turbid

NOTES: ↑ = Moved tubing up in well 4 ft.

WELL CASING VOLUMES

Diameter of Well (ID-inches)	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

MONITORING WELL SAMPLING LOG

Owner/Client DOT
 Location Gustavus
 Sampling Personnel GCD
 Weather Conditions Mostly cloudy, occasional rain Air Temp. (°F) 40°

Project No. 102599-008
 Date 10/12/19
 Well MW-3-40
 Time started 1245
 Time completed 1330

Sample No. MW-3-40 Time 1311
 Duplicate MW-3-140 Time 1301
 Equipment Blank - Time -

Pump Peripump
 Purging Method portable / dedicated pump
 Pumping Start _____
 Purge Rate (gal./min.) _____
 Pumping End _____

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 41.65
 Depth to Water Below MP (ft.) 8.75
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 32.90
 Gallons per foot 0.17
 Gallons in Well 5.60
 Purge Water Volume (gal.) ~40
 Purge Water Disposal Filter

Pump Set Depth Below MP (ft.) ~40
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~45
 Silicone = 1/2 ft.

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps) _____

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.19
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes ~35 gallons pumped with water's pump during well development, ~2 gallons pumped/p

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. MW-3-40

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI F Circle one: Parameters stabilized or >3 well volumes purged
 Sample Observations _____
 Notes _____

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1302	6.7	4.92	456.1	5.58	231.8	Clear
1305	6.6	1.43	432.0	6.35	186.0	Clear
1308	6.6	1.11	426.4 27.9	6.64	158.9	Clear
1311	Sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
<input checked="" type="checkbox"/>	<u>PFA3</u>	_____	_____	<input checked="" type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>

KRF

Well No. MW-3-40

WELL DEVELOPMENT LOG

Owner-Client DOT & PF Well No. MW-3-15
 Location Quarries Project No 102599-008
 Weather Partly cloudy Date 10/12/19
 Development Personnel GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 14.37
 Depth to Water **Before** Development (feet below top of casing): 8.68
 Depth to Screen Top and Bottom (from Construction Log): Top: 3.92 Bottom: 13.76

Development Details

Feet of water in well 5.69 Time pumping started 1341
 Gallons per foot 0.17 Flow rate (gal/min) " < 1 gal/min
 Gallons in well 0.97 Flow-rate measurement method:
 Surge method Surge block on end of tubing Estimated from previous me
 Pump used Waters Time pumping ended 1445
 Tubing used (ft) ~25 Gallons Pumped ~30
 Disposal: Filter+GAC, then to ground surface

Depth to Water **After** Development (feet below top of casing): 8.67
 Total Depth of Well **After** Development (feet below top of casing): 14.38

Observations

Began w/ tubing at 4 ft. above bottom

	Time	Water Clarity (Visual)		Time	Water Clarity (Visual)
↑	1343	opaque, light grey		1431	opaque, lighter grey
↑	1346	opaque, light grey		1436	Turbid, orange-grey
	1351	"		1444	Slightly turbid, nearly clear
↑	1353	"			
	1359	silty, grey			
	1405	opaque, light grey			
↑	1410	silty, grey			
↑	1416	opaque, light grey			
	1421	" not pumping, at the top of water level			

NOTES: ↑ = Moved tubing up in well 4 ft.
 ○ Removed surge block

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KEP

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PE
 Location Guantanamo
 Sampling Personnel GCD
 Weather Conditions Partly cloudy Air Temp. (°F) 40.5

Project No. 102599-0001
 Date 10/12/19
 Well MW-3-15
 Time started 1445
 Time completed 1545

Sample No. MW-315 Time 1502
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peri pump
 Purging Method portable / dedicated pump
 Pumping Start _____
 Purge Rate (gal./min.) _____
 Pumping End _____

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) _____
 Measured Total Depth of Well Below MP (ft.) 14.38
 Depth to Water Below MP (ft.) 8.67
 Depth to Ice (if frozen) Below MP (ft.) _____
 Feet of Water in Well _____
 Gallons per foot 0.17
 Gallons in Well _____

Pump Set Depth Below MP (ft.) ~13
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~17
Silicone tubing = ~ 1/2 ft.

Purge Water Volume (gal.) ~33 *
 Purge Water Disposal Filter + GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps) _____

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) _____ Datalogger type n/a
 Monument to ground surface (ft.) 0 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational NA - no lock
- Well name legible on outside of well NO
- Evidence of frost-jacking _____

Notes * ~30 pumped with Waters pump during well development, and ~2.5 gallons purged with Peri pump

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. MW-3-15

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI F Circle one: Parameters stabilized or >3 well volumes purged
 Sample Observations _____
 Notes _____

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1453	9.1	6.60	441.5	5.71	153.4	Slightly turbid
1456	9.2	1.83	427.2	6.40	140.0	Clear
1457	9.2	1.37	432.3	6.65	130.9	Clear
1502	sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
<input checked="" type="checkbox"/>	<u>FEAS</u>			<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

KRP

Well No. MW-3-15

WELL DEVELOPMENT LOG

Owner-Client DOT & PE Well No. MW-2-30
 Location Gustavus, AK Project No. 102599-008
 Weather Rain, 40's °F, then Sun Date 10/11/19
 Development Personnel GCP

Diameter and Type of Casing: 2" PVC 13.63
 Total Depth of Well **Before** Development (feet below top of casing): 27.54
 Depth to Water **Before** Development (feet below top of casing): 13.63
 Depth to Screen Top and Bottom (from Construction Log): Top: 21.99 Bottom: 27.07

Development Details

Feet of water in well 13.91 Time pumping started 1250
 Gallons per foot 0.17 Flow rate (gal/min) ~21
 Gallons in well 2.34 Flow-rate measurement method:
 Surge method Surge block on the end of tubing ESTIMATE based on previous well, measured w/
 Pump used Watters 2 Time pumping ended see sample log 5-gal bucket
 Tubing used (ft) ~37 Gallons Pumped 245 gallons
 Disposal: Filter + GAC buckets, then to ground surface

Depth to Water **After** Development (feet below top of casing): ~~14.37~~ 13.37
 Total Depth of Well **After** Development (feet below top of casing): 27.55

Observations

Tubing at
very Bow →

Time	Water Clarity (Visual)
1252	Opaque, dark grey
1255	Very silty, dark grey
↑ 1259	Very silty, dark grey
1301	Opaque, dark grey
1305	Very silty, dark grey
1311	Very silty, dark grey
↑ 1313	Very silty, dark grey
1317	Very silty, grey
↑ 1319	Very silty, grey
↑ 1324	Silty, grey

↓

Time	Water Clarity (Visual)
1330	Turbid
1332	Slightly silty, grey
1335	Somewhat turbid, stop pump, remove block, start pump
1339	Nearly clear, slightly turbid
1344	Nearly clear, slightly turbid
1347	Nearly clear, pump off

stopping tubing just above bottom

NOTES: ↑ = Moved up in well ~1ft.
 ↓ = Moved tubing all the way to the bottom

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Gustavus
 Sampling Personnel ACD
 Weather Conditions Rain Air Temp. (°F) 40's

Project No. 102599-008
 Date 10/11/19
 Well MW-2-30
 Time started 1250
 Time completed 1445

Sample No. MW-2-30 Time 1440
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peri pump
 Purging Method portable / dedicated pump
 Pumping Start 1228
 Purge Rate (gal./min.) 0.3
 Pumping End 1440
 Pump Set Depth Below MP (ft.) _____
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) _____

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 27.55
 Depth to Water Below MP (ft.) 13.37
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 14.18
 Gallons per foot 0.17
 Gallons in Well 2.41 x 3 = 7.23
 Purge Water Volume (gal.) 245
 Purge Water Disposal Filt + GAL, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps) _____

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.25
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking _____

Notes 2 3/4 55-gal drum purged during well development w/ Waterloo pump, and ~ 1/2 5 gal bucket purged w/ Peripump

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.
MW-2-30

WELL DEVELOPMENT LOG

Owner-Client <u>DOT & PF</u>	Well No. <u>MW-2-20</u>
Location <u>Asst. Gustav's</u>	Project No. <u>102599-008</u>
Weather <u>Rain, 40's</u>	Date <u>10/11/19</u>
Development Personnel <u>GCO</u>	

Diameter and Type of Casing: 2 1/4" PVC

Total Depth of Well **Before** Development (feet below top of casing): 17.25

Depth to Water **Before** Development (feet below top of casing): 13.51

Depth to Screen Top and Bottom (from Construction Log): Top: 2.03 Bottom: ~~17.42~~ 17.38 ~~17.58~~
16.86

Development Details

Feet of water in well <u>3.74</u>	Time pumping started <u>1412</u>
Gallons per foot <u>0.17</u>	Flow rate (gal/min) <u>~ 1 gal</u>
Gallons in well <u>0.64</u>	Flow-rate measurement method: <u>estimated from previous measurement w/ 5 gal bucket</u>
Surge method <u>Surge block attached to end of tubing</u>	Time pumping ended <u>1507</u>
Pump used <u>Waters</u>	Gallons Pumped <u>~ 30</u>
Tubing used (ft) <u>~ 27</u>	Disposal: <u>Filter + GAC buckets, then to ground surface</u>

Depth to Water **After** Development (feet below top of casing): 13.38

Total Depth of Well **After** Development (feet below top of casing): ~~17.55~~ 17.16

Observations

Time	Water Clarity (Visual)	Time	Water Clarity (Visual)
1412	opaque, grey-brown ^{light}	1500	Turbid, grey-brown
1418	opaque, grey-brown ^{light}	1507	Nearly clear, stop pump
1420	"		
1428	"		
1432	Very salty, light grey-brown		
1437	"		
1442	Dark grey opaque		
1445	opaque, light grey		
1451	Very salty, light grey-brown		
1455	"		

Began w/ tubing 2 little above bottom

water coming out in spurts (top of water level)

NOTES: ↑ = moved tubing up in well ~ 1 ft
 ↓ = moved to about 2 feet from the bottom
 removed Surge block & tubing ~ 1 ft from bottom

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

WSP

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Gustavus
 Sampling Personnel GCO
 Weather Conditions Rain Air Temp. (°F) 40.5

Project No. 102599-008
 Date 10/11/19
 Well MW-2-20
 Time started 1530
 Time completed 1630

Sample No. MW-2-20 Time 1545
 Duplicate - Time -
 Equipment Blank - Time -

Pump port pump
 Purging Method portable / dedicated pump
 Pumping Start 1535
 Purge Rate (gal./min.) 0.3
 Pumping End 1545
 Pump Set Depth Below MP (ft.) ~16
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~19

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 15.17.16
 Depth to Water Below MP (ft.) 13.38
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 0
 Gallons per foot 0.17
 Gallons in Well 3.78 $\times 3 = 11.34$
 Purge Water Volume (gal.) ~30 *
 Purge Water Disposal Filter + GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.50
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes 1/2 55-gal drum purged during well development, and 1/2 5-gal bucket purged prior to sampling with Peripump

at water pump

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.

MW-2-20

KP

WELL DEVELOPMENT LOG

Owner-Client DOT & PF Well No. MW-5-20
 Location Augustus AK Project No 102599-008
 Weather occasional rain (rainbows!) Date 10/11/19
 Development Personnel GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 18.18
 Depth to Water **Before** Development (feet below top of casing): 7.77
 Depth to Screen Top and Bottom (from Construction Log): Top: 7.86 Bottom: 17.7

Development Details

Feet of water in well 10.41 Time pumping started 1646
 Gallons per foot 0.17 Flow rate (gal/min) ~21 gal
 Gallons in well 1.77 Flow-rate measurement method:
 Surge method Surge block on end of tubing Estimated based on previous
 Pump used waterira Time pumping ended 1751
 Tubing used (ft) ~29 Gallons Pumped ~40
 Disposal: Filter + GAC, then to ground surface

Depth to Water **After** Development (feet below top of casing): 7.77
 Total Depth of Well **After** Development (feet below top of casing): 18.18

Observations

Began w/ tubing 1ft from bottom
 ↑
 ↑
 ↑
 ↑
 ↑
 ↑
 ↑
 ↑

Time	Water Clarity (Visual)
1647	opaque, dark grey
1652	opaque, light grey-brown
1657	"
1700	opaque dark grey
1708	opaque light grey-brown
1713	"
1717	very silty, grey
1722	"
1727	opaque light grey
1730	very silty, grey

Time	Water Clarity (Visual)
1733	Silty, grey
1736	Turbid, grey
1740	"
1744	"
1747	Somewhat turbid, grey
1750	Nearly clear, slightly turbid, pump off

turbid,

NOTES: ↑ = Moved tubing up in well 1ft.
 ○ = Remove surge block, place tubing ~1ft from bottom

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Greensboro, AK
 Sampling Personnel ACD
 Weather Conditions occasional rain Air Temp. (°F) 40's

Project No. 102599-008
 Date 10/11/19
 Well MW-5-20
 Time started 1740
 Time completed 1830

Sample No. MW-5-20 Time 1810
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peripump
 Purging Method portable / dedicated pump
 Pumping Start 1800
 Purge Rate (gal./min.) 2.2
 Pumping End 1810
 Pump Set Depth Below MP (ft.) ~17
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~20

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 18.18
 Depth to Water Below MP (ft.) 7.77
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 10.41
 Gallons per foot 0.17
 Gallons in Well 1.77
 Purge Water Volume (gal.) ~42
 Purge Water Disposal FIBR + GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup ~~Flushmount~~
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.18
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes ~40 gallons purged with water pump during well development,
~2 gal purged with peripump prior to sampling

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.

MW-5-20

KRF

WELL DEVELOPMENT LOG

Owner-Client DOT & PF Well No. MW-1-40
 Location Gustavus Project No. 102599-008
 Weather overcast, intermittent light Date 10/9/19 - 10/10/19
 Development Personnel GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well Before Development (feet below top of casing): 42.15
 Depth to Water Before Development (feet below top of casing): 7.30
 Depth to Screen Top and Bottom (from Construction Log): Top: 36.82 Bottom: 41.66

Development Details

Feet of water in well 31.85 34.85 Time pumping started 17:09
 Gallons per foot 5.92 0.17 Flow rate (gal/min) ~1.5
 Gallons in well 5.92 Flow-rate measurement method:
 Surge method Surge block attachment on tubing Timing with 5-gal bucket
 Pump used Waterterra Pump Time pumping ended 12:37
 Tubing used (ft) ~45 Gallons Pumped ~90
 Disposal: Filter + GAC, then to ground surface

Depth to Water After Development (feet below top of casing): 7.31
 Total Depth of Well After Development (feet below top of casing): 7.39 42.12

Observations

Time	Water Clarity (Visual)	Time	Water Clarity (Visual)
17:10	Clear, then opaque grey	18:35	Turbid, grey
17:15	Very silty, dark grey		Stop pumping
	stop pumping	11:55	Silty, grey
17:55	start pumping	12:00	Silty, grey
18:00	Very silty, opaque grey	12:05	Turbid, grey
18:07	Very silty, grey	* 12:07	Turbid, grey
18:15	Silty, turbid	12:13	Very silty, dark grey
18:20	Turbid, grey	12:18	Very silty, dark grey
18:25	Turbid, grey	12:25	Turbid, grey
18:30	Turbid, grey	12:29	Silty, grey

NOTES: * Moved tubing up in well

10/10/19
↓
→ Continued on reverse side

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

observations (cont)

MW-1-40

<u>Time</u>	<u>Water Clarity (visual)</u>
1232	Turbid, grey
1237	turbid, slightly grey - turn pump off, put ^{purge} water from 10/10 drum fill through GAC (second day (10/9))

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Gustavus, AK
 Sampling Personnel GCP
 Weather Conditions overcast, intermittent rain Air Temp. (°F) 46°

Project No. 102599-008
 Date 10/10/19
 Well MW-1-40
 Time started 1345
 Time completed 1500

Sample No. MW-1-40 Time 1447
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peri pump
 Purging Method portable / dedicated pump
 Pumping Start 1351
 Purge Rate (gal./min.) ~0.08 - 0.24 gal/min
 Pumping End 1448
 Pump Set Depth Below MP (ft.) ~42
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~43

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 42.25
 Depth to Water Below MP (ft.) 7.46
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 34.69
 Gallons per foot 0.17
 Gallons in Well 5.8590
 Purge Water Volume (gal.) ~100 *
 Purge Water Disposal Filter + GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

$k3 = 17.69$

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 2.01
 Monument to ground surface (ft.) 0

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes * 10/9 - well development with a Waters pump yielded 1 55-gal drum, slightly less than full
10/10 - further pumping with waters pump filled an additional 55 gal pump
Purging with peripump purged 2 5 gal buckets

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. MW-1-40

MONITORING WELL SAMPLING LOG

3 well volumes = 17.69

Field Parameter Instrument YSI F Circle one: Parameters stabilized or >3 well volumes purged
 Sample Observations _____

Notes water mostly clear, a little cloudy in sample bottles

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1353	7.4	1.72	498.8	7.14	67.2	Clear (nearly)
1355	7.2	1.07	504	7.12	50.0	Clear Turbid
1358	7.1	0.95	503	7.14	39.6	Turbid
1401	7.1	0.88	501	7.15	32.7	Turbid
1404	7.1	0.81	499.9	7.17	25.9	Turbid
1407	7.1	0.76	499.2	7.18	21.2	Turbid
1410	6.8	0.71	496.4	7.19	17.4	Turbid
1413	6.8	0.68	499.4	7.18	13.5	Somewhat turbid
1416	6.8	0.65	501	7.19	9.3	Somewhat turbid
1419	6.8	0.60	505	7.19	7.5	Somewhat turbid
1422	6.8	0.52	508	7.20	7.0	Somewhat turbid
1425	6.8	0.47	510	7.20	3.1	Somewhat turbid
1431	6.8	0.43	514	7.20	0.4	Somewhat turbid
1434	6.8	0.41	512	7.20	-1.0	Slightly turbid

Laboratory SGS

Analysis	Sample Containers	Preservatives	Dup
<input checked="" type="checkbox"/> PFA5	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	<input type="checkbox"/>

1409 - Bucket is $\frac{1}{4}$ full, turn pump speed up as high as it will go $\rightarrow \sim 0.08$ gal/min
 1447 - Collect sample, pump off, had filled additional ~ 9 gal $\rightarrow \sim 0.24$ gal/min

Well No. MW-140

WELL DEVELOPMENT LOG

Owner-Client DOT & PF Well No. MW-1-15
 Location Gustavus, AK Project No 102599-008
 Weather overcast, 40's °F Date 10/10/19
 Development Personnel GCD

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 15.30
 Depth to Water **Before** Development (feet below top of casing): 7.94
 Depth to Screen Top and Bottom (from Construction Log): Top: 5.23 Bottom: 15.06

Development Details

Feet of water in well 7.92 Time pumping started 1523
 Gallons per foot 0.17 Flow rate (gal/min) ~ a little < 1 gal/min
 Gallons in well 1.35 Flow-rate measurement method:
 Surge method Surge block attached to end of tubing time w/ 5-gal bucket
 Pump used Waterco Time pumping ended 1715
 Tubing used (ft) ~30 ft. Gallons Pumped ~60
 Disposal: Filter + GAC buckets, then to ground surface

Depth to Water **After** Development (feet below top of casing): 15.38 7.46
 Total Depth of Well **After** Development (feet below top of casing): 15.38

Begin surging/pumping with tubing at very bottom of well

Observations

Time	Water Clarity (Visual)
1523	opaque, dark grey
1531	very silty, dark grey-brown
1536	very silty, grey-brown
1540	Silty, grey-brown
1553	very silty, grey-brown
1555	opaque, dark grey
1600	opaque, grey-brown
1608	opaque, grey-brown
1617	opaque, grey-brown
1620	opaque, grey-brown

Time	Water Clarity (Visual)
1631	opaque grey-brown
1644	very silty, grey-brown
1648	very silty, grey brown
	down as full, turn pump off & GAC
1658	Remove surge block
1658	start pumping - very silty, grey brown
1702	Silty, grey-brown
1706	Turbid, grey
1712	Somewhat turbid
1715	Nearly clear, turn pump off

NOTES: * More tubing up in well a few feet
 • Reinserted tubing with no block just above bottom of well

WELL CASING VOLUMES

Diameter of Well (ID-inches)	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

ben

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location GUSTAVUS, AK
 Sampling Personnel GCD
 Weather Conditions Overcast, intermittent drizzle Air Temp. (°F) 40's

Project No. 102599-008
 Date 10/10/19
 Well MW-1-15
 Time started 1720
 Time completed 1820

Sample No. MW-1-15 Time 1741
 Duplicate - Time -
 Equipment Blank - Time -

Pump Per: Pump
 Purging Method portable / dedicated pump
 Pumping Start 1728
 Purge Rate (gal./min.) ~0.25
 Pumping End 1741
 Pump Set Depth Below MP (ft.) ~15
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~17

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 15.38
 Depth to Water Below MP (ft.) 7.46
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 7.92
 Gallons per foot 0.17
 Gallons in Well 1.35 $\times 3 = 4.04$
 Purge Water Volume (gal.) ~7.5
 Purge Water Disposal Filter + GAC buckets, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) _____ Datalogger type n/a
 Monument to ground surface (ft.) 0 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes ~70 gallons purged to 55-gal drums during well development using water pump, then 1/2 of a 5-gal bucket purged with the per pump

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. MW-1-15

WELL DEVELOPMENT LOG

Owner-Client DOTERR Well No. MW-4-20
 Location Gustavus Project No. 102599-008
 Weather 40's - rainy Date 10/9/2009
 Development Personnel GCD/KRF

Diameter and Type of Casing: 2" PVC
 Total Depth of Well **Before** Development (feet below top of casing): 18.40
 Depth to Water **Before** Development (feet below top of casing): 2.07
 Depth to Screen Top and Bottom (from Construction Log): Top: 15.16 Bottom: 8.32

Development Details

Feet of water in well 16.33 Time pumping started 10:05
 Gallons per foot 0.17 Flow rate (gal/min) ~0.75 → (turned up higher to restart pump, then to a slow flow, overall ~0.5-1 gal/min)
 Gallons in well 2.78 Flow-rate measurement method: Timing in 5-gal bucket
 Surge method Watera Pump w/ surge block Time pumping ended 1:31
 Pump used Watera Gallons Pumped ~80
 Tubing used (ft) ~40 Disposal: See MW sampling log

Depth to Water **After** Development (feet below top of casing): 2.10
 Total Depth of Well **After** Development (feet below top of casing): 18.44

Observations

Time	Water Clarity (Visual)		Time	Water Clarity (Visual)
10:10	Very silty, opaque, grey		11:20	Very silty, grey
10:20	"		11:30	Very silty, grey
* 10:25	Very silty, grey (less)	mp	11:40	Very silty, grey
10:28	less, but very silty, grey		* 11:43	Silty, slightly grey
* 10:35	Very silty, grey		11:50	Silty, grey
10:40	Very silty, grey		12:00	Silty, grey
10:48	Very silty, grey	very RR	12:02	Very silty, grey
* 10:55	Very silty, grey	bottom	12:04	Silty, grey
11:10	Very silty, grey		12:10	Stopped pumping
* 11:15	Very silty, grey		13:05	Began pumping, no block - silty, grey

NOTES: * Raised tubing in well
 * Lowered tubing in well
 Water at end was more clear (significantly) than beginning

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

KRF

Observations (cont)

NW-7-20

- 1308 Nearly clear, slightly turbid
1315 ~~Clear~~ slightly turbid
1316 Move tubing up in well, ^{nearly} ~~clear~~
1321 Move tubing up, ~~clear~~ slightly turbid
1325 Slightly turbid → nearly clear
1327 Move tubing down to just above bottom of well,
1330 Clear
1331 Stop pumping
Total well depth = 18.45 ft.
Depth to water = 2.08 ft

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Gustavus, AK
 Sampling Personnel EC
 Weather Conditions overcast, intermittent rain Air Temp. (°F) 40.5

Project No. 102599-008
 Date 10/19/19
 Well MW-4-20
 Time started 9:00
 Time completed 10:30

Sample No. MW-4-20 Time 1000
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peri pump
 Purging Method portable / dedicated pump
 Pumping Start 09:24
 Purge Rate (gal./min.) ~0.025 gal/min.
 Pumping End 1000

Diameter and Type of Casing 2" PVC
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 18.40
 Depth to Water Below MP (ft.) 2.06
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 16.34
 Gallons per foot 0.17
 Gallons in Well 2.78
 Purge Water Volume (gal.) ~4.5

Pump Set Depth Below MP (ft.) ~18
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~20 ft.
Silicone tubing = ~1 ft.

Purge Water Disposal Filter + GAC, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) _____ Datalogger type n/a
 Monument to ground surface (ft.) 0 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational N/A - no lock
- Well name legible on outside of well
- Evidence of frost-jacking No

Notes _____

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.
MW-4-20

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Gustavus, AK
 Sampling Personnel GCD
 Weather Conditions overcast, intermittent + Air Temp. (°F) 40's
light rain, 40's°F

Project No. 102599-008
 Date 10/9/2019
 Well MW-4-20
 Time started 1330
 Time completed 1550

Sample No. MW-4-20 Time 1421
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peripump
 Purging Method portable / dedicated pump
 Pumping Start 1355
 Purge Rate (gal./min.) 0.4
 Pumping End 1421

Diameter and Type of Casing PVC, 2"
 Approximate Total Depth of Well Below MP (ft.) -
 Measured Total Depth of Well Below MP (ft.) 18.45
 Depth to Water Below MP (ft.) 2.08
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 16.54
 Gallons per foot 0.17
 Gallons in Well 2.78
 Purge Water Volume (gal.) ~9 gallons

Pump Set Depth Below MP (ft.) ~17
 KuriTec Tubing (ft.) -
 TruPoly Tubing (ft.) ~20
silicone tubing = ~2 ft

Purge Water Disposal GAC + Filter, then to ground surface

Monument Condition New
 Casing Condition New
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) _____ Datalogger type n/a
 Monument to ground surface (ft.) 0 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational -N/A
- Well name legible on outside of well -N/A
- Evidence of frost-jacking No

Notes _____

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Sample cancelled due to potential
 sampling after YSI

Well No. _____

MONITORING WELL SAMPLING LOG

Owner/Client ADOT & PF
 Location Gustavus AK NE side of runway
 Sampling Personnel CAB
 Weather Conditions Cloudy Air Temp. (°F) 40

Project No. 102599-008
 Date 10/14/2019
 Well TWP-06
 Time started 1535
 Time completed 1625

Sample No. TWP-06 Time 1624
 Duplicate — Time —
 Equipment Blank — Time —

Pump Peri Pump
 Purging Method portable / dedicated pump
 Pumping Start 1543
 Purge Rate (gal./min.) 0.085
 Pumping End 1624

Diameter and Type of Casing 1" PVC
 Approximate Total Depth of Well Below MP (ft.) 20
 Measured Total Depth of Well Below MP (ft.) 18.65 to 20.0
 Depth to Water Below MP (ft.) 10.00
 Depth to Ice (if frozen) Below MP (ft.) —
 Feet of Water in Well 10.00
 Gallons per foot 0.08
 Gallons in Well 0.8
 Purge Water Volume (gal.) 3.5
 Purge Water Disposal GAC

Pump Set Depth Below MP (ft.) 15.5'
 Peri KuriTec Tubing (ft.) 30
 Siluxon TruPoly Tubing (ft.) 1

Monument Condition N/A

Casing Condition Good, monument is casing

Wiring Condition (dedicated pumps) N/A

Measuring Point (MP) Top of Casing (TOC)

Monument type Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) —
 Monument to ground surface (ft.) 4.7

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational
- Well name legible on outside of well
- Evidence of frost-jacking

Notes Total depth 20.0' after development

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4"	2"	3"	4"	6"	8"
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

KRF

1"

Well No.
TWP-06

MONITORING WELL SAMPLING LOG

Owner/Client ADOT & DF
 Location Gustavus, AK NE End of Runway
 Sampling Personnel LAB
 Weather Conditions cloudy Air Temp. (°F) 40

Project No. 102519-008
 Date 10/14/2019
 Well TWP-07
 Time started 1630
 Time completed 1730

Sample No. TWP-07 Time 1715
 Duplicate TWP-107 Time 1725
 Equipment Blank — Time —

Pump Peri Pump
 Purging Method portable / dedicated pump
 Pumping Start 1638
 Purge Rate (gal./min.) 0.68
 Pumping End 1715
 Pump Set Depth Below MP (ft.) 50'
 Peri KuriTec Tubing (ft.) 15
 Silicone TruPoly Tubing (ft.) 1

Diameter and Type of Casing 1" PVC
 Approximate Total Depth of Well Below MP (ft.) 9.91
 Measured Total Depth of Well Below MP (ft.) 8.81 to 10.02
 Depth to Water Below MP (ft.) 1.87
 Depth to Ice (if frozen) Below MP (ft.) —
 Feet of Water in Well 8.15
 Gallons per foot 0.68
 Gallons in Well 0.652
 Purge Water Volume (gal.) 2.5
 Purge Water Disposal GAC

Monument Condition N/A
 Casing Condition Monument is casing
 Wiring Condition (dedicated pumps) N/A

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Red & level / Tape measure

Top-of-casing to monument (ft.) 1.4 Datalogger type n/a
 Monument to ground surface (ft.) — Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational
- Well name legible on outside of well
- Evidence of frost-jacking

Notes Depth after Development 10.02'

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

MONITORING WELL SAMPLING LOG

Field Parameter Instrument
Sample Observations
Notes

YSI C

3wv = 1.96
Circle one: Parameters stabilized or >3 well volumes purged

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1701	7.7	1.68	301.9	7.09	-125.9	Clear
1704	7.7	0.47	276.2	7.11	-146.3	Clear
1707	7.8	0.24	292.9	7.16	-150.4	Clear
1710	7.8	0.12	277.3	7.17	-148.6	Clear
1713	7.8	0.16	299.9	7.17	-148.9	Clear
1715	Sample					

Laboratory SGS

Analysis	Sample Containers	Preservatives	Dup
<input checked="" type="checkbox"/> PFAS	2	—	<input checked="" type="checkbox"/>
<input type="checkbox"/>			<input type="checkbox"/>
<input type="checkbox"/>			<input type="checkbox"/>
<input type="checkbox"/>			<input type="checkbox"/>
<input type="checkbox"/>			<input type="checkbox"/>
<input type="checkbox"/>			<input type="checkbox"/>

Well No.
TWP-07

MONITORING WELL SAMPLING LOG

Owner/Client ADOT & PI
 Location Gustavus, 1 SE End of Runway
 Sampling Personnel CAB
 Weather Conditions Sunny Air Temp. (°F) 45°

Project No. 102544-008
 Date 10/18/2019
 Well TWP-05
 Time started 1711
 Time completed 1800

Sample No. TWP-05 Time 1755
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peri pump
 Purging Method portable / dedicated pump
 Pumping Start 1720
 Purge Rate (gal./min.) 0.09
 Pumping End 1755

Diameter and Type of Casing 1" PVC
 Approximate Total Depth of Well Below MP (ft.) 18.00
 Measured Total Depth of Well Below MP (ft.) 17.62 to 18.54
 Depth to Water Below MP (ft.) 9.58
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 8.96
 Gallons per foot 0.08
 Gallons in Well 0.72
 Purge Water Volume (gal.) 3
 Purge Water Disposal GAC

Pump Set Depth Below MP (ft.) -
 Peri KuriTec Tubing (ft.) 30
 Silan TruPoly Tubing (ft.) 1

Monument Condition -

Casing Condition Good - Monument is casing

Wiring Condition (dedicated pumps) N/A

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 2.84
 Monument to ground surface (ft.) -

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational
- Well name legible on outside of well
- Evidence of frost-jacking

Notes 18.54 after development

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

1"

BDF

Well No.
TWP-05

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSIC
 Sample Observations Clear
 Notes _____

Circle one Parameters stabilized or >3 well volumes purged

3wv = 2.16gal

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1740	7.9	1.47	311.5	7.37	-121.2	Clear
1743	7.9	0.53	311.0	7.37	-176.1	Clear
1746	8.0	0.50	313.0	7.37	-193.5	Clear
1749	7.9	0.57	315.1	7.37	-197.9	Clear
1752	7.8	0.53	315.5	7.37	-202.7	Clear
1755	Sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
<input checked="" type="checkbox"/>	<u>DEAS</u>	<u>2</u>	<u>-</u>	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>

KRF

Well No.
TWP-05

MONITORING WELL SAMPLING LOG

Owner/Client ADOT & PF
 Location Gustavus - SW End of Runway
 Sampling Personnel CAB
 Weather Conditions Clear Air Temp. (°F) 45

Project No. 102599-008
 Date 10/13/2019
 Well TWP-04
 Time started 1620
 Time completed 1716

Sample No. TWP-041 Time 1700
 Duplicate — Time —
 Equipment Blank — Time —

Pump Peri Pump
 Purging Method portable / dedicated pump
 Pumping Start 1625
 Purge Rate (gal./min.) —
 Pumping End 1702

Diameter and Type of Casing 1" PVC
 Approximate Total Depth of Well Below MP (ft.) 18.00
 Measured Total Depth of Well Below MP (ft.) 17.5 - 18.5
 Depth to Water Below MP (ft.) 8.59
 Depth to Ice (if frozen) Below MP (ft.) —
 Feet of Water in Well 9.96
 Gallons per foot 0.08
 Gallons in Well 0.80
 Purge Water Volume (gal.) —
 Purge Water Disposal GAC

Pump Set Depth Below MP (ft.) 14
Peri KuriTee Tubing (ft.) 30
Silcon TruPoly Tubing (ft.) 1

3uv = 2.4

Monument Condition —
 Casing Condition Good - Monument is casing
 Wiring Condition (dedicated pumps) N/A

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 3.09
 Monument to ground surface (ft.) —

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational
- Well name legible on outside of well
- Evidence of frost-jacking

Notes 18.55' - After development

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1"	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

KRF

1"

Well No.
TWP-041

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI C
 Sample Observations Clear
 Notes _____

3uv 2.4

Circle one: Parameters stabilized or >3 well volumes purged

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1648	8.0	2.26	333.1	7.23	-271.6	Clear
1651	7.9	0.47	335.4	7.23	-272.3	Clear
1654	7.9	0.56	333.0	7.25	-277.5	Clear
1657	7.8	0.30	330.4	7.27	-242.8	Clear
1700	7.8	0.24	328.6	7.27	-249.9	Clear
1702	sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
<input checked="" type="checkbox"/>	PFAS	2	—	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>
<input type="checkbox"/>	_____	_____	_____	<input type="checkbox"/>

Well No.
7WP-04

MONITORING WELL SAMPLING LOG

Owner/Client ADOT JPP
 Location Constance, W End Runway
 Sampling Personnel ASB
 Weather Conditions Sunny 45 Air Temp. (°F) 45

Project No. 102544-008
 Date 10/13/2019
 Well TWP-08
 Time started 1340
 Time completed 1453

Sample No. TWP-08 Time 1447
 Duplicate - Time -
 Equipment Blank - Time -

Pump Peripump
 Purging Method portable / dedicated pump
 Pumping Start 1356
 Purge Rate (gal./min.) 0.08
 Pumping End 1447

Diameter and Type of Casing 1" PVC
 Approximate Total Depth of Well Below MP (ft.) 20.00
 Measured Total Depth of Well Below MP (ft.) 18.75 + 19.87
 Depth to Water Below MP (ft.) 8.21
 Depth to Ice (if frozen) Below MP (ft.) -
 Feet of Water in Well 11.66
 Gallons per foot 0.08
 Gallons in Well 6.93
 Purge Water Volume (gal.) 4.5

Pump Set Depth Below MP (ft.) 16
Peri- KuriTec Tubing (ft.) 30
Silicon TruPoly Tubing (ft.) 1

Purge Water Disposal GAC

Monument Condition Good - Monument is casing

Casing Condition ✓

Wiring Condition (dedicated pumps) ✓

Measuring Point (MP) Top of Casing (TOC)

Monument type: Stickup / Flushmount
 Measurement method: Red & level / Tape measure

Top-of-casing to monument (ft.) 4.75 top
 Monument to ground surface (ft.) casing is monument

Datalogger type n/a
 Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational
- Well name legible on outside of well
- Evidence of frost-jacking

Notes 19.87 final depth

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

1"

Well No.
TWP-08

MONITORING WELL SAMPLING LOG

Field Parameter Instrument _____ Circle one: *Parameters stabilized* or >3 well volumes purged
 Sample Observations _____
 Notes _____

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1433	8.6	0.84	408.6	6.43	-139.7	clear
1436	8.5	0.59	432.6	6.40	-223.9	clear
1439	8.5	0.50	433.8	7.06	-252.7	clear
1442	8.5	0.39	436.6	7.12	-274.6	clear
1445	8.5	0.35	439.3	7.14	-274.9	clear
1447	sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
<input checked="" type="checkbox"/>	PFAS	2	~	<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

KRF

Well No.
TWP-08

MONITORING WELL SAMPLING LOG

Owner/Client DOT & PF
 Location Gustavus
 Sampling Personnel CRB
 Weather Conditions cloudy light rain Air Temp. (°F) 45

Project No. 102599-008
 Date 10/11/2019
 Well TWP-01
 Time started 1235
 Time completed 1400

Sample No. TWP-01 Time 1349
 Duplicate _____ Time _____
 Equipment Blank _____ Time _____

Pump Peri Pump
 Purging Method portable / dedicated pump
 Pumping Start 1245 - 1 sec notes
 Purge Rate (gal./min.) 0.06
 Pumping End 1349
 Pump Set Depth Below MP (ft.) 14.5
 KuriTec Tubing (ft.) 25
 TruPoly Tubing (ft.) _____
Silicone 1

Diameter and Type of Casing 1" PVC
 Approximate Total Depth of Well Below MP (ft.) 17'
 Measured Total Depth of Well Below MP (ft.) 17.67
 Depth to Water Below MP (ft.) 8.14
 Depth to Ice (if frozen) Below MP (ft.) _____
 Feet of Water in Well 9.53
 Gallons per foot 0.08
 Gallons in Well 0.76
 Purge Water Volume (gal.) 3
 Purge Water Disposal land

Monument Condition Good
 Casing Condition Good - monument is casing
 Wiring Condition _____
 (dedicated pumps) _____

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) _____ Datalogger type n/a
 Monument to ground surface (ft.) 2.95 casing is monument Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational
- Well name legible on outside of well
- Evidence of frost-jacking

Notes Pump stop @ 1300 for flow through cell retrieval. Pump start @ 1315 Pump stop @ 1331 - attach KSP

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1 1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

1" casing

Well No. TWP-01

KRF

MONITORING WELL SAMPLING LOG

Owner/Client ADOT & PF Project No. 102599-008
 Location Cuyahoga Date 10/14/2019
 Sampling Personnel AD Well TWP-02
 Weather Conditions Light Rain Air Temp. (°F) 45°F Time started 1450
 Time completed 1605

Sample No. TWP-02 Time 1600
 Duplicate — Time —
 Equipment Blank — Time —

Pump Peri Pump
 Purging Method portable / dedicated pump Diameter and Type of Casing 1" PVC
 Pumping Start 1500 Approximate Total Depth of Well Below MP (ft.) 18.00
 Purge Rate (gal./min.) 140-160 Measured Total Depth of Well Below MP (ft.) 17.95
 Pumping End 1600 Depth to Water Below MP (ft.) 9.96
 Pump Set Depth Below MP (ft.) 14.00 Depth to Ice (if frozen) Below MP (ft.) —
 KuriTec Tubing (ft.) 30 Feet of Water in Well 8.99
 TruPoly Tubing (ft.) — Gallons per foot 0.08
silicone ↓ Gallons in Well 0.68
 Purge Water Volume (gal.) 3
 Purge Water Disposal GAC

Monument Condition Good
 Casing Condition Good Monument is Casing
 Wiring Condition N/A
 (dedicated pumps)

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 2.87 Datalogger type n/a
 Monument to ground surface (ft.) " Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational
- Well name legible on outside of well
- Evidence of frost-jacking

Notes _____

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1½	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

1" PVC

KRF

Well No. TWP-02

MONITORING WELL SAMPLING LOG

Owner/Client DOT & DE
 Location Gustavs
 Sampling Personnel ADP
 Weather Conditions Cloudy Air Temp. (°F) 40

Project No. 102599-008
 Date 10/11/2019
 Well TWP-033
 Time started 1610
 Time completed 1720

Sample No. TWP-3 Time 1709
 Duplicate — Time —
 Equipment Blank — Time —

Pump Pari Pump
 Purging Method portable / dedicated pump
 Pumping Start 1620
 Purge Rate (gal./min.) 0.1/min
 Pumping End 1709
 Pump Set Depth Below MP (ft.) 15.5
Pari Pump KuriTee Tubing (ft.) 30
Silvamp FruPoly Tubing (ft.) 1

Diameter and Type of Casing 1" PVC
 Approximate Total Depth of Well Below MP (ft.) 20.0
 Measured Total Depth of Well Below MP (ft.) 18.25
 Depth to Water Below MP (ft.) 8.00
 Depth to Ice (if frozen) Below MP (ft.) —
 Feet of Water in Well 12.00 30" below
 Gallons per foot 0.08
300 2.88 Gallons in Well 0.96
 Purge Water Volume (gal.) 4.5
 Purge Water Disposal GAC

Monument Condition Good
 Casing Condition Good
 Wiring Condition (dedicated pumps) N/A

Measuring Point (MP) Top of Casing (TOC) Monument type: Stickup / Flushmount
 Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 3.24 Datalogger type n/a
 Monument to ground surface (ft.) monument is caving Datalogger serial # n/a
 Measured cable length (ft.) n/a

- Lock present and operational
- Well name legible on outside of well
- Evidence of frost-jacking

Notes Total depth change 20.0 after clearing

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1/4	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

1"

KCF

Well No. 3
TWP-033

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSIC

3wv = 2.88
 Circle one: Parameters stabilized or >3 well volumes purged

Sample Observations clear

Notes _____

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1655	7.4	0.18	328.9	7.38	-280.1	clear
1658	7.4	0.16	326.6	7.43	-316.4	clear
1701	7.4	0.12	324.3	7.45	-337.9	clear
1704	7.5	0.12	321.1	7.44	-352.8	clear
1707	7.4	0.12	320.5	7.44	-358.2	clear
1709	Sample					

Laboratory SGS

Analysis	Sample Containers	Preservatives	Dup
<u>PEAS</u>	<u>2</u>	<u>—</u>	<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

SAMPLE COLLECTION LOG

Project Number: 162591-003
 Date: 10/15/2019
 Sampler: CAG

Location: Gustavus

Sample Number	Location	Sample Time	Depth Interval (ft)		Matrix Type	Sampling Method	Sample Type	PID Reading	Analyses
			top	bottom					
Drum 01	MW-1 / SB-01 - to 50' Drum 1	1346			Soil	ES		PFAS	
Drum 02	MW-1 15-45' Drum 2 of 2	1325							
Drum 03	MW-2 to 20' SB-02 to 35' Drum 1 of 2	1336							
Drum 04	MW-2 20' to 30' Drum 2 of 2	1340							
Drum 05	MW-3 / SB-03 to 30' Drum 1 of 2	1355							
Drum 06	MW-3 25' to 40' Drum 2 of 2	1400							
Drum 07	MW-4, to 30' Drum 1 of 1	1414							
Drum 08	SB-05, to 25' Drum 1 of 1	1425							
Drum 09	SB-06 / MW-6 to 25' Drum 1 of 1	1430							
Drum 10	SB-07 / MW-7 to 25' Drum 1 of 1	1455							
Drum 11	MW-8 to 30' Drum 1 of 1	1518							
Drum 12	SB-09 / MW-9 to 35' Drum 1 of 1	1528							
Drum 13	SB-10 / MW-10 to 25' Drum 1 of 1	1532							
Drum 14	SB-11 / MW-11 to 20' Drum 1 of 1	1540							
Drum 15	SB-12 / MW-12 to 20' Drum 1 of 1	1545							
Drum 16	TWP-01 - 05 Bucket 1 of 1	1646							
EB-19-31	Hand trowel EB From 10/14	1713			W	G	EB		

Matrix Type
 AR Air
 GW Groundwater
 PR Product
 SB Subsurf. soil
 SE Sediment
 SG Sludge
 SS Surface soil
 SW Surface water
 WR Water

Sampling Method
 -B Baller/Collinsa
 D Drill cuttings
 G Grab sampling
 H Hand auger
 L Tube liner
 P Pump (liquid)
 SS Spill spoon
 T Shelby tube
 V Vacuum (gas)
 W Wipe sampling

Sample Type
 ES Environmental sample
 ER Equipment rinse
 FB Field blank
 FD Field duplicate
 FM Field measurement
 FR Field replicate
 MD Matrix spike duplicate
 MS Matrix spike duplicate
 TB Trip blank

SAMPLE COLLECTION LOG

Project Number: 102599-008 Location: Gustavos Airport Page | of 2
 Date: 10/14/2019
 Sampler: KRETCAB

Sample Number	Location	Sample Time	Depth Interval (ft)		Matrix Type	Sampling Method	Sample Type	PID Reading	Analyses
			top	bottom					
SS-19-01	Western most point	809	-	6"	SS	G	ES	-	PFAS
SS-19-02	SW corner 2-20	828	-	6"	SS	G	ES	-	PFAS
SS-19-03	Across 2-20 from SS-19-02	840	-	6"	SS	G	ES	-	PFAS
SS-19-04	Across 2-20 from DOT shop	851	-	6"	SS	G	ES	-	PFAS
SS-19-05	Near DOT station, spray area	854	-	6"	SS	G	ES	-	PFAS
SS-19-06	~6 feet west of SS-19-05	901	-	6"	SS	G	ES	-	PFAS
SS-19-07	across 2-20 from "new" HFF area	913	-	6"	SS	G	ES	-	PFAS
SS-19-08	NW berm old fire tray pit	943	-	6"	SS	G	ES	-	PFAS
SS-19-09	W berm old fire tray pit	948	-	6"	SS	G	ES	-	PFAS
SS-19-10	S berm old fire tray pit	951	-	6"	SS	G	ES	-	PFAS
SS-19-11	E berm old fire tray pit	959	-	6"	SS	G	ES	-	PFAS
SS-19-12	bottom of fire pit	1007	-	6"	SS	G	ES	-	PFAS
SS-19-13		1013	-	6"	SS	G	ES	-	PFAS
SS-19-14		1000	-	6"	SS	G	FD	-	PFAS
SS-19-15		1023	-	6"	SS	G	ES	-	PFAS
SS-19-16		1029	-	6"	SS	G	ES	-	PFAS
SS-19-17		1034	-	2"	SS	G	ES	-	PFAS
SS-19-18		1020	-	2"	SS	G	FD	-	PFAS
SS-19-19		1046	-	2"	SS	G	ES	-	PFAS
SS-19-20	Across 11-29 from AK, low roadway	1216	-	6"	SS	G	ES	-	PFAS
SS-19-21	Across 11-29 from DOT & PF building	1228	-	6"	SS	G	ES	-	PFAS
SS-19-22	East of 11-29 near main pit, spray area	1235	-	6"	SS	G	ES	-	PFAS
SS-19-23	East of 11-29 near main pit, spray area	1200	-	6"	SS	G	FD	-	PFAS
SS-19-24	East of 11-29, N corner, near top	1249	-	6"	SS	G	ES	-	PFAS
SS-19-25	NW corner of airport	1259	-	6"	SS	G	ES	-	PFAS
SS-19-26	W of 11-29	1306	-	6"	SS	G	ES	-	PFAS

Matrix Type	Sampling Method	Sample Type
AR Air	Baller/Colvessa	ES Environmental sample
GW Groundwater	D Drill cuttings	ER Equipment rinsate
PR Product	G Grab sampling	FB Field blank
SB Subsurf. soil	H Hand auger	FD Field duplicate
SE Sediment	L Tube liner	FM Field measurement
SG Sludge	P Pump (liquid)	FR Field replicate
SS Surface soil	SS Split spoon	MD Matrix spike duplicate
SW Surface water	T Shelby tube	MS Matrix spike duplicate
WR Water	V Vacuum (gas)	TB Trip blank
	W Wipe sampling	

SAMPLE COLLECTION LOG

Project Number: 102519-008 Location: Grashtaus Airport Page 2 of 2

Date: 10/14/2019

Sampler: RF/CAB

Sample Number	Location	Sample Time	Depth Interval (ft)		Matrix Type	Sampling Method	Sample Type	PID Reading	Analyses
			top	bottom					
SS-19-27	W of 11-29 near sampled pond	1318	-	6"	SS	G	ES	-	PFAS
SS-19-28	W of 11-29 near Altair, on runway	1326	-	6"	SS	G	ES	-	PFAS
SS-19-29	W of 11-29 S corner	1338	-	6"	SS	G	ES	-	PFAS
SW-19-10	Drainage SW of runway	1343	0"	3"	SW	cap	ES	-	PFAS
SW-19-11		1350	0"	3"	SE	G	ES	-	PFAS
SW-19-11		1330	0"	6"	SW	cap	FD	-	
SW-19-11		1340	0"	6"	SE	G	FD	-	
Culvert 1	Culvert 1 outfall	1446	0"	3"	SE	G	ES	-	PFAS
SS-19-29	4 feet in ditch of Culvert 1	1447	0"	6"	SS	G	ES	-	PFAS
Culvert 2	Culvert 2 outfall	1455	0"	3"	SS	G	ES	-	PFAS
SS-19-30	5 feet in ditch of Culvert 2	1456	0"	6"	SE	G	ES	-	PFAS
Culvert 3	Culvert 3 outfall	1510	0"	3"	SS	G	ES	-	PFAS
SS-19-31	4 feet downstream of Culvert 3	1512	0"	6"	SE	G	ES	-	PFAS

Matrix Type	Sampling Method	Sample Type
AR	Bailer/Cutwax	ES
GW	Drill cuttings	ER
PR	Grab sampling	FB
SB	Hand auger	FD
SE	Tube liner	FM
SG	Pump (liquid)	FR
SS	Split spoon	MD
SW	Shelby tube	MS
WR	Vacuum (gas)	TB
	Wipe sampling	

Water

SAMPLE COLLECTION LOG

Date: 10/9/2014

Sampler: KDE

Sample Number	Location	Sample Time	Depth Interval (ft)		Matrix Type	Sampling Method	Sample Type	PID Reading	Analyses
			top	bottom					
SW-19-01	Gold Fish pond along edge	14:10	-	-	SW	cup	ES	-	PFAS
SW-19-02	Drainage Ditch SE of airport	15:01	-	-	SW	cup	ES	-	PFAS
SW-19-03	Drainage Ditch Moose lane/Gold Rd	15:40	-	-	SW	cup	ES	-	PFAS
SW-19-04	Glens ditch S of Gold Rd	16:42	-	-	SW	cup	ES	-	PFAS
EB-19-04	EB from day before prior to storm	9:01	-	-	WR	G	ER	-	PFAS
SW-19-05	Ditch N of airport	9:31	-	-	SW	cup	ES	-	PFAS
SW-19-06	Ditch near old training area	9:52	-	-	SW	cup	ES	-	PFAS
SW-19-07	"Dark pond, same as last"	10:37	-	-	SW	cup	ES	-	PFAS
SW-19-08	Glens Ditch turn from airport	11:50	-	-	SW	cup	ES	-	PFAS
SW-19-09	Corner intersection pond	12:50	-	-	SW	cup	ES	-	PFAS
EB-19-09	EB from today's activities	14:10	-	-	WR	G	ER	-	PFAS

Matrix Type	Sampling Method	Sample Type
AR	Baller/Celwesa	ES
GW	Drill cuttings	ER
PR	Grab sampling	FB
SB	Hand squeegee	FD
SE	Tube liner	FM
SG	Pump (liquid)	FR
SS	Split spoon	MD
SW	Shelby tube	MS
WR	Vacuum (gas)	TB
	Wipe sampling	

FIELD ACTIVITIES DAILY LOG

Date 10/16/17/2019

Sheet 1 of 1

Project No. 102589-008/10/15/43-001

Project Name: GUSLANS

Field activity subject: Various

Description of daily activities and events:

8 - show surveyors around to wells

10 - Pak, talk items to POTPE

1230 - check in to airport, rental cars

- plane delay

- unable to take supplies, had to recheck them as cargo, each take personal bag on plane and sample cooler

1620 - small plane arrives

1730 - ship sample cooler via Gold Struck, check into hotel

10/17/2019 - 530 - head to airport to check in

- 800, flight canceled due to weather, rebooked on flight leaving later, arriving in FBI much later

- KRF arrives FBI ~ 1600

- CAB arrived FBI ~ 2100

Visitors on site:

Changes from plans/specifications and other special orders and important decisions:

Flight delays due to weather made demands time higher than anticipated

Weather conditions:

Important telephone calls:

Personnel on site: CAB

Signature: [Handwritten Signature]

Date: 10/17/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/16/2019

Sheet 1 of 1

Project No. 102592-008

Project Name: Gustavus WP Implementation

Field activity subject: Filtering development water - GAC consolidation

Description of daily activities and events: 0755 - Depart Annie Mae

0805 - Begin filtering water

- Filter remaining development water

15 - soil drums 1 soil bucket

- consolidate GAC into mw-12 drum

7 - empty drums

0955 - Complete consolidation - store equipment @ ADOT

1015 - Arrive @ TWP-01

- meet with surveyors

- Instruct how to pull & back fill TWPs w/ bentonite

1000 - Arrive @ Annie Mae load trucks

- see KRF daily for next

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

N/A

Weather conditions: Cloudy - light rain 45°F

Important telephone calls: N/A

Personnel on site: CAB, KRF

Signature: [Signature]

Date: 10/16/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/15/2019

Sheet 1 of 1

Project No. 102599-008

Project Name: Gustavus site characterization

Field activity subject:

Description of daily activities and events: 6:30 - prep team to head out, 7:00 - get COCs done, head to cherissa to bring piece of equipment and start the DTW checks until AK Seaplanes opens.

TTT - NOA 907-770-9041

Anchorage, AK AK Cargo # 27442457208 Shipper ID 9934 lbs. 49.4 lbs

- Airway 2962 4313 8:45 - checked into AK Seaplanes

- continued w/ DTW checks

- 1000 - met Craig, offsite drums are moved onsite, gave DTW meter to do onsite checks

1010 - talked to Cherissa, generator has gone back to AP&T

1020 - set pump from Annie Mae for MW-3 cluster

115 - exchange vehicles and pick up trash, dump run

- keep doing DTWs as I piss walls

- take sand back to drillers

- check in with surveyors

200p - Assist with getting Cherissa ready for plane, pack coolers

330 - call client (Sam Lord) notify this is wrapping up and things have gone well. No river sample, plan to do full study later.

- more done w/ Craig

- EB sample from day before

- meet w/ surveyors regarding tomorrow's plan

600p - pack for tomorrow

Visitors on site:

Changes from plans/specifications and other special orders and important decisions:

Weather conditions:

Important telephone calls:

Personnel on site:

Signature: [Signature]

Date: 10/15/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/15/2019

Sheet 1 of 1

Project No. 102599-008

Project Name: Gustavus WP Implementation

Field activity subject: Moving Drums to ADOT & PF

Description of daily activities and events: 0650 - Depart Annie Mae

0700 - Arrive @ ADOT - Discuss plan to move drums

- Warm up loader

- Move Drums to ADOT & PF

0950 - Offsite drums @ ADOT & PF

1016 - Begin Depth to water measurements

TWP-08 8.29'

TWP-06 10.00'

TWP-07 1.82'

MW-11-15 3.98'

MW-12-10 0.31'

1200 - Move offsite Drums to ADOT & PF

1245 - Begin Drum Sampling

Collect 16 samples

- Gate TWP water

- Consolidate remaining development water

1840 - Measure Depth to GW @ TWP-012 7.84'

1855 - Arrive at Annie Mae

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

N/A

Weather conditions: Cloudy to light Rain 35-45°F

Important telephone calls: N/A

Personnel on site: CAB, KRF, GCD

Signature: [Signature]

Date: 10/15/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/15/19

Sheet 1 of 2

Project No. 102599-008

Project Name: Statewide PFAS, DOT & PF, Gustavus

Field activity subject: monitoring well Development & Sampling

Description of daily activities and events: 0630 Prep/pack/organize

0700 Treat purge water contained in 2 drum with GAC buckets at MW-8

0730 Collect sample, "GAC#1" at from water treated from MW-8

0830 Treat drummed purge water with filter & GAC drum at MW-11-15! Water still fairly silty - added additional absorbent pads to improve filtering.

0930 Treat drummed purge water at MW-12-10.

1005 Collect sample, "GAC#2"

1120 Treat drummed per decon water from drilling at staging area by airport.

1300 Return to lodge, prepare sample shipping cooler!

1500- Check in for plane

Visitors on site: DOT & PF, Gustavus residents on Parker Drive

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: Rain, 40's

Important telephone calls: KRF, DOT & PF

Personnel on site: GCD, KRF, CAB

Signature: [Handwritten Signature] Date: 10/15/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/14/19

Sheet 1 of 1

Project No. 102599-008

Project Name: Statewide PFAS, DOT & PF, Gustavus

Field activity subject: Monitoring well development & sampling

Description of daily activities and events: 0630 Calibrate VSI's, C & F, prep

0700 Meet KRF, CAB, & GCD meet DOT & PF onsite

Gustavus Airport. Move/organize supplies.

0750 Begin well development at MW-11-15

Collect sample, "MW-11-15"

Collect sample, "MW-12-10"

1430 Treat water stored in drum at MW-7 (Moose Creek)

1700 Treat purge water stored in drum at MW-10 (Wilson Drive)

1800 Treat purge water stored in drum at MW-9

1900 Return to lodge, unpack

2030 organize samples, complete COC forms

Visitors on site: DOT & PF

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: Clear, 20's

Important telephone calls:

Personnel on site: GCD, KRF, CAB

Signature: [Handwritten Signature]

Date: 10/15/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/14/2019

Sheet 1 of 1

Project No. 02522-008

Project Name: Gustavus W/P Implementation

Field activity subject: TWP Development & Sampling

Description of daily activities and events: 1530- KRF depart site

1535 - Arrive @ TWP-06, develop & collect sample

1630 - Arrive @ TWP-07, develop, collect sample & duplicate

1750 - Check in w/ GCD on Wilson Road

- Assist GCD Pounding GAC Equipment @ MW-10

- Assist GCD setting up GAC Equipment @ MW-9

1615 - Depart site

1635 - Arrive @ Annie Mall

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

N/A

Weather conditions: Clear - cloudy 40-45°F

Important telephone calls: N/A

Personnel on site: CAB

Signature: [Signature]

Date: 10/14/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/14/2019

Sheet 1 of 2

Project No. 102599-008

Project Name: Gustavus Site characterization

Field activity subject: Various

Description of daily activities and events:

6:45- pack up to leave - CAB/KRF work together

7:15- meet Ian @ airport for escort, get driven for Cherrisa and drop her @ first location.

8:05 - arrive @ SS-19-01 - potential area of former training according to Bruce Smith

- grey sand
- SS-19-02 - brown sand, frozen silt (brown)
- SS-19-03 - brown sand, removed asphalt piece from hole prior to sampling
- SS-19-04 - brown sand

Samples collected beneath vegetation

- SS-19-05 - area picked based on discussion w/ DOT/DPF regarding former spray and where it ran off. Brown sand
- SS-19-06 - added based on discussion of where truck was washed after inspection. Brown sand
- SS-19-07 - brown to grey sand

9:40 - old fire training pit grid sampling
- sands, grey to brown in these samples
- see hand-drawn map for additional details

11:00 - lunch @ fireward, spoke w/ Kelly about their side by side sampling

- 11:00 - SS-19-20 - grey sand, along runway
- SS-19-21 - grey sand, along runway
- SS-19-22/23 - along runway grey sand
- SS-19-24, in area where possible fire training happened
- SS-19-25, grey sand
- SS-19-26, grey sand
- SS-19-27, grey sand
- SS-19-28, grey sand
- SW-19-10, grey and brown sediment, high organics

Visitors on site: Ian - escort

Changes from plans/specifications and other special orders and important decisions:

sampled culverts since spray occurred on asphalt, no grid available to sample

Weather conditions: 30's, sunny

Important telephone calls:

Personnel on site: KRF/CAB

Signature: [Handwritten Signature]

Date: 10/14/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/14/2019

Sheet 2 of 2

Project No. 107599-008

Project Name: Gustavus Site characterization Private wells

Field activity subject:

Description of daily activities and events:

Culvert 1 = Drain 1 outfall, into dry ditch, DOT notes it rarely fills up, tends to infiltrate

SS-19-29 - grey to brown sand

Culvert 2 = Drain 2 outfall, into dry ditch, INF, infiltrates

SS-19-30 - Dark brown, top soil, high organics, sediment of mostly dry ditch

Culvert 3 = Drain 3 outfall

SS-19-31 - same as SS-19-30

15:30 - depart from CAB, head to check on Cherissa

14:10 - depart cherissa to sample PW's - grab YSI

14:15 - PW sampling

-PW-219

-PW-212

17:15 - stop by to collect GAC sample - GAC 1 @ 1721

while dumping water from MW-10-20

18:00 - check on team, head back to Annie Mae's after getting

Paperwork - observed GAC in GAC sample - pitched sample due to potential false negative.

Visitors on site:

Changes from plans/specifications and other special orders and important decisions:

Weather conditions:

Important telephone calls:

Personnel on site:

Signature: [Handwritten Signature]

Date: 10/14/2019

KRR

FIELD ACTIVITIES DAILY LOG

Date 10/13/17

Sheet 1 of

Project No. 102599-008

Project Name: Statewide PFAS, DOT RPF, Gustavus

Field activity subject: Monitoring well development & sampling

Description of daily activities and events: 0745 Prep, calibrate VSI's C&F

0900 Move drums to monitoring wells to be sampled, KRF GAC-treating, purge water contained in drums by community center.

Get gasoline for generator

1000 well development at MW-7-20 (Moose Lane)

1129 Collect sample, "MW-7-20"

1200 well development at MW-9-30, MW-10-20, MW-8-20

1347 Collected sample, "MW-9-30" (Wilson Lane)
Move drums to next wells to be sampled

1604 Collected sample, "MW-10-20"
Move drums

1809 Collected sample, "MW-8-20"

1835 ~~Get~~ Pick up supplies, return to lodge, bring in samples and equipments

2030 Paperwork, bring in equipment

Visitors on site: _____

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: Clear, 30's

Important telephone calls: KRF

Personnel on site: GCD, CAB, KRF

Signature: [Signature] Date: 10/13/17

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/13/2019

Sheet 1 of 1

Project No. 102599-008

Project Name: Gustavus WP

Field activity subject: Soil Sampling Glens Ditch / TWP Sampling

Description of daily activities and events: 0830 - Load Trucks

0900 - Arrive on site (Glens Ditch)

- Collect 11 soil samples from ditch w/ hand auger

1330 - Finish w/ soil sampling

1340 - Begin sampling TWP-08 - collect sample

1400 - Load Check-in w/ KRF - begin to acquire more buckets

1430 - Swap vehicles w/ Bud

1400 - Toshiba closed - Acquire buckets from GCD + KRF

1700 - Begin TWP Sampling

- collect TWP-04 + TWP-05

1810 - Head for Annie Map

1832 - Arrive @ Annie Map

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

N/A

Weather conditions: Clear; 45°F

Important telephone calls: N/A

Personnel on site: ERTS

Signature: [Signature]

Date: 10/13/2019

KRF

FIELD ACTIVITIES DAILY LOG

M

Date 10/13/19

Sheet 1 of

Project No. 102599-008

Project Name: Gustavus Site Characterization

Field activity subject: Various

Description of daily activities and events: 8:00- help team pack/plan 8:45-meet Cherissa @

9:00- white drive to assist with moving a drum for a new development location.

9:15- start setting up TCP and GAC @ Community center well and ~~disposal~~ disposal of purge water allowed to settle overnight (due to high silt content), used valve to give the water extra contact time, removed filter since no flow silt left, filter replaced when it got siltier

10:18- called Jeff regarding plan for the next couple days, should be possible

10:45- pack up, head to Free Wi-Fi to book flights for team and scheduling for residential wells

12:45- Resident found me, pack up to head out to collect their sample

- driller's saving two empty drums for us for tomorrow's development

- grab YSI from Cherissa

1:30- meet resident @ PW-1164, sampled

1:30- take meter to Cherissa, set up on next drum to GAC it,

1:40- Go next Cherissa to assist moving drum

1:45- continue GAC'd drum near Glen's Ditch Road

1:47- call Crais, core w/ Glen's Ditch, taking TWP sample

1:600- wrap up, help Cherissa move drum to next location

1:630- Sample PW-211

1:730- pick up samples/paper from Cherissa, head to Annie Mac's to deal with paperwork

Visitors on site:

Changes from plans/specifications and other special orders and important decisions:

Weather conditions:

Important telephone calls:

on site:

Date: 10/13/19

FIELD ACTIVITIES DAILY LOG

Date 10/12/2019
 Sheet 1 of 1
 Project No. 102599-008

Project Name: Gustavus WP Implementation

Field activity subject: MW-Installation

Description of daily activities and events: 0635- Depart Annie Mae, Aquifer decan water

0700- Meet Discovery Drilling @ Staging Area

0710- Arrive @ Airport gate

0715- Arrive @ SB-11-50. - walk site

0745- Daily Safety Meeting

0750- Begin drilling

- Install MW-11-15

0850- Drive to Staging Area + Decan water into drum

0915- Arrive @ SB-12-50

- walk site

- Install MW-12-10

1100- Arrive @ staging area decan + decan water to drum

1130- ~~Arrive @ airport gate~~

1140- Arrive @ TWP-06

Install TWP-06 Screen 9.7 ~~Riser 9.91~~ Top GS 4.67'

Flat Endcap 0.12 Bottom Joint 0.11 Top Joint 0.28

1205- Arrive @ TWP-07 screen 9.7 Riser 9.91 Top GS 1.35'

Inst-11 TWP-07 ~~Riser~~ Endcap 0.12 ~~Bottom~~ Joint 0.28 ~~Top~~ Joint 0.11

1240 Arrive @ TWP-08 Screen 9.7 Riser 9.91 Top GS 4.75'

Install TWP-08 Point Endcap 0.11 Bottom Joint 0.28 Top 0.11

1310- Arrive @ staging area. Discuss drums & garbage to transfer site

1335- Deliver drum to GCD - ~~to~~ Depart for Annie Mae

1400- Arrive @ community center collect garbage from GCD - Depart for staging area

1430- Arrive @ staging area. Discuss drums/ decan water

1440- Arrive @ landfill - dispose of garbage

1520- Arrive @ staging area. Discuss left over construction materials

1530- Assist GCD load car + move drum

1610- Begin GACing half Full drum

1720- Dump 55 gal drum @ MW-7

1735- Begin GACing @ MW-5

1855- Depart 1905 Arrive @ Annie Mae

Visitors on site: _____

Changes from plans/specifications and other special orders and important decisions:

Set 1 well @ each location. 5' screen @ MW-12-10 due to depth of confining layer

Weather conditions: Rain

Important telephone calls: Call KRF Inform depth of confining layer.

Personnel on site: AB, KRF, GCD

Signature: [Signature] Date: 10/12/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/12/19

Sheet 1 of

Project No. 101543-001

Project Name: Gustavus Inn / PW Sampling / SC

Field activity subject: Various

Description of daily activities and events:

7:30 - pack to leave, calibrate YSI

8:00 - Arrive for appt, collect samples

9:20 - Check voice mail

- Ernest Mueller - well turned off for winter, maybe in spring, likely putting in a new well due to poor water production.

- Josh - Lonsbury - going to see if he can move to Tuesday, will let me know.

9:40 - PW-205 sample, see picture of set up

10:00 - pick up suppl left @ Wayne Fleas's house

10:10 - Back to Gustavus Inn to get some pictures and talk to Dave about separation distance issue. He noted he leaves November 7 and returns in March.

- He said he will do a survey and take measurements and get back to us. Noted Risk is unlikely to pay for survey. He also noted he moved the backwash waste line so it is 100 feet from the well. Gave him my copy of Interm to Approve letter

10:30 - Back to Annie Mae's to make calls to remain's locations

10:40 - obtained permission from Joshua to sample the clove hitch and Fireweed Gallery wells

- left message for Kelly again (also yesterday) about meeting up to collect sample when I do.

11:10 - pictures @ Gustavus Inn, stop by and help Cherissa set up on wells in front of Community Center, TCP required

11:38 - Fireweed Gallery to make more calls

- sample fireweed and clove hitch white hole

1300 - AW-S9 - sample

Visitors on site: 1345 - stopped by Spruce tip lodge, phone # doesn't work any longer. May have been fire (see photo) have cleared out.

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: 40's rain on and off

Important telephone calls: David Love - call by Monday, scheduled sample for 5 p.m.

Personnel on site: KRF

Signature: [Signature]

Date: 10/12/19

over ->

FIELD ACTIVITIES DAILY LOG

Date 10/12/19

Sheet 1 of 1

Project No. 102599-008

Project Name: Statewide PFAS, DOT & PF, Gustavus

Field activity subject: Monitoring well development & sampling

Description of daily activities and events: 0700 Prep, calibrate YSIS C & F

0730 Unload supplies at the Community Center / MW-3-40 & MW-3-15

0745 Return to City Hall (MW-2-20 & MW-2-30) to treat drummed water left overnight to settle with GAC buckets.

1115 Finish treating water, move supplies to MW-3-40 well development at MW-3-40.

1311 Collected sample, "MW-3-40" well development at MW-3-15.

1502 Collected sample, "MW-3-15"

1600 Begin well development at MW-6-20

1747 Collected sample, "MW-6-20"

1825 Return to lodge, organize samples, bring in sensitive equipment.

Visitors on site: Local Gustavus residents passing by, occasional neighbors

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: mostly cloudy, drizzle

Important telephone calls: KRF

Personnel on site: GCD, CAB, KRF

Signature: [Handwritten Signature]

Date: 10/12/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/11/19
 Sheet 1 of 1
 Project No. 102599-008

Project Name: Custavus WP Implementation
 Field activity subject: Temporary Well Point Installation & sampling
 Description of daily activities and events: 0710 - Depart Annie Mae

0720 - Arrive @ TWP-01
CAB Hand dig to 26"
- Safety meeting Screen 9.5' bottom joint 0.21 Top joint 0.25
- Install TWP-01 Endcap 0.2' riser 9.91' cutoff 1165 TOC to GS 2.95

0820 - Depart TWP-01
0825 - Arrive @ TWP-02
- Install TWP-02 Screen 9.5' bottom joint 0.2 Top joint 0.25
 Point Endcap 0.2' riser 9.91' cutoff 1156 TOC to GS 2.87

0855 - Depart TWP-02
0900 - Arrive @ TWP-03
- Install TWP-03 Screen 9.5' Bottom joint 0.12 Top joint 0.25
 Endcap 0.2' riser 9.91' cutoff 1156 TOC to GS 3.23'

0930 Arrive @ TWP-04
Install TWP-04 Screen 9.5' Bottom joint 0.12 Top joint 0.25
 Endcap 0.2' riser 9.91' cutoff 1146 TOC to GS 3.09

1000 Arrive @ TWP-05
Install TWP-05 Screen 9.5' Bottom joint 0.12 Top joint 0.25
 Endcap 0.2' Riser 9.91' cutoff 1146' TOP TOC to GS 2.83'

1025 - Discovery Drilling Mark to staging area for decon & staging
- CAB cut casings to 3' above ground surface & collect Aquifer collector points
11:05 - Meet w/ w/ GCD. Assist w/ well names
11:10 - KRF arrive. Discuss plan for day
11:35 - Return to Annie Mae for supplies
11:55 - Pick up materials from suppliers
12:00 - Deposit 5-gal bucket of cuttings (TWP) @ ADOT + PF
12:05 - Arrive @ City Hall to assist GCD w/ generator
12:15 - Jeff Jarvis arrives to assist
12:25 - CAB depart for TWP sampling
- Sample TWP-1, TWP-2, TWP-3

1720 - Depart for Annie Mae
 Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:
Sample TWP's

Weather conditions: Rain - Sunny 0-20 mph wind 40-45°F

Important telephone calls: N/A

Personnel on site: CAB, KRF
 Signature: Cyber Date: 10/11/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/11/19

Sheet 1 of 1

Project No. 102599-008

Project Name: Starwide PFB, DOT&PF, Gustavus

Field activity subject: Monitoring well development & sampling

Description of daily activities and events: 0700 Pcp, Calibrate VST-15 C&F

0800 Return to MW-1-15 & MW-1-40 to filter purge water stored overnight in drums through GAC drum

1010 Move drums to City Hall

1030 Begin setting well development at MW-2-30 and MW-2-20

1100 Generator malfunction

1250 Obtained new generator (borrowed from AR&T)

Begin developing MW-2-30

1440 Collect sample, "MW-2-30"

1545 Collect sample, "MW-2-20"

1640 Begin well development at MW-5-20.

1810 Collect sample, "MW-5-20"

Visitors on site: Jeff

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: Rain, 40°F

Important telephone calls: KRF, CAB, Jeff

Personnel on site: GCO, KRF, CAB

Signature: [Handwritten Signature]

Date: 10/11/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/11/2019

Sheet 1 of

Project No. 102599-008/001

Project Name: Gustavus PW Smplng and Site characterization

Field activity subject: Various

Description of daily activities and events:

7:00 - help team get supplies and out door
- YSI calibration

7:30 - review paperwork from yesterday's activities, log samples

8:20 - Park and head out for day

9:00 - Meet Jason @ NPS

9:30 - call office about update - call Sam Loos to arrive, scheduled for Wednesday

10:00 - Meet Bruce Hardee @ construction building across river from City Hall,
Pump broke, head to Bear's Nest to sample

10:50 - schedule 3 pm, call Bruce, headed back to his location
- unable to get the well going, will text me when ready

11:30 - Moose have portal samples

1415 - Check on team, help where needed, Sharly YSI's since cooler case in lake

1430 - Sample Bruce Smith

1515 - take YSI to Crais

1530 - Help Cherissa with GAC / development / sample, grab for YSI

1600 - Sam had approves sampling Wayne Fleck

- Sample Wayne Fleck property

1640 - take YSI to Cherissa, setting up on new well

1645 - Head to lodge to do paperwork, make calls to schedule appt.

Visitors on site:

Changes from plans/specifications and other special orders and important decisions:

Bruce Smith noted fire trainly used to occur at start of Glen's ditch near duck pond

Weather conditions: HD's rain, heavy at times

Important telephone calls: Sam Loos

Personnel on site: KRF

Signature: [Signature]

Date: 10/11/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/10/19
 Sheet 1 of 1
 Project No. 102594008

Project Name: Statewide PFAS, DOT & PF, Gustavus

Field activity subject: Monitoring well Development & Sampling

Description of daily activities and events: 0730 Prep for field, calibrate YSI F

0800 Return to MW-4-20 to put purged water in drum that was left on site for silt to settle through filter + GAC drums and resample

0900 Drum nearly empty - water filtered through GAC buckets and purged to ground. Set up for resampling MW-4-20.

1000 collect sample, "MW-4-20"
 Put additional purge water and remaining water in drum through GAC buckets, clean up.

Return to lodge to obtain supplies

1100 Return to finish developing MW-1-46

1447 collect sample, "MW-1-46"

1520 Begin developing MW-1-15"

1741 Collect sample, "MW-1-15"
 Clean up, put purge water through filter + GAC buckets

~~1825~~ Depart sampling area, leave two drums of purge water (closed properly) to settle and treat with GAC the following day.

1835 Unpack sensitive equipment and samples.

2030 Complete CAC forms, put samples in coolers with fresh ice, complete field forms

Visitors on site: occasional residents,

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: overcast, intermittent rain, 40's °F

Important telephone calls: KRF, CAB

Personnel on site: GCD, CAS, KRF

Signature:  Date: 10/10/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/10/19

Sheet 1 of

Project No. 102549-008

Project Name: Gostavus - Various projects

Field activity subject: see below

Description of daily activities and events:

- 7:30-park and head out, meet Jeff @ DOT&PF shop
- Jeff had to fix mower fast before we continue
- collect EB from hand auger from activities day before - EB-19-04
- SW-19-05 - high flow, sampled from flow
- SW-19-06 - old training area, standing water, sample near culvert, sand black w/ high organic content
- SW-19-07 - Duck pond, same as last one (year), black sand, some organics
- Jeff drove me down to show me the Glen's Ditch area that needs sampled
- quick email/lunch break
- call AK Seaplanes - supplies still in Jureau
- SW-19-08 - corner Glen's ditch turns at - black sand, high organic content, grassy area - flowing water - wait to set back in fence
- SW-19-09 - standing water, pond, black sands

Interview with Jeff and observation at site show the new training area leads to drains that release 3 areas. (see map Jeff made)

- Plan should change to get soil samples at these three drain areas instead of a grid.
- Note another potential training area near DOT&PF (hearsay) (see map)

- Collect EB from hand auger from today's activities - EB-19-09
- pick up private well sample containers @ the Post office
- Answer Kelly M email in person, would like to add sampler
- Call w/ Sam Lord about Kelly accompanying me on samples. Their lab say NO.
- stop by Cherissa to check on status
- Back to Annie Mae to make residential calls

Visitors on site: Jeff Jarvis - DOT&PF

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: 40's rain on/off

Important telephone calls: Sam Lord - option 3 from email for Glen's Ditch samples. Noted budget is not sufficient, will need to adjust

Personnel on site: KRF

Signature: [Signature]

Date: 10/10/2019

Imagery from this project water

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/10/2009
Sheet 1 of 1
Project No. 102599-009

Project Name: Gustavus WP Implementation

Field activity subject: MW-Installation / Soil Borings

Description of daily activities and events: 0715 - Depart airport

0730 - Arrive @ staging area. Discuss days plan

0755 - Arrive @ SB-08-50 - Safety meeting

0800 - Install MW-8-50

1010 - Discovery drilling went to decon @ staging area

1015 - CAB arrive @ MW-4-20. Check in with GCD

1025 - CAB - Arrive @ airport staging area

1055 - Arrive @ SB-09-50

- Install MW-09-30 - Discovery departs to decon.

1430 - CAB arrive @ MW-1 cluster. Check in w/ GCD

1445 - Arrive @ staging area. Discuss next well. CAB retrieves decon water

1515 - Arrive @ SB-10-50

- Install MW-10-15

1705 - Discovery departs to decon @ staging area

1715 - CAB arrive @ MW-1 cluster. Check in w/ GCD. Assist w/ drums.

1745 - CAB arrive @ staging area

- Discuss plan for next two days - Assist w/ decon. / Decon buckets

1810 - Arrive @ Amik Mcc - Paperwork

Visitors on site: Wynne

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: Mid 40°F, Raining

Important telephone calls: Jeff Jarvis @ 1735 - Discuss airport access for drilling.

Personnel on site: CAB, GCD, KRT

Signature: [Signature] Date: 10/10/2009

KRT

FIELD ACTIVITIES DAILY LOG

Date 10/19/19

Sheet 1 of 1

Project No. 102599-0 08

Project Name: Statewide PFAS, DOT & PF, Gustavus

Field activity subject: Well Development & Sampling

Description of daily activities and events: 0730 Prep for field, Calibrate YSI's C and F.

0830 obtain supplies, set up equipment

1005 Begin well development at MW-4-20

1421 collect sample, MW-4-20

1010 get gasoline for generator

1130 well development at MW-1-40

1830 Stop developing, to be continued following day, clean up

1900 Return to lodge, samples put in colder cooler, sensitive equipment brought inside, debrief.

Visitors on site: John Spoke appeared and spoke with Kristin Ribinger about residential sampling; another resident. Changes from plans/specifications and other special orders and important decisions:

Craig

Weather conditions: Overcast, intermittent rain, 40's of

Important telephone calls: KRF, CAB

Personnel on site: GCD, KRF, CAB

Signature: GCD Date: 10/10/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/9/2019

Sheet 1 of 1

Project No. 102599-008

Project Name: Gustavus Site Characterization

Field activity subject: Various

Description of daily activities and events:

8:00 - Head to grab sand and cores from airport
- Start development of MW-04-20 w/ GCD
- well not clearing, taking longer than non-silty wells
- Reschedule with Jeff for next day to do Glen's Ditch work, His day over soon

12:30 - Go to Post office
- cooler's not in yet (unable to ship with us due to new analyte list and preservative requirement)
- speak w/ Sally Lesh McLaughlin about new list

12:45 - speak w/ John Spote who asks about his area, directed to Bill (Saracco area) @ ADEC

1:00 - lunch / plan afternoon
- order silicon from TTT for pump to arrive next day
- plan to sample surface ^{H₂O} sediment. Raining, but forecast shows rain for considerable future
- plan to sample using disposable cups, not peripump due to supply shortage
- stop by Chris's; finish up well, GAC, purge water, moving to MW-1 (above)

2:00 - start surface water / sediment sampling
- Grad fish pond SW-19-01 - picture 141941.jpg - still pond
Soil description - top 1 inch sand, gray, 2-4 inches black, organic, sand
- SW-19-02 - soil description - red/gray sand - heavy flow channel
2 pictures
- SW-19-03 - soil description - black, highly organic, sand
1 picture - standing water, little to no flow

4p - stopped by post office - they noted supplies have been on weather hold all day, no mail, decided on development and drilling

4:30 - SW-19-04 - black sands, Glen's Ditch, S of Gust Rd - light flow in ditch
↳ highly organic material

Visitors on site:

- Hardware store to buy new piece for water pump, then back to lodge - 1800

Changes from plans/specifications and other special orders and important decisions:

Cup used for surface instead of peripump due to access

Weather conditions: 40° - Rain, on and off

Important telephone calls: Jeff Jarvis - re schedule for next day

Personnel on site:

Signature:

KRF/GCD

Date: 10/9/2019

half purged @ 1900

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/9/2019

Sheet 1 of 1

Project No. 102549-008

Project Name: Gus WP Implementation

Field activity subject: MW-Installation

Description of daily activities and events: 0725- Depart Annie Mae for site

0740- Arrive @ Moose lane
- Install MW-7-20

0915- Return to staging area for Decan

1000- Arrive @ Gus Road & Some old road
- Install MW-6-20

1145- Return to staging area for decan

1210- Drop drum off @ MW-4-20 for purge water

1230- Arrive @ MW-3-40
- Install MW-3-40

1450- Arrive @ return to staging area for decan

1600- Arrive @ ~~1400-2-30~~ City hall
- Install MW-2-30

1745- ~~Head~~ Drive towards staging area, meet up w/ KRF. Head to MW-1 Cluster to assist in locating pin for weather pump.

1800- KRF arrives w/ replacement

1800- Depart for Annie Mae

Visitors on site: Ron - Glacier bay construction

Changes from plans/specifications and other special orders and important decisions:

N/A

Weather conditions: Rain to cloudy 35°F - 45°F

Important telephone calls: N/A

Personnel on site: CAB, KRF, GCD

Signature: [Handwritten Signature]

Date: 10/9/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/8/2019
Sheet 1 of 1
Project No. 102599-008

Project Name: Gustavus Site characterization

Field activity subject: Various

Description of daily activities and events:

- 0915 - office to pack for flight
- 0530 - flight
- ~1300 - arrive in Gustavus, pick up shipments, organize supplies
- talk to drillers about dry decon process
- call Sam Lord / Bill O'Connell 15:45 to let them know:
 - some well clusters are turning into 1 well - OK'd
 - dry decon process for off-site wells, very liners for analytical samples - Bill OK with this approach
- meet James Mitrea to grab water, meet about bottled water distribution
- check w/ post office for supplies - still in anchorage
- 1700 - end of day

Visitors on site: _____

Changes from plans/specifications and other special orders and important decisions: _____

Weather conditions: _____

Important telephone calls: see above

Personnel on site: KRF/GCD
Signature: [Signature]

Date: 10/8/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/8/2019

Sheet 1 of 1

Project No. 102599-008

Project Name: Gustavus WP Implementation

Field activity subject: Soil Boring / MW Installation

Description of daily activities and events: 0715 - Depart Annie Mae to

0730 - Arrive @ airport, Trash pump frozen

- Collect water for decan / decan buckets

- Fuel & stage drums

0900 - Seaplanes shipment not in

- Fuel rig & discuss options

1030 - Arrive @ site for SB-07-50

1140 - Return to staging area for decan

- coordinate options for decan moving forward - prep materials

1250 - KRF, GCD arrive. Assist loading vehicles while discussing drilling

receives auger bolts

1340 - Arrive @ MW-1 cluster

- Install MW-1-40

1530 - Return to Staging Area for Decan

1600 + Arrive @ MW-5-20

- Install MW-5-20

1715 - Return to Staging area for decan

1815 - Arrive @ Annie Mae

Visitors on site: JS - stopped to ask about MW's

Changes from plans/specifications and other special orders and important decisions:

Switch to Dry Decan

Weather conditions: Sunny - 21°F - 40°F

Important telephone calls: N/A

Personnel on site: CSB

Signature: [Signature]

Date: 10/8/2019

1420

FIELD ACTIVITIES DAILY LOG

Date 10/7/2019

Sheet 1 of 1

Project No. 102599-008

Project Name: Gustavus WP Implementation

Field activity subject: Monitoring Well Installation

Description of daily activities and events: 0715 - Depart annie mae - Discovery Drilling reinstall ignition switches - CAB drive to MW-2-17 & MW-3-15 for measurements

815 - Arrive at site (North of Sorocco's)

- Daily safety meeting
- Drill SB-04-50 - stop @ 30' due to cl-ML silt material
- set well @ 18' MW-4-50

- Decan

1245 - Arrive @ SB-05-50 -

- Drill to 25' due to cl-ML material
- No expendable shoes for DT 45 casing/rod - Do not set well
- Decan

- Discovery drilling checks on Auger-bolt delivery - not in

1645 - Arrive at SB-06-50 - sure old road at Gustavus Rd

- Drill to 25' stop due to cl-ML material

1755 - Depart site

1815 - Arrive at annie Mae. Paperwork

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

Due to shallow confining layer & water table close to surface, installed only one well @ MW-4 location, same will be applied @ MW-5 & MW-6 when installed

Weather conditions: Sunny, 30°F - 49°F

Important telephone calls: KRF, MGE - Discuss confining layer and well placement

Personnel on site: CAB

Signature: [Handwritten Signature]

Date: 10/7/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/6/2017

Sheet 1 of 1

Project No. 102549-008

Project Name: Gustavus Work Plan Implementation

Field activity subject: MW-Installation

Description of daily activities and events: 0715 - Depart Annie Mae

0730 - Load rig & equipment onto trailers. Trouble w/ starter/ignition switch
- Gather materials/decan

0825 - Arrive @ community center
- Daily safety briefing
- Deploy traffic measures

0900 - Begin drilling
- Complete SB-03-50 - Trouble with sleeves getting stuck in rod
- Install MW-3-15

1230 - Head to staging area, decan

1400 - CAB grabs 2 - 5 gal buckets to assist w/ decan - From ground pit

1440 - Arrive at next drill site
- Ignition switch failed

1500 - CAB attempt to acquire silicone tubing while drill crew dismantles starter
- Drill crew works on rig, no silicone. Attempts to retrieve sample cores
from rods.

1600 - CAB ~~leaves~~ ^{leaves} ~~for~~ Annie Mae. - paperwork

Visitors on site: Tom Lesh, Bruce, Pun?

Changes from plans/specifications and other special orders and important decisions:

Repair rig

Weather conditions: Rainy, to cloudy, 10-25mph winds

Important telephone calls: -

Personnel on site: CAB

Signature: [Signature]

Date: 10/6/2017

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/5/2019
Sheet 1 of 1
Project No. 102599-008

Project Name: Gustavus WP Implantation

Field activity subject: Monitoring Well Installation

Description of daily activities and events: 0745 - Depart Annie Mae

0800 - Arrive at SB-01-40. Drillers prep, have no shovel in equipment.

0815 - CAB drives to annie mae to borrow shovel, no one present
- Acquire shovel from body at SeaPlanes & return to site

0845 - Daily safety meeting

0850 - Begin drilling SB-01-40

1145 - Complete SB-01-40 - slotted to 8'
- Begin well install for shallow well. MW-1-

1430 - Decan equipment mob to city hall for SB-02-50

1550 - Begin Drilling SB-02-50

1700 - Complete SB-02-50
- Begin installing SB-02-MW-0-

1815 - Depart site.
- Paperwork

Visitors on site: Various residents stopped on way to garden

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: Rain, 45°, 10-15 mph wind

Important telephone calls: KRF & MLS about location of deep well placement

Personnel on site: CAB

Signature: [Signature] Date: 10/5/19

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/4/2019

Sheet 1 of

Project No. 100599-010

Project Name: Gustavus Site Characterization

Field activity subject: MW-Installation

Description of daily activities and events: @800- Meet at airport and locate a staging area while Lee Parker loads Discovery Drilling equipment.

0820- Take Discovery Drilling to gravel pit, location for acquiring decon water.

1000- Lee Parker arrives and begins offloading equipment.

1115- Discovery Drilling departs for decon water & gas cans.

1245- Discovery Drilling arrives @ staging area. Trash pump broken. Borrowing one from Lee Parker.

1430- Discovery Drilling acquires pump & gas cans.

1500- Discovery Drilling arrives @ staging area w/ decon water, offloads ^{water} & loads materials.

1630- Stage equipment & drill rig at MW-1

1700- Return to Annie Mae lodge

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

N/A

Weather conditions: Sunny, 50°F

Important telephone calls: N/A

Personnel on site: CAB

Signature: [Signature]

Date: 10/4/2019

KPT

FIELD ACTIVITIES DAILY LOG

Date 10/3/2019

Sheet 1 of 1

Project No. 102599-010

Project Name: Gustavus Site Characterization

Field activity subject: Utility locates

Description of daily activities and events: 0800: chat w/ Don Duke about locates. schedule time to complete @ 8:20

0805: Confirm Ian Schroth is available for onsite locates.

0820: CAB, Ian Schroth, Marty & Don Duke go onsite to complete locates.
- Receive an all clear for onsite locates.

1000: CAB & Don Duke drive to each drill site & clear locates.

1230: Locates complete. Return to Annie Mae

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

- Residential Samples - no longer able to be completed w/ Trisana

Weather conditions: Sunny, 55°F

Important telephone calls: 1045: KRF call & inform not to collect residential water samples w/o having Trisana in samples

Personnel on site: CAB

Signature: [Handwritten Signature]

Date: 10/3/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/2/2019

Sheet 1 of 1

Project No. 102599-010

Project Name: Gustavus Site Characterization

Field activity subject: Utility Locates

Description of daily activities and events: CAB - Meet w/ Chris Howard. Go over maps and drilling locations. Chris heads out to mark several locations.

0830: Meet w/ Jeff Sarvis & Ian Schroter. Discuss onsite locates and optimum time. Ian available all day on 10/3/2019.

0845: Meet w/ Don Duke. States he is available morning of 10/3/19 as well. For onsite, potential for afternoon locates off site.

0900: Meet with Chris Howard. Show him location of potential conflicts

- He begins locates

1000: Met w/ Tom Williams at City Hall, approves locat of installing wells by city hall. Assists in locating placement.

1030: Discuss placement w/ KRF

- Meet Chris Howard to look at a conflict. Adjust location

1100: Met w/ Tom Howard to look at property ownership. Shows CAB BCM site. Plat number required for use.

- CAB acquires plat numbers from city map

1130: CAB uses BIM site to attempt ascertaining ownership information.

1215: CAB confirms MW locations are on public right of ways & DOT owned land.

1440: Discuss conflicts w/ ACS w/ Chris Howard. Adjust locations accordingly

1600: Meet Don Duke, unavailable until 10/3 for offsite locates.

1615: Return to Annie Mae Lodge

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

N/A

Weather conditions: Sunny 55°F

Important telephone calls: N/A

Personnel on site: CAB

Signature: [Handwritten Signature]

Date: 10/2/2019

KRF

FIELD ACTIVITIES DAILY LOG

Date 10/1/2019

Sheet 1 of 1

Project No. 102599-010

Project Name: Gustavus Site Characterization

Field activity subject: Travel & Utility locates/Coordination

Description of daily activities and events: 0900 - Arrive @ airport & fly to Gustavus

1300 - Arrive in Gustavus, meet w/ Chris Howard (ACS) at airport. Discuss locates and look at maps.

1330 - Meet w/ Jeff Jarvis and discuss locate schedule. Jan Schroth also present

1400 - Meet w/ Jeff, Dan Duke & Marty (AP&T) to coordinate locates.

1430 - CAB & marked proposed boring locations w/ pin flags. Inform Chris Howard locations are marked.

1545 - CAB return to Annie Mae lodge to complete paperwork.

1500 - CAB arrive @ City Hall, discuss moving wells on west side of salmon river. Property owned by BLM. Call KRF and discuss moving to City Hall pending city approval.

Visitors on site: N/A

Changes from plans/specifications and other special orders and important decisions:

N/A

Weather conditions: Sunny to light rain

Important telephone calls: N/A

Personnel on site: CAB

Signature: [Signature]

Date: 10/1/2019

KRF

Appendix C

Laboratory Reports

CONTENTS

- Test America/Eurofins Laboratory Reports

ANALYTICAL REPORT

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

Laboratory Job ID: 320-55420-1
Client Project/Site: Gust SC

For:

Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:
11/18/2019 11:53:50 AM

David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



Table of Contents

Cover Page	1
Table of Contents	2
Definitions/Glossary	3
Case Narrative	4
Detection Summary	6
Client Sample Results	12
Isotope Dilution Summary	51
QC Sample Results	54
QC Association Summary	65
Lab Chronicle	68
Certification Summary	75
Method Summary	76
Sample Summary	77
Chain of Custody	78
Receipt Checklists	83

Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
E	Result exceeded calibration range.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Job ID: 320-55420-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative 320-55420-1

Receipt

The samples were received on 10/17/2019 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 6 coolers at receipt time were 4.5° C, 4.8° C, 5.5° C, 5.6° C, 6.0° C and 6.2° C.

LCMS

Method 537 (modified): Due to a shortage in the marketplace for 13C3-PFBS, the target analyte PFBS and/or Perfluoropentanesulfonic acid (PFPeS) could not be quantitated against 13C3-PFBS (its labeled variant) as listed in the SOP. PFBS and Perfluoropentanesulfonic acid (PFPeS) was quantitated versus 18O2-PFHxS instead.

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgement was used to positively identify the analyte. SW-19-02 (320-55420-2)

Method 537 (modified): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following samples exceeded the instrument calibration range: SW-19-06 (320-55420-7). These analytes have been qualified; however, the peaks did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analytes were outside of the established ratio limits. The qualitative identification of the analytes have some degree of uncertainty. However, analyst judgment was used to positively identify the analytes. SW-19-05 (320-55420-6), MW-3-40 (320-55420-21), MW-3-140 (320-55420-23) and (CCVL 320-333895/2)

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

Organic Prep

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MSD) associated with preparation batch 320-332996.

Method 3535: The following samples were observed to be a yellow color prior to extraction: MW-9-30 (320-55420-26), MW-7-20 (320-55420-27), TWP-05 (320-55420-28), TWP-04 (320-55420-29), TWP-08 (320-55420-30), TWP-07 (320-55420-32), TWP-107 (320-55420-33), TWP-06 (320-55420-34) and MW-12-10 (320-55420-37) in preparation batch 320-332996.

Method 3535: The following samples were observed to contain sediment prior to extraction: MW-8-20 (320-55420-31), MW-11-15 (320-55420-35), MW-11-115 (320-55420-36), SW-19-10 (320-55420-38) and SW-19-11 (320-55420-39) in preparation batch 320-332996.

Method 3535: The following samples: MW-9-30 (320-55420-26), MW-7-20 (320-55420-27), TWP-05 (320-55420-28), MW-8-20 (320-55420-31) and MW-12-10 (320-55420-37) in preparation batch 320-332996 had non-settleable particulate matter, which plugged the solid-phase extraction column.

Method 3535: The following samples were observed to be turbid prior to extraction: MW-9-30 (320-55420-26), MW-7-20 (320-55420-27), TWP-05 (320-55420-28), TWP-04 (320-55420-29), TWP-08 (320-55420-30), MW-8-20 (320-55420-31), TWP-07 (320-55420-32), TWP-107 (320-55420-33), MW-11-15 (320-55420-35), MW-11-115 (320-55420-36) and MW-12-10 (320-55420-37) in preparation batch 320-332996.

Method 3535: The following sample was observed to be a yellow color after it was brought up to final volume: TWP-04 (320-55420-29) in preparation batch 320-332996.

Method 3535: The following sample was observed to be turbid after it was brought up to final volume: MW-8-20 (320-55420-31) in preparation batch 320-332996.

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Job ID: 320-55420-1 (Continued)

Laboratory: Eurofins TestAmerica, Sacramento (Continued)

preparation batch 320-333266.

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-333385.

Method 3535: The following samples: SW-19-05 (320-55420-6), SW-19-07 (320-55420-8), MW-4-20 (320-55420-12), MW-1-40 (320-55420-14), TWP-02 (320-55420-19), TWP-03 (320-55420-20), MW-3-40 (320-55420-21), MW-3-15 (320-55420-22), MW-3-140 (320-55420-23) and MW-6-20 (320-55420-24) in preparation batch 320-333385 were observed to be a yellow color prior to extraction.

Method 3535: The following samples: MW-4-20 (320-55420-12), MW-1-15 (320-55420-13), MW-1-40 (320-55420-14), MW-2-30 (320-55420-15), MW-2-20 (320-55420-16), MW-5-20 (320-55420-17), TWP-02 (320-55420-19), TWP-03 (320-55420-20), MW-3-40 (320-55420-21), MW-3-15 (320-55420-22), MW-3-140 (320-55420-23) and MW-6-20 (320-55420-24) in preparation batch 320-333385 were observed to contain sediment prior to extraction.

Method 3535: The following samples: MW-1-15 (320-55420-13), MW-1-40 (320-55420-14), MW-2-30 (320-55420-15), MW-2-20 (320-55420-16), MW-3-40 (320-55420-21), MW-3-15 (320-55420-22), MW-3-140 (320-55420-23) and MW-6-20 (320-55420-24) in preparation batch 320-333385 had non-settleable particulate matter, which plugged the solid-phase extraction column.

Method 3535: The following samples: MW-4-20 (320-55420-12) and MW-1-40 (320-55420-14) in preparation batch 320-333385 were observed to a turbid yellow color after they were brought up to final volume.

Method 3535: The following sample: MW-1-15 (320-55420-13) in preparation batch 320-333385 was observed to turbid after it was brought up to final volume.

Method 3535: The following sample: TWP-03 (320-55420-20) in preparation batch 320-333385 was observed to a yellow color after it was brought up to final volume.

Method 3535: The following samples: MW-10-20 (320-55420-25) in preparation batch 320-333422 had non-settleable particulate matter, which plugged the solid-phase extraction column.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-01

Lab Sample ID: 320-55420-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.40	J	1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.39	J B	1.9	0.17	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-02

Lab Sample ID: 320-55420-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	4.1		1.8	0.53	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4	J	1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.5	J	1.8	0.78	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.30	J I	1.8	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.86	J	1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.2	B	1.8	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	41		1.8	0.49	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-03

Lab Sample ID: 320-55420-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	16		1.8	0.53	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.8		1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	5.1		1.8	0.78	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.37	J	1.8	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	5.8		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	54	B	1.8	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	220		1.8	0.50	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-04

Lab Sample ID: 320-55420-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	8.5		1.9	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.7		1.9	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.5	J	1.9	0.80	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.90	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	49		1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: EB-19-04

Lab Sample ID: 320-55420-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.26	J	1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-05

Lab Sample ID: 320-55420-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.61	J	1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.46	J	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.53	J I	1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-06

Lab Sample ID: 320-55420-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	27		1.9	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.1		1.9	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	8.7		1.9	0.80	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	1.1	J	1.9	0.25	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-06 (Continued)

Lab Sample ID: 320-55420-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.8		1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	64		1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	370	E	1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-07

Lab Sample ID: 320-55420-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	4.8		2.0	0.57	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.6	J	2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	4.2		2.0	0.84	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.9	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	61		2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	120		2.0	0.53	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-08

Lab Sample ID: 320-55420-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	11		1.9	0.55	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.6		1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.3		1.9	0.81	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.2	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	25		1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	61		1.9	0.52	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-09

Lab Sample ID: 320-55420-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.28	J	1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.5		1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: EB-19-09

Lab Sample ID: 320-55420-11

No Detections.

Client Sample ID: MW-4-20

Lab Sample ID: 320-55420-12

No Detections.

Client Sample ID: MW-1-15

Lab Sample ID: 320-55420-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	1.8	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-1-40

Lab Sample ID: 320-55420-14

No Detections.

Client Sample ID: MW-2-30

Lab Sample ID: 320-55420-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.5	J	1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.4	J	1.8	0.16	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-2-20

Lab Sample ID: 320-55420-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	4.6		1.9	0.55	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.95	J	1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.5	J	1.9	0.80	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.9		1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.8		1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-5-20

Lab Sample ID: 320-55420-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.31	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.1		1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-01

Lab Sample ID: 320-55420-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-02

Lab Sample ID: 320-55420-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.4	J	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.0		1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-03

Lab Sample ID: 320-55420-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.50	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.91	J	1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-3-40

Lab Sample ID: 320-55420-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	5.3		1.9	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1	J	1.9	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.1		1.9	0.79	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	3.2		1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	31		1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.0	I	1.9	0.50	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-3-15

Lab Sample ID: 320-55420-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	3.7		1.8	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.5		1.8	0.50	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-3-140

Lab Sample ID: 320-55420-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	5.2	I	1.9	0.55	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.8		1.9	0.81	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.9		1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	32		1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.5	I	1.9	0.52	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-6-20

Lab Sample ID: 320-55420-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.9		1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-10-20

Lab Sample ID: 320-55420-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	5.6		1.9	0.56	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3		1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.2	J	1.9	0.82	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.75	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	49		1.9	0.52	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-9-30

Lab Sample ID: 320-55420-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	5.5		1.9	0.55	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.2		1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.5	J	1.9	0.80	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.2	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	97		1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-7-20

Lab Sample ID: 320-55420-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.1	J	1.9	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.56	J	1.9	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.4	J	1.9	0.80	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.35	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.5	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.3	J	1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-05

Lab Sample ID: 320-55420-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.62	J	1.9	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.36	J	1.9	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.23	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.6	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.4	J	1.9	0.50	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-04

Lab Sample ID: 320-55420-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.52	J B	2.0	0.17	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-08

Lab Sample ID: 320-55420-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	5.8		2.0	0.57	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3		2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.83	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.1	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15	B	2.0	0.17	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-08 (Continued)

Lab Sample ID: 320-55420-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	22		2.0	0.53	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-8-20

Lab Sample ID: 320-55420-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.1	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.81	J	1.9	0.52	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-07

Lab Sample ID: 320-55420-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.71	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	11	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.5	J	1.9	0.52	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-107

Lab Sample ID: 320-55420-33

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.73	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	11	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.5	J	1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TWP-06

Lab Sample ID: 320-55420-34

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.30	J	1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.2	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.57	J	1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-11-15

Lab Sample ID: 320-55420-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	18		1.9	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.8		1.9	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.9		1.9	0.79	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	1.0	J	1.9	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	1.7	J	1.9	0.29	ng/L	1		537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.4	J	1.9	1.0	ng/L	1		537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.68	J	1.9	0.51	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.2	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	39		1.9	0.50	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-11-115

Lab Sample ID: 320-55420-36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	18		1.9	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.8		1.9	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.8	J	1.9	0.80	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.88	J	1.9	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	1.8	J	1.9	0.29	ng/L	1		537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.2	J	1.9	1.0	ng/L	1		537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.68	J	1.9	0.51	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.3	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-11-115 (Continued)

Lab Sample ID: 320-55420-36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	12	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	38		1.9	0.51	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-12-10

Lab Sample ID: 320-55420-37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	17		1.9	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	10		1.9	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	8.4		1.9	0.79	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.83	J	1.9	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	3.1		1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	52	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	180		1.9	0.50	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-10

Lab Sample ID: 320-55420-38

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	19		2.0	0.58	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.3		2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	6.0		2.0	0.85	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	1.3	J	2.0	0.27	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.36	J	2.0	0.31	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	3.2		2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	38	B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	170		2.0	0.54	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-19-11

Lab Sample ID: 320-55420-39

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	19		1.9	0.56	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.5		1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	6.0		1.9	0.81	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	1.4	J	1.9	0.26	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.47	J	1.9	0.30	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	3.2		1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	38	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	170		1.9	0.52	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-01

Lab Sample ID: 320-55420-1

Date Collected: 10/09/19 14:10

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.56	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluoroheptanoic acid (PFHpA)	0.40	J	1.9	0.24	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.83	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.54	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.3	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorohexanesulfonic acid (PFHxS)	0.39	J B	1.9	0.17	ng/L		10/23/19 21:45	10/24/19 22:43	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.53	ng/L		10/23/19 21:45	10/24/19 22:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.9	ng/L		10/23/19 21:45	10/24/19 22:43	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/23/19 21:45	10/24/19 22:43	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 21:45	10/24/19 22:43	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		10/23/19 21:45	10/24/19 22:43	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/23/19 21:45	10/24/19 22:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.18	ng/L		10/23/19 21:45	10/24/19 22:43	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C4 PFHpA	93		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C4 PFOA	98		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C5 PFNA	97		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C2 PFDA	101		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C2 PFUnA	98		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C2 PFDoA	101		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C2 PFTeDA	84		25 - 150	10/23/19 21:45	10/24/19 22:43	1
18O2 PFHxS	107		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C4 PFOS	99		25 - 150	10/23/19 21:45	10/24/19 22:43	1
d3-NMeFOSAA	101		25 - 150	10/23/19 21:45	10/24/19 22:43	1
d5-NEtFOSAA	112		25 - 150	10/23/19 21:45	10/24/19 22:43	1
13C3 HFPO-DA	84		25 - 150	10/23/19 21:45	10/24/19 22:43	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-02

Lab Sample ID: 320-55420-2

Date Collected: 10/09/19 15:01

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	4.1		1.8	0.53	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluoroheptanoic acid (PFHpA)	1.4	J	1.8	0.23	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorooctanoic acid (PFOA)	1.5	J	1.8	0.78	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorononanoic acid (PFNA)	0.30	J I	1.8	0.25	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.26	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorobutanesulfonic acid (PFBS)	0.86	J	1.8	0.18	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorohexanesulfonic acid (PFHxS)	8.2	B	1.8	0.16	ng/L		10/23/19 21:45	10/24/19 22:51	1
Perfluorooctanesulfonic acid (PFOS)	41		1.8	0.49	ng/L		10/23/19 21:45	10/24/19 22:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.7	ng/L		10/23/19 21:45	10/24/19 22:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.8	ng/L		10/23/19 21:45	10/24/19 22:51	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		10/23/19 21:45	10/24/19 22:51	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.6	1.4	ng/L		10/23/19 21:45	10/24/19 22:51	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		10/23/19 21:45	10/24/19 22:51	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.16	ng/L		10/23/19 21:45	10/24/19 22:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C4 PFHpA	102		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C4 PFOA	101		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C5 PFNA	101		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C2 PFDA	102		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C2 PFUnA	100		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C2 PFDoA	91		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C2 PFTeDA	92		25 - 150				10/23/19 21:45	10/24/19 22:51	1
18O2 PFHxS	107		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C4 PFOS	106		25 - 150				10/23/19 21:45	10/24/19 22:51	1
d3-NMeFOSAA	94		25 - 150				10/23/19 21:45	10/24/19 22:51	1
d5-NEtFOSAA	97		25 - 150				10/23/19 21:45	10/24/19 22:51	1
13C3 HFPO-DA	82		25 - 150				10/23/19 21:45	10/24/19 22:51	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-03

Lab Sample ID: 320-55420-3

Date Collected: 10/09/19 15:40

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	16		1.8	0.53	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluoroheptanoic acid (PFHpA)	3.8		1.8	0.23	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorooctanoic acid (PFOA)	5.1		1.8	0.78	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorononanoic acid (PFNA)	0.37	J	1.8	0.25	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.29	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.27	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorobutanesulfonic acid (PFBS)	5.8		1.8	0.18	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorohexanesulfonic acid (PFHxS)	54	B	1.8	0.16	ng/L		10/23/19 21:45	10/24/19 23:00	1
Perfluorooctanesulfonic acid (PFOS)	220		1.8	0.50	ng/L		10/23/19 21:45	10/24/19 23:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.8	ng/L		10/23/19 21:45	10/24/19 23:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.9	ng/L		10/23/19 21:45	10/24/19 23:00	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		10/23/19 21:45	10/24/19 23:00	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/23/19 21:45	10/24/19 23:00	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		10/23/19 21:45	10/24/19 23:00	1
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.17	ng/L		10/23/19 21:45	10/24/19 23:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	93		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C4 PFHpA	100		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C4 PFOA	105		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C5 PFNA	100		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C2 PFDA	103		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C2 PFUnA	103		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C2 PFDoA	108		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C2 PFTeDA	96		25 - 150				10/23/19 21:45	10/24/19 23:00	1
18O2 PFHxS	112		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C4 PFOS	101		25 - 150				10/23/19 21:45	10/24/19 23:00	1
d3-NMeFOSAA	94		25 - 150				10/23/19 21:45	10/24/19 23:00	1
d5-NEtFOSAA	100		25 - 150				10/23/19 21:45	10/24/19 23:00	1
13C3 HFPO-DA	80		25 - 150				10/23/19 21:45	10/24/19 23:00	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-04

Lab Sample ID: 320-55420-4

Date Collected: 10/09/19 16:42

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	8.5		1.9	0.54	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluoroheptanoic acid (PFHpA)	3.7		1.9	0.23	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorooctanoic acid (PFOA)	1.5	J	1.9	0.80	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorobutanesulfonic acid (PFBS)	0.90	J	1.9	0.19	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorohexanesulfonic acid (PFHxS)	15	B	1.9	0.16	ng/L		10/23/19 21:45	10/24/19 23:08	1
Perfluorooctanesulfonic acid (PFOS)	49		1.9	0.51	ng/L		10/23/19 21:45	10/24/19 23:08	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 21:45	10/24/19 23:08	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/23/19 21:45	10/24/19 23:08	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 21:45	10/24/19 23:08	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/23/19 21:45	10/24/19 23:08	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 21:45	10/24/19 23:08	1
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 21:45	10/24/19 23:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	91		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C4 PFHpA	97		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C4 PFOA	98		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C5 PFNA	97		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C2 PFDA	99		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C2 PFUnA	95		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C2 PFDoA	97		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C2 PFTeDA	83		25 - 150				10/23/19 21:45	10/24/19 23:08	1
18O2 PFHxS	110		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C4 PFOS	97		25 - 150				10/23/19 21:45	10/24/19 23:08	1
d3-NMeFOSAA	89		25 - 150				10/23/19 21:45	10/24/19 23:08	1
d5-NEtFOSAA	97		25 - 150				10/23/19 21:45	10/24/19 23:08	1
13C3 HFPO-DA	90		25 - 150				10/23/19 21:45	10/24/19 23:08	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: EB-19-04

Lab Sample ID: 320-55420-5

Date Collected: 10/10/19 09:01

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorohexanesulfonic acid (PFHxS)	0.26	J	1.9	0.16	ng/L		10/24/19 10:05	10/25/19 17:12	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 17:12	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 17:12	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/24/19 10:05	10/25/19 17:12	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 17:12	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 17:12	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 17:12	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 17:12	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	92		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C4 PFHpA	96		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C4 PFOA	98		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C5 PFNA	97		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C2 PFDA	106		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C2 PFUnA	104		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C2 PFDoA	75		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C2 PFTeDA	104		25 - 150	10/24/19 10:05	10/25/19 17:12	1
18O2 PFHxS	90		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C4 PFOS	100		25 - 150	10/24/19 10:05	10/25/19 17:12	1
d3-NMeFOSAA	60		25 - 150	10/24/19 10:05	10/25/19 17:12	1
d5-NEtFOSAA	99		25 - 150	10/24/19 10:05	10/25/19 17:12	1
13C3 HFPO-DA	89		25 - 150	10/24/19 10:05	10/25/19 17:12	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-05

Lab Sample ID: 320-55420-6

Date Collected: 10/10/19 09:31

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluoroheptanoic acid (PFHpA)	0.61	J	1.9	0.24	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.80	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorohexanesulfonic acid (PFHxS)	0.46	J	1.9	0.16	ng/L		10/24/19 10:05	10/25/19 17:20	1
Perfluorooctanesulfonic acid (PFOS)	0.53	JI	1.9	0.51	ng/L		10/24/19 10:05	10/25/19 17:20	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 17:20	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 17:20	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 17:20	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 17:20	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 17:20	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 17:20	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	86		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C4 PFHpA	92		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C4 PFOA	96		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C5 PFNA	102		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C2 PFDA	105		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C2 PFUnA	110		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C2 PFDoA	107		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C2 PFTeDA	89		25 - 150	10/24/19 10:05	10/25/19 17:20	1
18O2 PFHxS	93		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C4 PFOS	96		25 - 150	10/24/19 10:05	10/25/19 17:20	1
d3-NMeFOSAA	76		25 - 150	10/24/19 10:05	10/25/19 17:20	1
d5-NEtFOSAA	90		25 - 150	10/24/19 10:05	10/25/19 17:20	1
13C3 HFPO-DA	57		25 - 150	10/24/19 10:05	10/25/19 17:20	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-06

Lab Sample ID: 320-55420-7

Date Collected: 10/10/19 09:52

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	27		1.9	0.54	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluoroheptanoic acid (PFHpA)	7.1		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorooctanoic acid (PFOA)	8.7		1.9	0.80	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorononanoic acid (PFNA)	1.1	J	1.9	0.25	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorobutanesulfonic acid (PFBS)	7.8		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorohexanesulfonic acid (PFHxS)	64		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 17:29	1
Perfluorooctanesulfonic acid (PFOS)	370	E	1.9	0.51	ng/L		10/24/19 10:05	10/25/19 17:29	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 17:29	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 17:29	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 17:29	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 17:29	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 17:29	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 17:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C4 PFHpA	95		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C4 PFOA	95		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C5 PFNA	84		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C2 PFDA	112		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C2 PFUnA	108		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C2 PFDoA	98		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C2 PFTeDA	107		25 - 150				10/24/19 10:05	10/25/19 17:29	1
18O2 PFHxS	89		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C4 PFOS	82		25 - 150				10/24/19 10:05	10/25/19 17:29	1
d3-NMeFOSAA	67		25 - 150				10/24/19 10:05	10/25/19 17:29	1
d5-NEtFOSAA	84		25 - 150				10/24/19 10:05	10/25/19 17:29	1
13C3 HFPO-DA	71		25 - 150				10/24/19 10:05	10/25/19 17:29	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-07

Lab Sample ID: 320-55420-8

Date Collected: 10/10/19 10:37

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	4.8		2.0	0.57	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluoroheptanoic acid (PFHpA)	1.6	J	2.0	0.25	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorooctanoic acid (PFOA)	4.2		2.0	0.84	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorobutanesulfonic acid (PFBS)	1.9	J	2.0	0.20	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorohexanesulfonic acid (PFHxS)	61		2.0	0.17	ng/L		10/24/19 10:05	10/25/19 17:37	1
Perfluorooctanesulfonic acid (PFOS)	120		2.0	0.53	ng/L		10/24/19 10:05	10/25/19 17:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/24/19 10:05	10/25/19 17:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		10/24/19 10:05	10/25/19 17:37	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/24/19 10:05	10/25/19 17:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		10/24/19 10:05	10/25/19 17:37	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		10/24/19 10:05	10/25/19 17:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/24/19 10:05	10/25/19 17:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	85		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C4 PFHpA	92		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C4 PFOA	96		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C5 PFNA	93		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C2 PFDA	107		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C2 PFUnA	109		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C2 PFDoA	111		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C2 PFTeDA	100		25 - 150				10/24/19 10:05	10/25/19 17:37	1
18O2 PFHxS	89		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C4 PFOS	95		25 - 150				10/24/19 10:05	10/25/19 17:37	1
d3-NMeFOSAA	65		25 - 150				10/24/19 10:05	10/25/19 17:37	1
d5-NEtFOSAA	91		25 - 150				10/24/19 10:05	10/25/19 17:37	1
13C3 HFPO-DA	73		25 - 150				10/24/19 10:05	10/25/19 17:37	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-08

Lab Sample ID: 320-55420-9

Date Collected: 10/10/19 11:50

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	11		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluoroheptanoic acid (PFHpA)	5.6		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorooctanoic acid (PFOA)	2.3		1.9	0.81	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorobutanesulfonic acid (PFBS)	1.2 J		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorohexanesulfonic acid (PFHxS)	25		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 17:45	1
Perfluorooctanesulfonic acid (PFOS)	61		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 17:45	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 17:45	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/24/19 10:05	10/25/19 17:45	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 17:45	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 17:45	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/24/19 10:05	10/25/19 17:45	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 17:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	93		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C4 PFHpA	96		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C4 PFOA	99		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C5 PFNA	101		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C2 PFDA	104		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C2 PFUnA	109		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C2 PFDoA	112		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C2 PFTeDA	112		25 - 150				10/24/19 10:05	10/25/19 17:45	1
18O2 PFHxS	89		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C4 PFOS	98		25 - 150				10/24/19 10:05	10/25/19 17:45	1
d3-NMeFOSAA	75		25 - 150				10/24/19 10:05	10/25/19 17:45	1
d5-NEtFOSAA	92		25 - 150				10/24/19 10:05	10/25/19 17:45	1
13C3 HFPO-DA	56		25 - 150				10/24/19 10:05	10/25/19 17:45	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-09

Lab Sample ID: 320-55420-10

Date Collected: 10/10/19 12:50

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.56	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluoroheptanoic acid (PFHpA)	0.28	J	1.9	0.24	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.82	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.3	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorohexanesulfonic acid (PFHxS)	2.5		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 17:52	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 17:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 17:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/24/19 10:05	10/25/19 17:52	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 17:52	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		10/24/19 10:05	10/25/19 17:52	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/24/19 10:05	10/25/19 17:52	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 17:52	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	92		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C4 PFHpA	90		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C4 PFOA	93		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C5 PFNA	93		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C2 PFDA	95		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C2 PFUnA	98		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C2 PFDoA	88		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C2 PFTeDA	94		25 - 150	10/24/19 10:05	10/25/19 17:52	1
18O2 PFHxS	87		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C4 PFOS	96		25 - 150	10/24/19 10:05	10/25/19 17:52	1
d3-NMeFOSAA	67		25 - 150	10/24/19 10:05	10/25/19 17:52	1
d5-NEtFOSAA	88		25 - 150	10/24/19 10:05	10/25/19 17:52	1
13C3 HFPO-DA	94		25 - 150	10/24/19 10:05	10/25/19 17:52	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: EB-19-09

Lab Sample ID: 320-55420-11

Date Collected: 10/10/19 14:10

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 18:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 18:17	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 18:17	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/24/19 10:05	10/25/19 18:17	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 18:17	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 18:17	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/24/19 10:05	10/25/19 18:17	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 18:17	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C4 PFHpA	99		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C4 PFOA	99		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C5 PFNA	103		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C2 PFDA	104		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C2 PFUnA	112		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C2 PFDoA	101		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C2 PFTeDA	112		25 - 150	10/24/19 10:05	10/25/19 18:17	1
18O2 PFHxS	91		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C4 PFOS	97		25 - 150	10/24/19 10:05	10/25/19 18:17	1
d3-NMeFOSAA	76		25 - 150	10/24/19 10:05	10/25/19 18:17	1
d5-NEtFOSAA	105		25 - 150	10/24/19 10:05	10/25/19 18:17	1
13C3 HFPO-DA	58		25 - 150	10/24/19 10:05	10/25/19 18:17	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-4-20

Lab Sample ID: 320-55420-12

Date Collected: 10/10/19 10:00

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 18:25	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 18:25	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 18:25	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 18:25	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 18:25	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 18:25	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 18:25	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 18:25	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	91		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C4 PFHpA	96		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C4 PFOA	100		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C5 PFNA	102		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C2 PFDA	109		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C2 PFUnA	115		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C2 PFDoA	109		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C2 PFTeDA	111		25 - 150	10/24/19 10:05	10/25/19 18:25	1
18O2 PFHxS	90		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C4 PFOS	93		25 - 150	10/24/19 10:05	10/25/19 18:25	1
d3-NMeFOSAA	76		25 - 150	10/24/19 10:05	10/25/19 18:25	1
d5-NEtFOSAA	92		25 - 150	10/24/19 10:05	10/25/19 18:25	1
13C3 HFPO-DA	57		25 - 150	10/24/19 10:05	10/25/19 18:25	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-1-15

Lab Sample ID: 320-55420-13

Date Collected: 10/10/19 17:41

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.54	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.78	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.29	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.27	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	1.8	0.16	ng/L		10/24/19 10:05	10/25/19 18:35	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.50	ng/L		10/24/19 10:05	10/25/19 18:35	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.8	ng/L		10/24/19 10:05	10/25/19 18:35	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.9	ng/L		10/24/19 10:05	10/25/19 18:35	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		10/24/19 10:05	10/25/19 18:35	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/24/19 10:05	10/25/19 18:35	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.30	ng/L		10/24/19 10:05	10/25/19 18:35	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.17	ng/L		10/24/19 10:05	10/25/19 18:35	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	76		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C4 PFHpA	83		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C4 PFOA	84		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C5 PFNA	81		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C2 PFDA	87		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C2 PFUnA	89		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C2 PFDoA	76		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C2 PFTeDA	93		25 - 150	10/24/19 10:05	10/25/19 18:35	1
18O2 PFHxS	77		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C4 PFOS	83		25 - 150	10/24/19 10:05	10/25/19 18:35	1
d3-NMeFOSAA	60		25 - 150	10/24/19 10:05	10/25/19 18:35	1
d5-NEtFOSAA	70		25 - 150	10/24/19 10:05	10/25/19 18:35	1
13C3 HFPO-DA	54		25 - 150	10/24/19 10:05	10/25/19 18:35	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-1-40

Lab Sample ID: 320-55420-14

Date Collected: 10/10/19 14:47

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.80	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 18:42	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 18:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 18:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 18:42	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 18:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 18:42	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 18:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 18:42	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	73		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C4 PFHpA	80		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C4 PFOA	82		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C5 PFNA	78		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C2 PFDA	85		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C2 PFUnA	78		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C2 PFDoA	81		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C2 PFTeDA	91		25 - 150	10/24/19 10:05	10/25/19 18:42	1
18O2 PFHxS	75		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C4 PFOS	75		25 - 150	10/24/19 10:05	10/25/19 18:42	1
d3-NMeFOSAA	52		25 - 150	10/24/19 10:05	10/25/19 18:42	1
d5-NEtFOSAA	70		25 - 150	10/24/19 10:05	10/25/19 18:42	1
13C3 HFPO-DA	57		25 - 150	10/24/19 10:05	10/25/19 18:42	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-2-30

Lab Sample ID: 320-55420-15

Date Collected: 10/11/19 14:40

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.53	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.78	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.29	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.27	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorobutanesulfonic acid (PFBS)	1.5	J	1.8	0.18	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorohexanesulfonic acid (PFHxS)	1.4	J	1.8	0.16	ng/L		10/24/19 10:05	10/25/19 18:50	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.50	ng/L		10/24/19 10:05	10/25/19 18:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.7	ng/L		10/24/19 10:05	10/25/19 18:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.9	ng/L		10/24/19 10:05	10/25/19 18:50	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		10/24/19 10:05	10/25/19 18:50	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/24/19 10:05	10/25/19 18:50	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		10/24/19 10:05	10/25/19 18:50	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.17	ng/L		10/24/19 10:05	10/25/19 18:50	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	60		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C4 PFHpA	60		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C4 PFOA	64		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C5 PFNA	63		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C2 PFDA	65		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C2 PFUnA	61		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C2 PFDoA	56		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C2 PFTeDA	65		25 - 150	10/24/19 10:05	10/25/19 18:50	1
18O2 PFHxS	57		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C4 PFOS	60		25 - 150	10/24/19 10:05	10/25/19 18:50	1
d3-NMeFOSAA	39		25 - 150	10/24/19 10:05	10/25/19 18:50	1
d5-NEtFOSAA	56		25 - 150	10/24/19 10:05	10/25/19 18:50	1
13C3 HFPO-DA	46		25 - 150	10/24/19 10:05	10/25/19 18:50	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-2-20

Lab Sample ID: 320-55420-16

Date Collected: 10/11/19 15:45

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	4.6		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluoroheptanoic acid (PFHpA)	0.95	J	1.9	0.24	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorooctanoic acid (PFOA)	1.5	J	1.9	0.80	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorohexanesulfonic acid (PFHxS)	3.9		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 18:58	1
Perfluorooctanesulfonic acid (PFOS)	3.8		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 18:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 18:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 18:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 18:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 18:58	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 18:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 18:58	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	79		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C4 PFHpA	84		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C4 PFOA	94		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C5 PFNA	90		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C2 PFDA	89		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C2 PFUnA	82		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C2 PFDoA	88		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C2 PFTeDA	91		25 - 150	10/24/19 10:05	10/25/19 18:58	1
18O2 PFHxS	80		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C4 PFOS	77		25 - 150	10/24/19 10:05	10/25/19 18:58	1
d3-NMeFOSAA	56		25 - 150	10/24/19 10:05	10/25/19 18:58	1
d5-NEtFOSAA	70		25 - 150	10/24/19 10:05	10/25/19 18:58	1
13C3 HFPO-DA	60		25 - 150	10/24/19 10:05	10/25/19 18:58	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-5-20

Lab Sample ID: 320-55420-17

Date Collected: 10/11/19 18:10

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.54	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.80	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorobutanesulfonic acid (PFBS)	0.31	J	1.9	0.19	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorohexanesulfonic acid (PFHxS)	3.1		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 19:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 19:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 19:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 19:07	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 19:07	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 19:07	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 19:07	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 19:07	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	44		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C4 PFHpA	48		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C4 PFOA	48		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C5 PFNA	45		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C2 PFDA	49		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C2 PFUnA	53		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C2 PFDoA	47		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C2 PFTeDA	55		25 - 150	10/24/19 10:05	10/25/19 19:07	1
18O2 PFHxS	43		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C4 PFOS	42		25 - 150	10/24/19 10:05	10/25/19 19:07	1
d3-NMeFOSAA	33		25 - 150	10/24/19 10:05	10/25/19 19:07	1
d5-NEtFOSAA	41		25 - 150	10/24/19 10:05	10/25/19 19:07	1
13C3 HFPO-DA	38		25 - 150	10/24/19 10:05	10/25/19 19:07	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-01

Lab Sample ID: 320-55420-18

Date Collected: 10/11/19 13:49

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.54	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.80	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	1.9	0.16	ng/L		10/24/19 10:05	10/25/19 19:15	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 19:15	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 19:15	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 19:15	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/24/19 10:05	10/25/19 19:15	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/24/19 10:05	10/25/19 19:15	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 19:15	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 19:15	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	89		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C4 PFHpA	95		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C4 PFOA	101		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C5 PFNA	100		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C2 PFDA	104		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C2 PFUnA	115		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C2 PFDoA	110		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C2 PFTeDA	123		25 - 150	10/24/19 10:05	10/25/19 19:15	1
18O2 PFHxS	86		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C4 PFOS	102		25 - 150	10/24/19 10:05	10/25/19 19:15	1
d3-NMeFOSAA	77		25 - 150	10/24/19 10:05	10/25/19 19:15	1
d5-NEtFOSAA	93		25 - 150	10/24/19 10:05	10/25/19 19:15	1
13C3 HFPO-DA	70		25 - 150	10/24/19 10:05	10/25/19 19:15	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-02

Lab Sample ID: 320-55420-19

Date Collected: 10/11/19 16:00

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.80	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorohexanesulfonic acid (PFHxS)	1.4	J	1.9	0.16	ng/L		10/24/19 10:05	10/25/19 19:23	1
Perfluorooctanesulfonic acid (PFOS)	2.0		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 19:23	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 19:23	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 19:23	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 19:23	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 19:23	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 19:23	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 19:23	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	95		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C4 PFHpA	96		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C4 PFOA	103		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C5 PFNA	105		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C2 PFDA	109		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C2 PFUnA	110		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C2 PFDoA	109		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C2 PFTeDA	121		25 - 150	10/24/19 10:05	10/25/19 19:23	1
18O2 PFHxS	89		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C4 PFOS	102		25 - 150	10/24/19 10:05	10/25/19 19:23	1
d3-NMeFOSAA	76		25 - 150	10/24/19 10:05	10/25/19 19:23	1
d5-NEtFOSAA	98		25 - 150	10/24/19 10:05	10/25/19 19:23	1
13C3 HFPO-DA	59		25 - 150	10/24/19 10:05	10/25/19 19:23	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-03

Lab Sample ID: 320-55420-20

Date Collected: 10/11/19 17:09

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.80	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorobutanesulfonic acid (PFBS)	0.50	J	1.9	0.19	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorohexanesulfonic acid (PFHxS)	0.91	J	1.9	0.16	ng/L		10/24/19 10:05	10/25/19 19:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 19:30	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 19:30	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 19:30	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 19:30	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 19:30	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 19:30	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 19:30	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	87		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C4 PFHpA	96		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C4 PFOA	99		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C5 PFNA	102		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C2 PFDA	105		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C2 PFUnA	108		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C2 PFDoA	104		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C2 PFTeDA	112		25 - 150	10/24/19 10:05	10/25/19 19:30	1
18O2 PFHxS	93		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C4 PFOS	115		25 - 150	10/24/19 10:05	10/25/19 19:30	1
d3-NMeFOSAA	69		25 - 150	10/24/19 10:05	10/25/19 19:30	1
d5-NEtFOSAA	96		25 - 150	10/24/19 10:05	10/25/19 19:30	1
13C3 HFPO-DA	90		25 - 150	10/24/19 10:05	10/25/19 19:30	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-3-40

Lab Sample ID: 320-55420-21

Date Collected: 10/12/19 13:11

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	5.3		1.9	0.54	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluoroheptanoic acid (PFHpA)	1.1	J	1.9	0.23	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorooctanoic acid (PFOA)	2.1		1.9	0.79	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.51	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorobutanesulfonic acid (PFBS)	3.2		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorohexanesulfonic acid (PFHxS)	31		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 19:55	1
Perfluorooctanesulfonic acid (PFOS)	9.0	I	1.9	0.50	ng/L		10/24/19 10:05	10/25/19 19:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 19:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/24/19 10:05	10/25/19 19:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/24/19 10:05	10/25/19 19:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/24/19 10:05	10/25/19 19:55	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 19:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 19:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	54		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C4 PFHpA	53		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C4 PFOA	57		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C5 PFNA	56		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C2 PFDA	62		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C2 PFUnA	63		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C2 PFDoA	64		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C2 PFTeDA	65		25 - 150				10/24/19 10:05	10/25/19 19:55	1
18O2 PFHxS	49		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C4 PFOS	52		25 - 150				10/24/19 10:05	10/25/19 19:55	1
d3-NMeFOSAA	37		25 - 150				10/24/19 10:05	10/25/19 19:55	1
d5-NEtFOSAA	51		25 - 150				10/24/19 10:05	10/25/19 19:55	1
13C3 HFPO-DA	52		25 - 150				10/24/19 10:05	10/25/19 19:55	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-3-15

Lab Sample ID: 320-55420-22

Date Collected: 10/12/19 15:02

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.53	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.78	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.27	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorohexanesulfonic acid (PFHxS)	3.7		1.8	0.16	ng/L		10/24/19 10:05	10/25/19 20:03	1
Perfluorooctanesulfonic acid (PFOS)	9.5		1.8	0.50	ng/L		10/24/19 10:05	10/25/19 20:03	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.7	ng/L		10/24/19 10:05	10/25/19 20:03	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.8	ng/L		10/24/19 10:05	10/25/19 20:03	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		10/24/19 10:05	10/25/19 20:03	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/24/19 10:05	10/25/19 20:03	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		10/24/19 10:05	10/25/19 20:03	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.17	ng/L		10/24/19 10:05	10/25/19 20:03	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	56		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C4 PFHpA	55		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C4 PFOA	60		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C5 PFNA	57		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C2 PFDA	60		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C2 PFUnA	60		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C2 PFDoA	59		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C2 PFTeDA	63		25 - 150	10/24/19 10:05	10/25/19 20:03	1
18O2 PFHxS	50		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C4 PFOS	52		25 - 150	10/24/19 10:05	10/25/19 20:03	1
d3-NMeFOSAA	40		25 - 150	10/24/19 10:05	10/25/19 20:03	1
d5-NEtFOSAA	54		25 - 150	10/24/19 10:05	10/25/19 20:03	1
13C3 HFPO-DA	40		25 - 150	10/24/19 10:05	10/25/19 20:03	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-3-140

Lab Sample ID: 320-55420-23

Date Collected: 10/12/19 13:01

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	5.2	I	1.9	0.55	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorooctanoic acid (PFOA)	2.8		1.9	0.81	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorobutanesulfonic acid (PFBS)	2.9		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorohexanesulfonic acid (PFHxS)	32		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 20:13	1
Perfluorooctanesulfonic acid (PFOS)	8.5	I	1.9	0.52	ng/L		10/24/19 10:05	10/25/19 20:13	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 20:13	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/24/19 10:05	10/25/19 20:13	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 20:13	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 20:13	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/24/19 10:05	10/25/19 20:13	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 20:13	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	59		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C4 PFHpA	59		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C4 PFOA	60		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C5 PFNA	62		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C2 PFDA	64		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C2 PFUnA	67		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C2 PFDoA	56		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C2 PFTeDA	71		25 - 150	10/24/19 10:05	10/25/19 20:13	1
18O2 PFHxS	56		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C4 PFOS	54		25 - 150	10/24/19 10:05	10/25/19 20:13	1
d3-NMeFOSAA	41		25 - 150	10/24/19 10:05	10/25/19 20:13	1
d5-NEtFOSAA	57		25 - 150	10/24/19 10:05	10/25/19 20:13	1
13C3 HFPO-DA	46		25 - 150	10/24/19 10:05	10/25/19 20:13	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-6-20

Lab Sample ID: 320-55420-24

Date Collected: 10/12/19 17:47

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorohexanesulfonic acid (PFHxS)	2.9		1.9	0.16	ng/L		10/24/19 10:05	10/25/19 20:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.52	ng/L		10/24/19 10:05	10/25/19 20:20	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 10:05	10/25/19 20:20	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/24/19 10:05	10/25/19 20:20	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 10:05	10/25/19 20:20	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 10:05	10/25/19 20:20	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/24/19 10:05	10/25/19 20:20	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 10:05	10/25/19 20:20	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	41		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C4 PFHpA	45		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C4 PFOA	43		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C5 PFNA	46		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C2 PFDA	44		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C2 PFUnA	44		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C2 PFDoA	48		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C2 PFTeDA	52		25 - 150	10/24/19 10:05	10/25/19 20:20	1
18O2 PFHxS	44		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C4 PFOS	44		25 - 150	10/24/19 10:05	10/25/19 20:20	1
d3-NMeFOSAA	30		25 - 150	10/24/19 10:05	10/25/19 20:20	1
d5-NEtFOSAA	41		25 - 150	10/24/19 10:05	10/25/19 20:20	1
13C3 HFPO-DA	35		25 - 150	10/24/19 10:05	10/25/19 20:20	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-10-20

Lab Sample ID: 320-55420-25

Date Collected: 10/13/19 16:04

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	5.6		1.9	0.56	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluoroheptanoic acid (PFHpA)	2.3		1.9	0.24	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorooctanoic acid (PFOA)	1.2	J	1.9	0.82	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.3	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorobutanesulfonic acid (PFBS)	0.75	J	1.9	0.19	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorohexanesulfonic acid (PFHxS)	12	B	1.9	0.16	ng/L		10/24/19 12:02	10/25/19 13:34	1
Perfluorooctanesulfonic acid (PFOS)	49		1.9	0.52	ng/L		10/24/19 12:02	10/25/19 13:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/24/19 12:02	10/25/19 13:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/24/19 12:02	10/25/19 13:34	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/24/19 12:02	10/25/19 13:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/24/19 12:02	10/25/19 13:34	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/24/19 12:02	10/25/19 13:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/24/19 12:02	10/25/19 13:34	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	52		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C4 PFHpA	54		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C4 PFOA	53		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C5 PFNA	52		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C2 PFDA	50		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C2 PFUnA	50		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C2 PFDoA	49		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C2 PFTeDA	45		25 - 150	10/24/19 12:02	10/25/19 13:34	1
18O2 PFHxS	48		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C4 PFOS	50		25 - 150	10/24/19 12:02	10/25/19 13:34	1
d3-NMeFOSAA	50		25 - 150	10/24/19 12:02	10/25/19 13:34	1
d5-NEtFOSAA	52		25 - 150	10/24/19 12:02	10/25/19 13:34	1
13C3 HFPO-DA	51		25 - 150	10/24/19 12:02	10/25/19 13:34	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-9-30

Lab Sample ID: 320-55420-26

Date Collected: 10/13/19 13:47

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	5.5		1.9	0.55	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluoroheptanoic acid (PFHpA)	2.2		1.9	0.24	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorooctanoic acid (PFOA)	1.5	J	1.9	0.80	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorobutanesulfonic acid (PFBS)	1.2	J	1.9	0.19	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorohexanesulfonic acid (PFHxS)	15	B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 18:34	1
Perfluorooctanesulfonic acid (PFOS)	97		1.9	0.51	ng/L		10/23/19 08:55	10/24/19 18:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 18:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/23/19 08:55	10/24/19 18:34	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 18:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/23/19 08:55	10/24/19 18:34	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 18:34	1
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 18:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	63		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C4 PFHpA	66		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C4 PFOA	68		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C5 PFNA	67		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C2 PFDA	61		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C2 PFUnA	60		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C2 PFDoA	53		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C2 PFTeDA	49		25 - 150				10/23/19 08:55	10/24/19 18:34	1
18O2 PFHxS	64		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C4 PFOS	63		25 - 150				10/23/19 08:55	10/24/19 18:34	1
d3-NMeFOSAA	64		25 - 150				10/23/19 08:55	10/24/19 18:34	1
d5-NEtFOSAA	66		25 - 150				10/23/19 08:55	10/24/19 18:34	1
13C3 HFPO-DA	56		25 - 150				10/23/19 08:55	10/24/19 18:34	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-7-20

Lab Sample ID: 320-55420-27

Date Collected: 10/13/19 11:29

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	1.1	J	1.9	0.54	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluoroheptanoic acid (PFHpA)	0.56	J	1.9	0.23	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorooctanoic acid (PFOA)	1.4	J	1.9	0.80	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorobutanesulfonic acid (PFBS)	0.35	J	1.9	0.19	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorohexanesulfonic acid (PFHxS)	1.5	J B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 18:42	1
Perfluorooctanesulfonic acid (PFOS)	1.3	J	1.9	0.51	ng/L		10/23/19 08:55	10/24/19 18:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 18:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/23/19 08:55	10/24/19 18:42	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 18:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/23/19 08:55	10/24/19 18:42	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 18:42	1
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 18:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	84		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C4 PFHpA	86		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C4 PFOA	88		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C5 PFNA	82		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C2 PFDA	81		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C2 PFUnA	77		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C2 PFDoA	70		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C2 PFTeDA	64		25 - 150				10/23/19 08:55	10/24/19 18:42	1
18O2 PFHxS	80		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C4 PFOS	83		25 - 150				10/23/19 08:55	10/24/19 18:42	1
d3-NMeFOSAA	82		25 - 150				10/23/19 08:55	10/24/19 18:42	1
d5-NEtFOSAA	80		25 - 150				10/23/19 08:55	10/24/19 18:42	1
13C3 HFPO-DA	75		25 - 150				10/23/19 08:55	10/24/19 18:42	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-05

Lab Sample ID: 320-55420-28

Date Collected: 10/13/19 17:55

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.62	J	1.9	0.54	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluoroheptanoic acid (PFHpA)	0.36	J	1.9	0.23	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.79	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.51	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorobutanesulfonic acid (PFBS)	0.23	J	1.9	0.19	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorohexanesulfonic acid (PFHxS)	2.6	B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 18:50	1
Perfluorooctanesulfonic acid (PFOS)	1.4	J	1.9	0.50	ng/L		10/23/19 08:55	10/24/19 18:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 18:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/23/19 08:55	10/24/19 18:50	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/23/19 08:55	10/24/19 18:50	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/23/19 08:55	10/24/19 18:50	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 18:50	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 18:50	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	58		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C4 PFHpA	59		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C4 PFOA	62		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C5 PFNA	57		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C2 PFDA	57		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C2 PFUnA	48		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C2 PFDoA	46		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C2 PFTeDA	42		25 - 150	10/23/19 08:55	10/24/19 18:50	1
18O2 PFHxS	54		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C4 PFOS	57		25 - 150	10/23/19 08:55	10/24/19 18:50	1
d3-NMeFOSAA	53		25 - 150	10/23/19 08:55	10/24/19 18:50	1
d5-NEtFOSAA	53		25 - 150	10/23/19 08:55	10/24/19 18:50	1
13C3 HFPO-DA	60		25 - 150	10/23/19 08:55	10/24/19 18:50	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-04

Lab Sample ID: 320-55420-29

Date Collected: 10/13/19 17:02

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.57	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.24	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.83	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.26	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.30	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.28	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorohexanesulfonic acid (PFHxS)	0.52	J B	2.0	0.17	ng/L		10/23/19 08:55	10/24/19 18:58	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.53	ng/L		10/23/19 08:55	10/24/19 18:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/23/19 08:55	10/24/19 18:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.0	ng/L		10/23/19 08:55	10/24/19 18:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.23	ng/L		10/23/19 08:55	10/24/19 18:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		10/23/19 08:55	10/24/19 18:58	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.31	ng/L		10/23/19 08:55	10/24/19 18:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/23/19 08:55	10/24/19 18:58	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	100		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C4 PFHpA	101		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C4 PFOA	102		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C5 PFNA	102		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C2 PFDA	95		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C2 PFUnA	98		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C2 PFDoA	101		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C2 PFTeDA	95		25 - 150	10/23/19 08:55	10/24/19 18:58	1
18O2 PFHxS	91		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C4 PFOS	101		25 - 150	10/23/19 08:55	10/24/19 18:58	1
d3-NMeFOSAA	101		25 - 150	10/23/19 08:55	10/24/19 18:58	1
d5-NEtFOSAA	99		25 - 150	10/23/19 08:55	10/24/19 18:58	1
13C3 HFPO-DA	77		25 - 150	10/23/19 08:55	10/24/19 18:58	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-08

Lab Sample ID: 320-55420-30

Date Collected: 10/13/19 14:47

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	5.8		2.0	0.57	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluoroheptanoic acid (PFHpA)	2.3		2.0	0.25	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.83	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.26	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.30	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.28	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorobutanesulfonic acid (PFBS)	1.1	J	2.0	0.20	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorohexanesulfonic acid (PFHxS)	15	B	2.0	0.17	ng/L		10/23/19 08:55	10/24/19 19:06	1
Perfluorooctanesulfonic acid (PFOS)	22		2.0	0.53	ng/L		10/23/19 08:55	10/24/19 19:06	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/23/19 08:55	10/24/19 19:06	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.0	ng/L		10/23/19 08:55	10/24/19 19:06	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/23/19 08:55	10/24/19 19:06	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		10/23/19 08:55	10/24/19 19:06	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.31	ng/L		10/23/19 08:55	10/24/19 19:06	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/23/19 08:55	10/24/19 19:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	99		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C4 PFHpA	98		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C4 PFOA	102		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C5 PFNA	101		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C2 PFDA	103		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C2 PFUnA	102		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C2 PFDoA	102		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C2 PFTeDA	100		25 - 150				10/23/19 08:55	10/24/19 19:06	1
18O2 PFHxS	91		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C4 PFOS	100		25 - 150				10/23/19 08:55	10/24/19 19:06	1
d3-NMeFOSAA	105		25 - 150				10/23/19 08:55	10/24/19 19:06	1
d5-NEtFOSAA	107		25 - 150				10/23/19 08:55	10/24/19 19:06	1
13C3 HFPO-DA	89		25 - 150				10/23/19 08:55	10/24/19 19:06	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-8-20

Lab Sample ID: 320-55420-31

Date Collected: 10/13/19 18:09

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.56	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.82	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.3	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorohexanesulfonic acid (PFHxS)	1.1	J B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 19:14	1
Perfluorooctanesulfonic acid (PFOS)	0.81	J	1.9	0.52	ng/L		10/23/19 08:55	10/24/19 19:14	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 19:14	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/23/19 08:55	10/24/19 19:14	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 19:14	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.4	ng/L		10/23/19 08:55	10/24/19 19:14	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/23/19 08:55	10/24/19 19:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 19:14	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	35		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C4 PFHpA	38		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C4 PFOA	37		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C5 PFNA	34		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C2 PFDA	35		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C2 PFUnA	34		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C2 PFDoA	32		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C2 PFTeDA	26		25 - 150	10/23/19 08:55	10/24/19 19:14	1
18O2 PFHxS	33		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C4 PFOS	34		25 - 150	10/23/19 08:55	10/24/19 19:14	1
d3-NMeFOSAA	36		25 - 150	10/23/19 08:55	10/24/19 19:14	1
d5-NEtFOSAA	38		25 - 150	10/23/19 08:55	10/24/19 19:14	1
13C3 HFPO-DA	35		25 - 150	10/23/19 08:55	10/24/19 19:14	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-07

Lab Sample ID: 320-55420-32

Date Collected: 10/14/19 17:15

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorobutanesulfonic acid (PFBS)	0.71	J	1.9	0.19	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorohexanesulfonic acid (PFHxS)	11	B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 19:38	1
Perfluorooctanesulfonic acid (PFOS)	1.5	J	1.9	0.52	ng/L		10/23/19 08:55	10/24/19 19:38	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 19:38	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/23/19 08:55	10/24/19 19:38	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 19:38	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/23/19 08:55	10/24/19 19:38	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/23/19 08:55	10/24/19 19:38	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 19:38	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C2 PFHxA	97		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C4 PFHpA	99		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C4 PFOA	99		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C5 PFNA	97		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C2 PFDA	102		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C2 PFUnA	95		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C2 PFDoA	92		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C2 PFTeDA	94		25 - 150				10/23/19 08:55	10/24/19 19:38	1
18O2 PFHxS	92		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C4 PFOS	94		25 - 150				10/23/19 08:55	10/24/19 19:38	1
d3-NMeFOSAA	99		25 - 150				10/23/19 08:55	10/24/19 19:38	1
d5-NEtFOSAA	98		25 - 150				10/23/19 08:55	10/24/19 19:38	1
13C3 HFPO-DA	97		25 - 150				10/23/19 08:55	10/24/19 19:38	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-107

Lab Sample ID: 320-55420-33

Date Collected: 10/14/19 17:05

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorobutanesulfonic acid (PFBS)	0.73	J	1.9	0.19	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorohexanesulfonic acid (PFHxS)	11	B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 19:46	1
Perfluorooctanesulfonic acid (PFOS)	1.5	J	1.9	0.51	ng/L		10/23/19 08:55	10/24/19 19:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 19:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/23/19 08:55	10/24/19 19:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 19:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/23/19 08:55	10/24/19 19:46	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 19:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 19:46	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	94		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C4 PFHpA	99		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C4 PFOA	102		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C5 PFNA	97		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C2 PFDA	97		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C2 PFUnA	99		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C2 PFDoA	98		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C2 PFTeDA	89		25 - 150	10/23/19 08:55	10/24/19 19:46	1
18O2 PFHxS	92		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C4 PFOS	95		25 - 150	10/23/19 08:55	10/24/19 19:46	1
d3-NMeFOSAA	95		25 - 150	10/23/19 08:55	10/24/19 19:46	1
d5-NEtFOSAA	102		25 - 150	10/23/19 08:55	10/24/19 19:46	1
13C3 HFPO-DA	91		25 - 150	10/23/19 08:55	10/24/19 19:46	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-06

Lab Sample ID: 320-55420-34

Date Collected: 10/14/19 16:24

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluoroheptanoic acid (PFHpA)	0.30	J	1.9	0.24	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorohexanesulfonic acid (PFHxS)	1.2	J B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 19:54	1
Perfluorooctanesulfonic acid (PFOS)	0.57	J	1.9	0.51	ng/L		10/23/19 08:55	10/24/19 19:54	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 19:54	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/23/19 08:55	10/24/19 19:54	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 19:54	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/23/19 08:55	10/24/19 19:54	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 19:54	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 19:54	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	95		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C4 PFHpA	102		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C4 PFOA	104		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C5 PFNA	98		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C2 PFDA	105		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C2 PFUnA	102		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C2 PFDoA	103		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C2 PFTeDA	97		25 - 150	10/23/19 08:55	10/24/19 19:54	1
18O2 PFHxS	96		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C4 PFOS	103		25 - 150	10/23/19 08:55	10/24/19 19:54	1
d3-NMeFOSAA	101		25 - 150	10/23/19 08:55	10/24/19 19:54	1
d5-NEtFOSAA	104		25 - 150	10/23/19 08:55	10/24/19 19:54	1
13C3 HFPO-DA	102		25 - 150	10/23/19 08:55	10/24/19 19:54	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-11-15

Lab Sample ID: 320-55420-35

Date Collected: 10/14/19 11:29

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	18		1.9	0.54	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluoroheptanoic acid (PFHpA)	4.8		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorooctanoic acid (PFOA)	1.9		1.9	0.79	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorononanoic acid (PFNA)	1.0	J	1.9	0.25	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorodecanoic acid (PFDA)	1.7	J	1.9	0.29	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluoroundecanoic acid (PFUnA)	1.4	J	1.9	1.0	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorododecanoic acid (PFDoA)	0.68	J	1.9	0.51	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorobutanesulfonic acid (PFBS)	1.2	J	1.9	0.19	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorohexanesulfonic acid (PFHxS)	12	B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 20:02	1
Perfluorooctanesulfonic acid (PFOS)	39		1.9	0.50	ng/L		10/23/19 08:55	10/24/19 20:02	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 20:02	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/23/19 08:55	10/24/19 20:02	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/23/19 08:55	10/24/19 20:02	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/23/19 08:55	10/24/19 20:02	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 20:02	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 20:02	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	94		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C4 PFHpA	95		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C4 PFOA	98		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C5 PFNA	97		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C2 PFDA	100		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C2 PFUnA	96		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C2 PFDoA	89		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C2 PFTeA	77		25 - 150	10/23/19 08:55	10/24/19 20:02	1
18O2 PFHxS	89		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C4 PFOS	94		25 - 150	10/23/19 08:55	10/24/19 20:02	1
d3-NMeFOSAA	100		25 - 150	10/23/19 08:55	10/24/19 20:02	1
d5-NEtFOSAA	100		25 - 150	10/23/19 08:55	10/24/19 20:02	1
13C3 HFPO-DA	94		25 - 150	10/23/19 08:55	10/24/19 20:02	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-11-115

Lab Sample ID: 320-55420-36

Date Collected: 10/14/19 11:19

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	18		1.9	0.54	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluoroheptanoic acid (PFHpA)	4.8		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorooctanoic acid (PFOA)	1.8	J	1.9	0.80	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorononanoic acid (PFNA)	0.88	J	1.9	0.25	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorodecanoic acid (PFDA)	1.8	J	1.9	0.29	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluoroundecanoic acid (PFUnA)	1.2	J	1.9	1.0	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorododecanoic acid (PFDoA)	0.68	J	1.9	0.51	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorobutanesulfonic acid (PFBS)	1.3	J	1.9	0.19	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorohexanesulfonic acid (PFHxS)	12	B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 20:10	1
Perfluorooctanesulfonic acid (PFOS)	38		1.9	0.51	ng/L		10/23/19 08:55	10/24/19 20:10	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 20:10	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/23/19 08:55	10/24/19 20:10	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/23/19 08:55	10/24/19 20:10	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/23/19 08:55	10/24/19 20:10	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 20:10	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 20:10	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	99		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C4 PFHpA	100		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C4 PFOA	102		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C5 PFNA	101		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C2 PFDA	104		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C2 PFUnA	102		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C2 PFDoA	100		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C2 PFTeDA	89		25 - 150	10/23/19 08:55	10/24/19 20:10	1
18O2 PFHxS	91		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C4 PFOS	98		25 - 150	10/23/19 08:55	10/24/19 20:10	1
d3-NMeFOSAA	100		25 - 150	10/23/19 08:55	10/24/19 20:10	1
d5-NEtFOSAA	106		25 - 150	10/23/19 08:55	10/24/19 20:10	1
13C3 HFPO-DA	102		25 - 150	10/23/19 08:55	10/24/19 20:10	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-12-10

Lab Sample ID: 320-55420-37

Date Collected: 10/14/19 13:27

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	17		1.9	0.54	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluoroheptanoic acid (PFHpA)	10		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorooctanoic acid (PFOA)	8.4		1.9	0.79	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorononanoic acid (PFNA)	0.83	J	1.9	0.25	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.51	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorobutanesulfonic acid (PFBS)	3.1		1.9	0.19	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorohexanesulfonic acid (PFHxS)	52	B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 20:18	1
Perfluorooctanesulfonic acid (PFOS)	180		1.9	0.50	ng/L		10/23/19 08:55	10/24/19 20:18	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 20:18	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/23/19 08:55	10/24/19 20:18	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/23/19 08:55	10/24/19 20:18	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/23/19 08:55	10/24/19 20:18	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/23/19 08:55	10/24/19 20:18	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 20:18	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	70		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C4 PFHpA	69		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C4 PFOA	71		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C5 PFNA	68		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C2 PFDA	68		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C2 PFUnA	63		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C2 PFDoA	57		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C2 PFTeDA	51		25 - 150	10/23/19 08:55	10/24/19 20:18	1
18O2 PFHxS	68		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C4 PFOS	68		25 - 150	10/23/19 08:55	10/24/19 20:18	1
d3-NMeFOSAA	64		25 - 150	10/23/19 08:55	10/24/19 20:18	1
d5-NEtFOSAA	63		25 - 150	10/23/19 08:55	10/24/19 20:18	1
13C3 HFPO-DA	58		25 - 150	10/23/19 08:55	10/24/19 20:18	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-10

Lab Sample ID: 320-55420-38

Date Collected: 10/14/19 13:43

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	19		2.0	0.58	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluoroheptanoic acid (PFHpA)	7.3		2.0	0.25	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorooctanoic acid (PFOA)	6.0		2.0	0.85	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorononanoic acid (PFNA)	1.3	J	2.0	0.27	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorodecanoic acid (PFDA)	0.36	J	2.0	0.31	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorobutanesulfonic acid (PFBS)	3.2		2.0	0.20	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorohexanesulfonic acid (PFHxS)	38	B	2.0	0.17	ng/L		10/23/19 08:55	10/24/19 20:26	1
Perfluorooctanesulfonic acid (PFOS)	170		2.0	0.54	ng/L		10/23/19 08:55	10/24/19 20:26	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/23/19 08:55	10/24/19 20:26	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		10/23/19 08:55	10/24/19 20:26	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/23/19 08:55	10/24/19 20:26	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		10/23/19 08:55	10/24/19 20:26	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		10/23/19 08:55	10/24/19 20:26	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/23/19 08:55	10/24/19 20:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C4 PFHpA	101		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C4 PFOA	100		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C5 PFNA	100		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C2 PFDA	102		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C2 PFUnA	97		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C2 PFDoA	80		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C2 PFTeDA	89		25 - 150				10/23/19 08:55	10/24/19 20:26	1
18O2 PFHxS	96		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C4 PFOS	103		25 - 150				10/23/19 08:55	10/24/19 20:26	1
d3-NMeFOSAA	95		25 - 150				10/23/19 08:55	10/24/19 20:26	1
d5-NEtFOSAA	97		25 - 150				10/23/19 08:55	10/24/19 20:26	1
13C3 HFPO-DA	94		25 - 150				10/23/19 08:55	10/24/19 20:26	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-11

Lab Sample ID: 320-55420-39

Date Collected: 10/14/19 13:30

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	19		1.9	0.56	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluoroheptanoic acid (PFHpA)	7.5		1.9	0.24	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorooctanoic acid (PFOA)	6.0		1.9	0.81	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorononanoic acid (PFNA)	1.4	J	1.9	0.26	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorodecanoic acid (PFDA)	0.47	J	1.9	0.30	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorobutanesulfonic acid (PFBS)	3.2		1.9	0.19	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorohexanesulfonic acid (PFHxS)	38	B	1.9	0.16	ng/L		10/23/19 08:55	10/24/19 20:34	1
Perfluorooctanesulfonic acid (PFOS)	170		1.9	0.52	ng/L		10/23/19 08:55	10/24/19 20:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/23/19 08:55	10/24/19 20:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/23/19 08:55	10/24/19 20:34	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/23/19 08:55	10/24/19 20:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/23/19 08:55	10/24/19 20:34	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/23/19 08:55	10/24/19 20:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/23/19 08:55	10/24/19 20:34	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	93		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C4 PFHpA	101		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C4 PFOA	101		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C5 PFNA	102		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C2 PFDA	103		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C2 PFUnA	100		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C2 PFDoA	93		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C2 PFTeDA	84		25 - 150	10/23/19 08:55	10/24/19 20:34	1
18O2 PFHxS	100		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C4 PFOS	105		25 - 150	10/23/19 08:55	10/24/19 20:34	1
d3-NMeFOSAA	96		25 - 150	10/23/19 08:55	10/24/19 20:34	1
d5-NEtFOSAA	100		25 - 150	10/23/19 08:55	10/24/19 20:34	1
13C3 HFPO-DA	113		25 - 150	10/23/19 08:55	10/24/19 20:34	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDaA (25-150)	PFTDA (25-150)
320-55420-1	SW-19-01	88	93	98	97	101	98	101	84
320-55420-2	SW-19-02	90	102	101	101	102	100	91	92
320-55420-3	SW-19-03	93	100	105	100	103	103	108	96
320-55420-4	SW-19-04	91	97	98	97	99	95	97	83
320-55420-5	EB-19-04	92	96	98	97	106	104	75	104
320-55420-6	SW-19-05	86	92	96	102	105	110	107	89
320-55420-7	SW-19-06	90	95	95	84	112	108	98	107
320-55420-8	SW-19-07	85	92	96	93	107	109	111	100
320-55420-9	SW-19-08	93	96	99	101	104	109	112	112
320-55420-10	SW-19-09	92	90	93	93	95	98	88	94
320-55420-11	EB-19-09	96	99	99	103	104	112	101	112
320-55420-12	MW-4-20	91	96	100	102	109	115	109	111
320-55420-13	MW-1-15	76	83	84	81	87	89	76	93
320-55420-14	MW-1-40	73	80	82	78	85	78	81	91
320-55420-15	MW-2-30	60	60	64	63	65	61	56	65
320-55420-16	MW-2-20	79	84	94	90	89	82	88	91
320-55420-17	MW-5-20	44	48	48	45	49	53	47	55
320-55420-18	TWP-01	89	95	101	100	104	115	110	123
320-55420-19	TWP-02	95	96	103	105	109	110	109	121
320-55420-20	TWP-03	87	96	99	102	105	108	104	112
320-55420-21	MW-3-40	54	53	57	56	62	63	64	65
320-55420-22	MW-3-15	56	55	60	57	60	60	59	63
320-55420-23	MW-3-140	59	59	60	62	64	67	56	71
320-55420-24	MW-6-20	41	45	43	46	44	44	48	52
320-55420-25	MW-10-20	52	54	53	52	50	50	49	45
320-55420-26	MW-9-30	63	66	68	67	61	60	53	49
320-55420-27	MW-7-20	84	86	88	82	81	77	70	64
320-55420-28	TWP-05	58	59	62	57	57	48	46	42
320-55420-29	TWP-04	100	101	102	102	95	98	101	95
320-55420-30	TWP-08	99	98	102	101	103	102	102	100
320-55420-31	MW-8-20	35	38	37	34	35	34	32	26
320-55420-32	TWP-07	97	99	99	97	102	95	92	94
320-55420-33	TWP-107	94	99	102	97	97	99	98	89
320-55420-34	TWP-06	95	102	104	98	105	102	103	97
320-55420-35	MW-11-15	94	95	98	97	100	96	89	77
320-55420-36	MW-11-115	99	100	102	101	104	102	100	89
320-55420-37	MW-12-10	70	69	71	68	68	63	57	51
320-55420-38	SW-19-10	96	101	100	100	102	97	80	89
320-55420-39	SW-19-11	93	101	101	102	103	100	93	84
LCS 320-332996/2-A	Lab Control Sample	103	96	100	99	105	103	109	111
LCS 320-333266/2-A	Lab Control Sample	99	96	102	96	98	102	108	99
LCS 320-333385/2-A	Lab Control Sample	90	98	96	100	96	100	102	105
LCS 320-333422/2-A	Lab Control Sample	100	106	102	101	104	101	111	105
LCSD 320-332996/3-A	Lab Control Sample Dup	101	98	101	101	103	101	108	116
LCSD 320-333266/3-A	Lab Control Sample Dup	103	98	101	100	98	104	102	98
LCSD 320-333385/3-A	Lab Control Sample Dup	93	102	103	96	97	114	101	118
LCSD 320-333422/3-A	Lab Control Sample Dup	100	105	105	103	105	104	111	110
MB 320-332996/1-A	Method Blank	101	98	104	99	99	100	109	112
MB 320-333266/1-A	Method Blank	102	107	102	100	104	106	108	102

Eurofins TestAmerica, Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDaA (25-150)	PFTDA (25-150)
MB 320-333385/1-A	Method Blank	87	102	95	98	104	106	94	109
MB 320-333422/1-A	Method Blank	98	100	101	97	97	97	105	100

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFOS (25-150)	-NMeFOS/ (25-150)	-NEtFOS/ (25-150)	HFPODA (25-150)
320-55420-1	SW-19-01	107	99	101	112	84
320-55420-2	SW-19-02	107	106	94	97	82
320-55420-3	SW-19-03	112	101	94	100	80
320-55420-4	SW-19-04	110	97	89	97	90
320-55420-5	EB-19-04	90	100	60	99	89
320-55420-6	SW-19-05	93	96	76	90	57
320-55420-7	SW-19-06	89	82	67	84	71
320-55420-8	SW-19-07	89	95	65	91	73
320-55420-9	SW-19-08	89	98	75	92	56
320-55420-10	SW-19-09	87	96	67	88	94
320-55420-11	EB-19-09	91	97	76	105	58
320-55420-12	MW-4-20	90	93	76	92	57
320-55420-13	MW-1-15	77	83	60	70	54
320-55420-14	MW-1-40	75	75	52	70	57
320-55420-15	MW-2-30	57	60	39	56	46
320-55420-16	MW-2-20	80	77	56	70	60
320-55420-17	MW-5-20	43	42	33	41	38
320-55420-18	TWP-01	86	102	77	93	70
320-55420-19	TWP-02	89	102	76	98	59
320-55420-20	TWP-03	93	115	69	96	90
320-55420-21	MW-3-40	49	52	37	51	52
320-55420-22	MW-3-15	50	52	40	54	40
320-55420-23	MW-3-140	56	54	41	57	46
320-55420-24	MW-6-20	44	44	30	41	35
320-55420-25	MW-10-20	48	50	50	52	51
320-55420-26	MW-9-30	64	63	64	66	56
320-55420-27	MW-7-20	80	83	82	80	75
320-55420-28	TWP-05	54	57	53	53	60
320-55420-29	TWP-04	91	101	101	99	77
320-55420-30	TWP-08	91	100	105	107	89
320-55420-31	MW-8-20	33	34	36	38	35
320-55420-32	TWP-07	92	94	99	98	97
320-55420-33	TWP-107	92	95	95	102	91
320-55420-34	TWP-06	96	103	101	104	102
320-55420-35	MW-11-15	89	94	100	100	94
320-55420-36	MW-11-115	91	98	100	106	102
320-55420-37	MW-12-10	68	68	64	63	58
320-55420-38	SW-19-10	96	103	95	97	94
320-55420-39	SW-19-11	100	105	96	100	113
LCS 320-332996/2-A	Lab Control Sample	92	98	94	101	85
LCS 320-333266/2-A	Lab Control Sample	115	109	101	106	85
LCS 320-333385/2-A	Lab Control Sample	87	101	78	91	77
LCS 320-333422/2-A	Lab Control Sample	93	102	111	111	113
LCSD 320-332996/3-A	Lab Control Sample Dup	94	100	95	97	80
LCSD 320-333266/3-A	Lab Control Sample Dup	115	108	105	102	91

Eurofins TestAmerica, Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFOS (25-150)	-NMeFOS/ (25-150)	-NEtFOS/ (25-150)	HFPODA (25-150)
LCSD 320-333385/3-A	Lab Control Sample Dup	88	99	84	94	87
LCSD 320-333422/3-A	Lab Control Sample Dup	95	103	106	109	103
MB 320-332996/1-A	Method Blank	93	97	95	100	67
MB 320-333266/1-A	Method Blank	123	108	102	110	107
MB 320-333385/1-A	Method Blank	87	101	77	95	81
MB 320-333422/1-A	Method Blank	92	100	101	103	83

Surrogate Legend

PFHxA = 13C2 PFHxA
 PFHpA = 13C4 PFHpA
 PFOA = 13C4 PFOA
 PFNA = 13C5 PFNA
 PFDA = 13C2 PFDA
 PFUnA = 13C2 PFUnA
 PFDaA = 13C2 PFDaA
 PFTDA = 13C2 PFTeDA
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3-NMeFOSAA = d3-NMeFOSAA
 d5-NEtFOSAA = d5-NEtFOSAA
 HFPODA = 13C3 HFPO-DA

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-332996/1-A
Matrix: Water
Analysis Batch: 337635

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 332996

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorohexanesulfonic acid (PFHxS)	0.245	J	2.0	0.17	ng/L		10/23/19 08:55	11/11/19 16:05	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		10/23/19 08:55	11/11/19 16:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/23/19 08:55	11/11/19 16:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		10/23/19 08:55	11/11/19 16:05	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/23/19 08:55	11/11/19 16:05	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		10/23/19 08:55	11/11/19 16:05	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		10/23/19 08:55	11/11/19 16:05	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/23/19 08:55	11/11/19 16:05	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	101		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C4 PFHpA	98		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C4 PFOA	104		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C5 PFNA	99		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C2 PFDA	99		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C2 PFUnA	100		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C2 PFDoA	109		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C2 PFTeDA	112		25 - 150	10/23/19 08:55	11/11/19 16:05	1
18O2 PFHxS	93		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C4 PFOS	97		25 - 150	10/23/19 08:55	11/11/19 16:05	1
d3-NMeFOSAA	95		25 - 150	10/23/19 08:55	11/11/19 16:05	1
d5-NEtFOSAA	100		25 - 150	10/23/19 08:55	11/11/19 16:05	1
13C3 HFPO-DA	67		25 - 150	10/23/19 08:55	11/11/19 16:05	1

Lab Sample ID: LCS 320-332996/2-A
Matrix: Water
Analysis Batch: 337635

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332996

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	40.0	40.2		ng/L		101	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	45.1		ng/L		113	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	41.9		ng/L		105	70 - 130
Perfluorononanoic acid (PFNA)	40.0	44.4		ng/L		111	75 - 135
Perfluorodecanoic acid (PFDA)	40.0	41.1		ng/L		103	76 - 136

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-332996/2-A
Matrix: Water
Analysis Batch: 337635

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332996

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroundecanoic acid (PFUnA)	40.0	40.2		ng/L		101	68 - 128
Perfluorododecanoic acid (PFDoA)	40.0	40.4		ng/L		101	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	40.6		ng/L		101	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	41.4		ng/L		104	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	41.3		ng/L		117	67 - 127
Perfluorohexanesulfonic acid (PFHxS)	36.4	39.3		ng/L		108	59 - 119
Perfluorooctanesulfonic acid (PFOS)	37.1	39.5		ng/L		106	70 - 130
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	37.3	42.6		ng/L		114	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	44.4		ng/L		111	51 - 173
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	36.2		ng/L		96	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	43.8		ng/L		116	79 - 139

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	103		25 - 150
13C4 PFHpA	96		25 - 150
13C4 PFOA	100		25 - 150
13C5 PFNA	99		25 - 150
13C2 PFDA	105		25 - 150
13C2 PFUnA	103		25 - 150
13C2 PFDoA	109		25 - 150
13C2 PFTeDA	111		25 - 150
18O2 PFHxS	92		25 - 150
13C4 PFOS	98		25 - 150
d3-NMeFOSAA	94		25 - 150
d5-NEtFOSAA	101		25 - 150
13C3 HFPO-DA	85		25 - 150

Lab Sample ID: LCSD 320-332996/3-A
Matrix: Water
Analysis Batch: 337635

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 332996

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	41.5		ng/L		104	73 - 133	3	30
Perfluoroheptanoic acid (PFHpA)	40.0	42.6		ng/L		106	72 - 132	6	30
Perfluorooctanoic acid (PFOA)	40.0	40.4		ng/L		101	70 - 130	4	30
Perfluorononanoic acid (PFNA)	40.0	43.1		ng/L		108	75 - 135	3	30
Perfluorodecanoic acid (PFDA)	40.0	42.7		ng/L		107	76 - 136	4	30
Perfluoroundecanoic acid (PFUnA)	40.0	42.0		ng/L		105	68 - 128	4	30
Perfluorododecanoic acid (PFDoA)	40.0	39.7		ng/L		99	71 - 131	2	30

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-332996/3-A
Matrix: Water
Analysis Batch: 337635

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 332996

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorotridecanoic acid (PFTriA)	40.0	42.4		ng/L		106	71 - 131	4	30
Perfluorotetradecanoic acid (PFTeA)	40.0	41.7		ng/L		104	70 - 130	1	30
Perfluorobutanesulfonic acid (PFBS)	35.4	41.2		ng/L		116	67 - 127	0	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	38.8		ng/L		107	59 - 119	1	30
Perfluorooctanesulfonic acid (PFOS)	37.1	40.1		ng/L		108	70 - 130	2	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.3	42.2		ng/L		113	75 - 135	1	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	48.7		ng/L		122	51 - 173	9	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	34.5		ng/L		91	54 - 114	5	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	44.4		ng/L		118	79 - 139	1	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
13C2 PFHxA	101		25 - 150
13C4 PFHpA	98		25 - 150
13C4 PFOA	101		25 - 150
13C5 PFNA	101		25 - 150
13C2 PFDA	103		25 - 150
13C2 PFUnA	101		25 - 150
13C2 PFDoA	108		25 - 150
13C2 PFTeDA	116		25 - 150
18O2 PFHxS	94		25 - 150
13C4 PFOS	100		25 - 150
d3-NMeFOSAA	95		25 - 150
d5-NEtFOSAA	97		25 - 150
13C3 HFPO-DA	80		25 - 150

Lab Sample ID: MB 320-333266/1-A
Matrix: Water
Analysis Batch: 333639

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333266

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorohexanesulfonic acid (PFHxS)	0.268	J	2.0	0.17	ng/L		10/23/19 21:45	10/24/19 22:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		10/23/19 21:45	10/24/19 22:11	1

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-333266/1-A
Matrix: Water
Analysis Batch: 333639

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333266

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/23/19 21:45	10/24/19 22:11	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		10/23/19 21:45	10/24/19 22:11	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/23/19 21:45	10/24/19 22:11	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		10/23/19 21:45	10/24/19 22:11	1
11-Chloroeicosfluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		10/23/19 21:45	10/24/19 22:11	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/23/19 21:45	10/24/19 22:11	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	102		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C4 PFHpA	107		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C4 PFOA	102		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C5 PFNA	100		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C2 PFDA	104		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C2 PFUnA	106		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C2 PFDoA	108		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C2 PFTeDA	102		25 - 150	10/23/19 21:45	10/24/19 22:11	1
18O2 PFHxS	123		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C4 PFOS	108		25 - 150	10/23/19 21:45	10/24/19 22:11	1
d3-NMeFOSAA	102		25 - 150	10/23/19 21:45	10/24/19 22:11	1
d5-NEtFOSAA	110		25 - 150	10/23/19 21:45	10/24/19 22:11	1
13C3 HFPO-DA	107		25 - 150	10/23/19 21:45	10/24/19 22:11	1

Lab Sample ID: LCS 320-333266/2-A
Matrix: Water
Analysis Batch: 333639

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333266

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorohexanoic acid (PFHxA)	40.0	40.7		ng/L		102	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	42.6		ng/L		107	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	39.0		ng/L		97	70 - 130
Perfluorononanoic acid (PFNA)	40.0	40.1		ng/L		100	75 - 135
Perfluorodecanoic acid (PFDA)	40.0	42.3		ng/L		106	76 - 136
Perfluoroundecanoic acid (PFUnA)	40.0	37.4		ng/L		93	68 - 128
Perfluorododecanoic acid (PFDoA)	40.0	35.9		ng/L		90	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	39.4		ng/L		99	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	40.6		ng/L		101	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	33.0		ng/L		93	67 - 127
Perfluorohexanesulfonic acid (PFHxS)	36.4	31.4		ng/L		86	59 - 119
Perfluorooctanesulfonic acid (PFOS)	37.1	37.1		ng/L		100	70 - 130

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-333266/3-A
Matrix: Water
Analysis Batch: 333639

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333266

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	37.7	28.3		ng/L		75	54 - 114	1	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	40.4		ng/L		107	79 - 139	5	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
13C2 PFHxA	103		25 - 150
13C4 PFHpA	98		25 - 150
13C4 PFOA	101		25 - 150
13C5 PFNA	100		25 - 150
13C2 PFDA	98		25 - 150
13C2 PFUnA	104		25 - 150
13C2 PFDoA	102		25 - 150
13C2 PFTeDA	98		25 - 150
18O2 PFHxS	115		25 - 150
13C4 PFOS	108		25 - 150
d3-NMeFOSAA	105		25 - 150
d5-NEtFOSAA	102		25 - 150
13C3 HFPO-DA	91		25 - 150

Lab Sample ID: MB 320-333385/1-A
Matrix: Water
Analysis Batch: 333895

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333385

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.17	ng/L		10/24/19 10:05	10/25/19 16:47	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		10/24/19 10:05	10/25/19 16:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/24/19 10:05	10/25/19 16:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		10/24/19 10:05	10/25/19 16:47	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/24/19 10:05	10/25/19 16:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		10/24/19 10:05	10/25/19 16:47	1
11-Chloroeicosafuoro-3-oxadecane-1-sulfonic acid	ND		2.0	0.32	ng/L		10/24/19 10:05	10/25/19 16:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/24/19 10:05	10/25/19 16:47	1

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>MB</i>	<i>MB</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
	<i>%Recovery</i>	<i>Qualifier</i>				
13C2 PFHxA	87		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C4 PFHpA	102		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C4 PFOA	95		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C5 PFNA	98		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C2 PFDA	104		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C2 PFUnA	106		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C2 PFDaA	94		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C2 PFTeDA	109		25 - 150	10/24/19 10:05	10/25/19 16:47	1
18O2 PFHxS	87		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C4 PFOS	101		25 - 150	10/24/19 10:05	10/25/19 16:47	1
d3-NMeFOSAA	77		25 - 150	10/24/19 10:05	10/25/19 16:47	1
d5-NEtFOSAA	95		25 - 150	10/24/19 10:05	10/25/19 16:47	1
13C3 HFPO-DA	81		25 - 150	10/24/19 10:05	10/25/19 16:47	1

Lab Sample ID: LCS 320-333385/2-A
Matrix: Water
Analysis Batch: 333895

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333385

<i>Analyte</i>	<i>Spike</i>	<i>LCS</i>	<i>LCS</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>Limits</i>
	<i>Added</i>	<i>Result</i>	<i>Qualifier</i>				<i>%Rec.</i>
Perfluorohexanoic acid (PFHxA)	40.0	41.5		ng/L		104	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	37.7		ng/L		94	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	37.1		ng/L		93	70 - 130
Perfluorononanoic acid (PFNA)	40.0	37.6		ng/L		94	75 - 135
Perfluorodecanoic acid (PFDA)	40.0	45.0		ng/L		112	76 - 136
Perfluoroundecanoic acid (PFUnA)	40.0	43.7		ng/L		109	68 - 128
Perfluorododecanoic acid (PFDaA)	40.0	39.2		ng/L		98	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	33.6		ng/L		84	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	42.2		ng/L		105	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	40.6		ng/L		115	67 - 127
Perfluorohexanesulfonic acid (PFHxS)	36.4	38.6		ng/L		106	59 - 119
Perfluorooctanesulfonic acid (PFOS)	37.1	33.3		ng/L		90	70 - 130
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.3	31.8		ng/L		85	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	43.9		ng/L		110	51 - 173
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	28.4		ng/L		75	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	37.4		ng/L		99	79 - 139

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C2 PFHxA	90		25 - 150
13C4 PFHpA	98		25 - 150
13C4 PFOA	96		25 - 150
13C5 PFNA	100		25 - 150
13C2 PFDA	96		25 - 150
13C2 PFUnA	100		25 - 150
13C2 PFDaA	102		25 - 150

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-333385/2-A
Matrix: Water
Analysis Batch: 333895

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333385

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
13C2 PFTeDA	105		25 - 150
18O2 PFHxS	87		25 - 150
13C4 PFOS	101		25 - 150
d3-NMeFOSAA	78		25 - 150
d5-NEtFOSAA	91		25 - 150
13C3 HFPO-DA	77		25 - 150

Lab Sample ID: LCSD 320-333385/3-A
Matrix: Water
Analysis Batch: 333895

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333385

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD Result</i>	<i>LCSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluorohexanoic acid (PFHxA)	40.0	39.6		ng/L		99	73 - 133	5	30
Perfluoroheptanoic acid (PFHpA)	40.0	41.7		ng/L		104	72 - 132	10	30
Perfluorooctanoic acid (PFOA)	40.0	39.4		ng/L		98	70 - 130	6	30
Perfluorononanoic acid (PFNA)	40.0	42.4		ng/L		106	75 - 135	12	30
Perfluorodecanoic acid (PFDA)	40.0	39.7		ng/L		99	76 - 136	12	30
Perfluoroundecanoic acid (PFUnA)	40.0	40.0		ng/L		100	68 - 128	9	30
Perfluorododecanoic acid (PFDoA)	40.0	40.9		ng/L		102	71 - 131	4	30
Perfluorotridecanoic acid (PFTriA)	40.0	35.4		ng/L		89	71 - 131	5	30
Perfluorotetradecanoic acid (PFTeA)	40.0	40.0		ng/L		100	70 - 130	5	30
Perfluorobutanesulfonic acid (PFBS)	35.4	38.8		ng/L		110	67 - 127	5	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	42.4		ng/L		117	59 - 119	9	30
Perfluorooctanesulfonic acid (PFOS)	37.1	33.3		ng/L		90	70 - 130	0	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.3	32.8		ng/L		88	75 - 135	3	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	39.1		ng/L		98	51 - 173	12	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	29.5		ng/L		78	54 - 114	4	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	40.6		ng/L		108	79 - 139	8	30

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
13C2 PFHxA	93		25 - 150
13C4 PFHpA	102		25 - 150
13C4 PFOA	103		25 - 150
13C5 PFNA	96		25 - 150
13C2 PFDA	97		25 - 150
13C2 PFUnA	114		25 - 150
13C2 PFDoA	101		25 - 150
13C2 PFTeDA	118		25 - 150
18O2 PFHxS	88		25 - 150
13C4 PFOS	99		25 - 150
d3-NMeFOSAA	84		25 - 150

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-333385/3-A
Matrix: Water
Analysis Batch: 333895

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333385

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
d5-NEtFOSAA	94		25 - 150
13C3 HFPO-DA	87		25 - 150

Lab Sample ID: MB 320-333422/1-A
Matrix: Water
Analysis Batch: 333782

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333422

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorohexanesulfonic acid (PFHxS)	0.337	J	2.0	0.17	ng/L		10/24/19 12:02	10/25/19 13:09	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		10/24/19 12:02	10/25/19 13:09	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/24/19 12:02	10/25/19 13:09	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		10/24/19 12:02	10/25/19 13:09	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/24/19 12:02	10/25/19 13:09	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		10/24/19 12:02	10/25/19 13:09	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		10/24/19 12:02	10/25/19 13:09	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/24/19 12:02	10/25/19 13:09	1

Isotope Dilution	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	98		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C4 PFHpA	100		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C4 PFOA	101		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C5 PFNA	97		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C2 PFDA	97		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C2 PFUnA	97		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C2 PFDoA	105		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C2 PFTeDA	100		25 - 150	10/24/19 12:02	10/25/19 13:09	1
18O2 PFHxS	92		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C4 PFOS	100		25 - 150	10/24/19 12:02	10/25/19 13:09	1
d3-NMeFOSAA	101		25 - 150	10/24/19 12:02	10/25/19 13:09	1
d5-NEtFOSAA	103		25 - 150	10/24/19 12:02	10/25/19 13:09	1
13C3 HFPO-DA	83		25 - 150	10/24/19 12:02	10/25/19 13:09	1

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-333422/2-A
Matrix: Water
Analysis Batch: 333782

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333422

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorohexanoic acid (PFHxA)	40.0	42.8		ng/L		107	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	40.9		ng/L		102	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	40.4		ng/L		101	70 - 130
Perfluorononanoic acid (PFNA)	40.0	43.2		ng/L		108	75 - 135
Perfluorodecanoic acid (PFDA)	40.0	42.6		ng/L		106	76 - 136
Perfluoroundecanoic acid (PFUnA)	40.0	41.2		ng/L		103	68 - 128
Perfluorododecanoic acid (PFDoA)	40.0	37.5		ng/L		94	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	39.1		ng/L		98	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	41.7		ng/L		104	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	41.1		ng/L		116	67 - 127
Perfluorohexanesulfonic acid (PFHxS)	36.4	40.1		ng/L		110	59 - 119
Perfluorooctanesulfonic acid (PFOS)	37.1	39.7		ng/L		107	70 - 130
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	37.3	41.5		ng/L		111	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	36.0		ng/L		90	51 - 173
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	32.5		ng/L		86	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	41.6		ng/L		110	79 - 139

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	100		25 - 150
13C4 PFHpA	106		25 - 150
13C4 PFOA	102		25 - 150
13C5 PFNA	101		25 - 150
13C2 PFDA	104		25 - 150
13C2 PFUnA	101		25 - 150
13C2 PFDoA	111		25 - 150
13C2 PFTeDA	105		25 - 150
18O2 PFHxS	93		25 - 150
13C4 PFOS	102		25 - 150
d3-NMeFOSAA	111		25 - 150
d5-NEtFOSAA	111		25 - 150
13C3 HFPO-DA	113		25 - 150

Lab Sample ID: LCSD 320-333422/3-A
Matrix: Water
Analysis Batch: 333782

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333422

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	42.6		ng/L		107	73 - 133	0	30
Perfluoroheptanoic acid (PFHpA)	40.0	41.1		ng/L		103	72 - 132	0	30
Perfluorooctanoic acid (PFOA)	40.0	39.6		ng/L		99	70 - 130	2	30

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-333422/3-A
Matrix: Water
Analysis Batch: 333782

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333422

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorononanoic acid (PFNA)	40.0	42.0		ng/L		105	75 - 135	3	30
Perfluorodecanoic acid (PFDA)	40.0	43.7		ng/L		109	76 - 136	3	30
Perfluoroundecanoic acid (PFUnA)	40.0	38.9		ng/L		97	68 - 128	6	30
Perfluorododecanoic acid (PFDoA)	40.0	39.5		ng/L		99	71 - 131	5	30
Perfluorotridecanoic acid (PFTriA)	40.0	39.8		ng/L		100	71 - 131	2	30
Perfluorotetradecanoic acid (PFTeA)	40.0	40.4		ng/L		101	70 - 130	3	30
Perfluorobutanesulfonic acid (PFBS)	35.4	41.6		ng/L		118	67 - 127	1	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	38.5		ng/L		106	59 - 119	4	30
Perfluorooctanesulfonic acid (PFOS)	37.1	37.1		ng/L		100	70 - 130	7	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.3	41.1		ng/L		110	75 - 135	1	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	40.6		ng/L		102	51 - 173	12	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	32.1		ng/L		85	54 - 114	1	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	42.9		ng/L		114	79 - 139	3	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
¹³ C2 PFHxA	100		25 - 150
¹³ C4 PFHpA	105		25 - 150
¹³ C4 PFOA	105		25 - 150
¹³ C5 PFNA	103		25 - 150
¹³ C2 PFDA	105		25 - 150
¹³ C2 PFUnA	104		25 - 150
¹³ C2 PFDoA	111		25 - 150
¹³ C2 PFTeDA	110		25 - 150
¹⁸ O2 PFHxS	95		25 - 150
¹³ C4 PFOS	103		25 - 150
d3-NMeFOSAA	106		25 - 150
d5-NEtFOSAA	109		25 - 150
¹³ C3 HFPO-DA	103		25 - 150

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

LCMS

Prep Batch: 332996

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-26	MW-9-30	Total/NA	Water	3535	
320-55420-27	MW-7-20	Total/NA	Water	3535	
320-55420-28	TWP-05	Total/NA	Water	3535	
320-55420-29	TWP-04	Total/NA	Water	3535	
320-55420-30	TWP-08	Total/NA	Water	3535	
320-55420-31	MW-8-20	Total/NA	Water	3535	
320-55420-32	TWP-07	Total/NA	Water	3535	
320-55420-33	TWP-107	Total/NA	Water	3535	
320-55420-34	TWP-06	Total/NA	Water	3535	
320-55420-35	MW-11-15	Total/NA	Water	3535	
320-55420-36	MW-11-115	Total/NA	Water	3535	
320-55420-37	MW-12-10	Total/NA	Water	3535	
320-55420-38	SW-19-10	Total/NA	Water	3535	
320-55420-39	SW-19-11	Total/NA	Water	3535	
MB 320-332996/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-332996/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-332996/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Prep Batch: 333266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-1	SW-19-01	Total/NA	Water	3535	
320-55420-2	SW-19-02	Total/NA	Water	3535	
320-55420-3	SW-19-03	Total/NA	Water	3535	
320-55420-4	SW-19-04	Total/NA	Water	3535	
MB 320-333266/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-333266/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-333266/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Prep Batch: 333385

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-5	EB-19-04	Total/NA	Water	3535	
320-55420-6	SW-19-05	Total/NA	Water	3535	
320-55420-7	SW-19-06	Total/NA	Water	3535	
320-55420-8	SW-19-07	Total/NA	Water	3535	
320-55420-9	SW-19-08	Total/NA	Water	3535	
320-55420-10	SW-19-09	Total/NA	Water	3535	
320-55420-11	EB-19-09	Total/NA	Water	3535	
320-55420-12	MW-4-20	Total/NA	Water	3535	
320-55420-13	MW-1-15	Total/NA	Water	3535	
320-55420-14	MW-1-40	Total/NA	Water	3535	
320-55420-15	MW-2-30	Total/NA	Water	3535	
320-55420-16	MW-2-20	Total/NA	Water	3535	
320-55420-17	MW-5-20	Total/NA	Water	3535	
320-55420-18	TWP-01	Total/NA	Water	3535	
320-55420-19	TWP-02	Total/NA	Water	3535	
320-55420-20	TWP-03	Total/NA	Water	3535	
320-55420-21	MW-3-40	Total/NA	Water	3535	
320-55420-22	MW-3-15	Total/NA	Water	3535	
320-55420-23	MW-3-140	Total/NA	Water	3535	
320-55420-24	MW-6-20	Total/NA	Water	3535	
MB 320-333385/1-A	Method Blank	Total/NA	Water	3535	

Eurofins TestAmerica, Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

LCMS (Continued)

Prep Batch: 333385 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-333385/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-333385/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Prep Batch: 333422

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-25	MW-10-20	Total/NA	Water	3535	
MB 320-333422/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-333422/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-333422/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 333438

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-26	MW-9-30	Total/NA	Water	537 (modified)	332996
320-55420-27	MW-7-20	Total/NA	Water	537 (modified)	332996
320-55420-28	TWP-05	Total/NA	Water	537 (modified)	332996
320-55420-29	TWP-04	Total/NA	Water	537 (modified)	332996
320-55420-30	TWP-08	Total/NA	Water	537 (modified)	332996
320-55420-31	MW-8-20	Total/NA	Water	537 (modified)	332996
320-55420-32	TWP-07	Total/NA	Water	537 (modified)	332996
320-55420-33	TWP-107	Total/NA	Water	537 (modified)	332996
320-55420-34	TWP-06	Total/NA	Water	537 (modified)	332996
320-55420-35	MW-11-15	Total/NA	Water	537 (modified)	332996
320-55420-36	MW-11-115	Total/NA	Water	537 (modified)	332996
320-55420-37	MW-12-10	Total/NA	Water	537 (modified)	332996
320-55420-38	SW-19-10	Total/NA	Water	537 (modified)	332996
320-55420-39	SW-19-11	Total/NA	Water	537 (modified)	332996

Analysis Batch: 333639

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-1	SW-19-01	Total/NA	Water	537 (modified)	333266
320-55420-2	SW-19-02	Total/NA	Water	537 (modified)	333266
320-55420-3	SW-19-03	Total/NA	Water	537 (modified)	333266
320-55420-4	SW-19-04	Total/NA	Water	537 (modified)	333266
MB 320-333266/1-A	Method Blank	Total/NA	Water	537 (modified)	333266
LCS 320-333266/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	333266
LCSD 320-333266/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	333266

Analysis Batch: 333782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-25	MW-10-20	Total/NA	Water	537 (modified)	333422
MB 320-333422/1-A	Method Blank	Total/NA	Water	537 (modified)	333422
LCS 320-333422/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	333422
LCSD 320-333422/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	333422

Analysis Batch: 333895

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-5	EB-19-04	Total/NA	Water	537 (modified)	333385
320-55420-6	SW-19-05	Total/NA	Water	537 (modified)	333385
320-55420-7	SW-19-06	Total/NA	Water	537 (modified)	333385
320-55420-8	SW-19-07	Total/NA	Water	537 (modified)	333385
320-55420-9	SW-19-08	Total/NA	Water	537 (modified)	333385

Eurofins TestAmerica, Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

LCMS (Continued)

Analysis Batch: 333895 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55420-10	SW-19-09	Total/NA	Water	537 (modified)	333385
320-55420-11	EB-19-09	Total/NA	Water	537 (modified)	333385
320-55420-12	MW-4-20	Total/NA	Water	537 (modified)	333385
320-55420-13	MW-1-15	Total/NA	Water	537 (modified)	333385
320-55420-14	MW-1-40	Total/NA	Water	537 (modified)	333385
320-55420-15	MW-2-30	Total/NA	Water	537 (modified)	333385
320-55420-16	MW-2-20	Total/NA	Water	537 (modified)	333385
320-55420-17	MW-5-20	Total/NA	Water	537 (modified)	333385
320-55420-18	TWP-01	Total/NA	Water	537 (modified)	333385
320-55420-19	TWP-02	Total/NA	Water	537 (modified)	333385
320-55420-20	TWP-03	Total/NA	Water	537 (modified)	333385
320-55420-21	MW-3-40	Total/NA	Water	537 (modified)	333385
320-55420-22	MW-3-15	Total/NA	Water	537 (modified)	333385
320-55420-23	MW-3-140	Total/NA	Water	537 (modified)	333385
320-55420-24	MW-6-20	Total/NA	Water	537 (modified)	333385
MB 320-333385/1-A	Method Blank	Total/NA	Water	537 (modified)	333385
LCS 320-333385/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	333385
LCSD 320-333385/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	333385

Analysis Batch: 337635

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-332996/1-A	Method Blank	Total/NA	Water	537 (modified)	332996
LCS 320-332996/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	332996
LCSD 320-332996/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	332996

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-01

Lab Sample ID: 320-55420-1

Date Collected: 10/09/19 14:10

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			256.7 mL	10.00 mL	333266	10/23/19 21:45	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1			333639	10/24/19 22:43	S1M	TAL SAC

Client Sample ID: SW-19-02

Lab Sample ID: 320-55420-2

Date Collected: 10/09/19 15:01

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			274 mL	10.00 mL	333266	10/23/19 21:45	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1			333639	10/24/19 22:51	S1M	TAL SAC

Client Sample ID: SW-19-03

Lab Sample ID: 320-55420-3

Date Collected: 10/09/19 15:40

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			271.3 mL	10.00 mL	333266	10/23/19 21:45	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1			333639	10/24/19 23:00	S1M	TAL SAC

Client Sample ID: SW-19-04

Lab Sample ID: 320-55420-4

Date Collected: 10/09/19 16:42

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			266.4 mL	10.00 mL	333266	10/23/19 21:45	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1			333639	10/24/19 23:08	S1M	TAL SAC

Client Sample ID: EB-19-04

Lab Sample ID: 320-55420-5

Date Collected: 10/10/19 09:01

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			262.4 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 17:12	P1N	TAL SAC

Client Sample ID: SW-19-05

Lab Sample ID: 320-55420-6

Date Collected: 10/10/19 09:31

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			265.9 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 17:20	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: SW-19-06

Lab Sample ID: 320-55420-7

Date Collected: 10/10/19 09:52

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			266.3 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 17:29	P1N	TAL SAC

Client Sample ID: SW-19-07

Lab Sample ID: 320-55420-8

Date Collected: 10/10/19 10:37

Matrix: Water

Date Received: 10/17/19 09:10

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	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 17:37	P1N	TAL SAC

Client Sample ID: SW-19-08

Lab Sample ID: 320-55420-9

Date Collected: 10/10/19 11:50

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			261.5 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 17:45	P1N	TAL SAC

Client Sample ID: SW-19-09

Lab Sample ID: 320-55420-10

Date Collected: 10/10/19 12:50

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			257.7 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 17:52	P1N	TAL SAC

Client Sample ID: EB-19-09

Lab Sample ID: 320-55420-11

Date Collected: 10/10/19 14:10

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			261.4 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 18:17	P1N	TAL SAC

Client Sample ID: MW-4-20

Lab Sample ID: 320-55420-12

Date Collected: 10/10/19 10:00

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			263.6 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 18:25	P1N	TAL SAC

Eurofins TestAmerica, Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-1-15

Lab Sample ID: 320-55420-13

Date Collected: 10/10/19 17:41

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			271 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 18:35	P1N	TAL SAC

Client Sample ID: MW-1-40

Lab Sample ID: 320-55420-14

Date Collected: 10/10/19 14:47

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			264.6 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 18:42	P1N	TAL SAC

Client Sample ID: MW-2-30

Lab Sample ID: 320-55420-15

Date Collected: 10/11/19 14:40

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			271.8 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 18:50	P1N	TAL SAC

Client Sample ID: MW-2-20

Lab Sample ID: 320-55420-16

Date Collected: 10/11/19 15:45

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			264.8 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 18:58	P1N	TAL SAC

Client Sample ID: MW-5-20

Lab Sample ID: 320-55420-17

Date Collected: 10/11/19 18:10

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			266.2 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 19:07	P1N	TAL SAC

Client Sample ID: TWP-01

Lab Sample ID: 320-55420-18

Date Collected: 10/11/19 13:49

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			266.9 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 19:15	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: TWP-02

Date Collected: 10/11/19 16:00

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-19

Matrix: Water

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	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 19:23	P1N	TAL SAC

Client Sample ID: TWP-03

Date Collected: 10/11/19 17:09

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-20

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			265.4 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 19:30	P1N	TAL SAC

Client Sample ID: MW-3-40

Date Collected: 10/12/19 13:11

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-21

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			270 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 19:55	P1N	TAL SAC

Client Sample ID: MW-3-15

Date Collected: 10/12/19 15:02

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-22

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			272.4 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 20:03	P1N	TAL SAC

Client Sample ID: MW-3-140

Date Collected: 10/12/19 13:01

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-23

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			261.8 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 20:13	P1N	TAL SAC

Client Sample ID: MW-6-20

Date Collected: 10/12/19 17:47

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-24

Matrix: Water

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 mL	10.00 mL	333385	10/24/19 10:05	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333895	10/25/19 20:20	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-10-20

Date Collected: 10/13/19 16:04

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-25

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			259.8 mL	10.00 mL	333422	10/24/19 12:02	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333782	10/25/19 13:34	JRB	TAL SAC

Client Sample ID: MW-9-30

Date Collected: 10/13/19 13:47

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-26

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			265 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 18:34	GMK	TAL SAC

Client Sample ID: MW-7-20

Date Collected: 10/13/19 11:29

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-27

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			266.1 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 18:42	GMK	TAL SAC

Client Sample ID: TWP-05

Date Collected: 10/13/19 17:55

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-28

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			268.2 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 18:50	GMK	TAL SAC

Client Sample ID: TWP-04

Date Collected: 10/13/19 17:02

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-29

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			256.1 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 18:58	GMK	TAL SAC

Client Sample ID: TWP-08

Date Collected: 10/13/19 14:47

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-30

Matrix: Water

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 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 19:06	GMK	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-8-20

Date Collected: 10/13/19 18:09

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-31

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			259.3 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 19:14	GMK	TAL SAC

Client Sample ID: TWP-07

Date Collected: 10/14/19 17:15

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-32

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			262.1 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 19:38	GMK	TAL SAC

Client Sample ID: TWP-107

Date Collected: 10/14/19 17:05

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-33

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			263 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 19:46	GMK	TAL SAC

Client Sample ID: TWP-06

Date Collected: 10/14/19 16:24

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-34

Matrix: Water

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	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 19:54	GMK	TAL SAC

Client Sample ID: MW-11-15

Date Collected: 10/14/19 11:29

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-35

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			268.1 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 20:02	GMK	TAL SAC

Client Sample ID: MW-11-115

Date Collected: 10/14/19 11:19

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55420-36

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			267 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 20:10	GMK	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Client Sample ID: MW-12-10

Lab Sample ID: 320-55420-37

Date Collected: 10/14/19 13:27

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			268.5 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 20:18	GMK	TAL SAC

Client Sample ID: SW-19-10

Lab Sample ID: 320-55420-38

Date Collected: 10/14/19 13:43

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			250.9 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 20:26	GMK	TAL SAC

Client Sample ID: SW-19-11

Lab Sample ID: 320-55420-39

Date Collected: 10/14/19 13:30

Matrix: Water

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			261 mL	10.00 mL	332996	10/23/19 08:55	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			333438	10/24/19 20:34	GMK	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-20 *
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55420-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-55420-1	SW-19-01	Water	10/09/19 14:10	10/17/19 09:10	
320-55420-2	SW-19-02	Water	10/09/19 15:01	10/17/19 09:10	
320-55420-3	SW-19-03	Water	10/09/19 15:40	10/17/19 09:10	
320-55420-4	SW-19-04	Water	10/09/19 16:42	10/17/19 09:10	
320-55420-5	EB-19-04	Water	10/10/19 09:01	10/17/19 09:10	
320-55420-6	SW-19-05	Water	10/10/19 09:31	10/17/19 09:10	
320-55420-7	SW-19-06	Water	10/10/19 09:52	10/17/19 09:10	
320-55420-8	SW-19-07	Water	10/10/19 10:37	10/17/19 09:10	
320-55420-9	SW-19-08	Water	10/10/19 11:50	10/17/19 09:10	
320-55420-10	SW-19-09	Water	10/10/19 12:50	10/17/19 09:10	
320-55420-11	EB-19-09	Water	10/10/19 14:10	10/17/19 09:10	
320-55420-12	MW-4-20	Water	10/10/19 10:00	10/17/19 09:10	
320-55420-13	MW-1-15	Water	10/10/19 17:41	10/17/19 09:10	
320-55420-14	MW-1-40	Water	10/10/19 14:47	10/17/19 09:10	
320-55420-15	MW-2-30	Water	10/11/19 14:40	10/17/19 09:10	
320-55420-16	MW-2-20	Water	10/11/19 15:45	10/17/19 09:10	
320-55420-17	MW-5-20	Water	10/11/19 18:10	10/17/19 09:10	
320-55420-18	TWP-01	Water	10/11/19 13:49	10/17/19 09:10	
320-55420-19	TWP-02	Water	10/11/19 16:00	10/17/19 09:10	
320-55420-20	TWP-03	Water	10/11/19 17:09	10/17/19 09:10	
320-55420-21	MW-3-40	Water	10/12/19 13:11	10/17/19 09:10	
320-55420-22	MW-3-15	Water	10/12/19 15:02	10/17/19 09:10	
320-55420-23	MW-3-140	Water	10/12/19 13:01	10/17/19 09:10	
320-55420-24	MW-6-20	Water	10/12/19 17:47	10/17/19 09:10	
320-55420-25	MW-10-20	Water	10/13/19 16:04	10/17/19 09:10	
320-55420-26	MW-9-30	Water	10/13/19 13:47	10/17/19 09:10	
320-55420-27	MW-7-20	Water	10/13/19 11:29	10/17/19 09:10	
320-55420-28	TWP-05	Water	10/13/19 17:55	10/17/19 09:10	
320-55420-29	TWP-04	Water	10/13/19 17:02	10/17/19 09:10	
320-55420-30	TWP-08	Water	10/13/19 14:47	10/17/19 09:10	
320-55420-31	MW-8-20	Water	10/13/19 18:09	10/17/19 09:10	
320-55420-32	TWP-07	Water	10/14/19 17:15	10/17/19 09:10	
320-55420-33	TWP-107	Water	10/14/19 17:05	10/17/19 09:10	
320-55420-34	TWP-06	Water	10/14/19 16:24	10/17/19 09:10	
320-55420-35	MW-11-15	Water	10/14/19 11:29	10/17/19 09:10	
320-55420-36	MW-11-115	Water	10/14/19 11:19	10/17/19 09:10	
320-55420-37	MW-12-10	Water	10/14/19 13:27	10/17/19 09:10	
320-55420-38	SW-19-10	Water	10/14/19 13:43	10/17/19 09:10	
320-55420-39	SW-19-11	Water	10/14/19 13:30	10/17/19 09:10	

Project: site characterization waters

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
 2355 Hill Road
 Fairbanks, AK 99709
 (907) 479-0600
 www.shannonwilson.com

Laboratory Page 1 of 45
 Attn: Test Analytica

Quote No: _____
 J-Flags: Yes No

Turn Around Time:
 Normal Rush
 Please Specify _____

Analytical Methods (include preservative if used)

PFAS-5371 (15+ analytes)	2
Coal #2	2

Remarks/Matrix Composition/Grab? Sample Containers

Sample Identity	Lab No.	Time	Date Sampled
SW-19-01	1410	10/9/19	
SW-19-02	1501		
SW-19-03	1540		
SW-19-04	1642		
EW-4-20	1421		
EB-19-04	901	10/10/19	
SW-19-05	931		
SW-19-06	952		
SW-19-07	1037		
SW-19-08	1150		

Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
2	Surface water
2	Surface water
2	Surface water
2	Surface water
2	Ground water KRF
2	EB
2	Surface water
2	Surface water
2	Surface water
2	Surface water

Project Information
 Number: 102599-008
 Name: GOST SC
 Contact: KRISTEN F
 Ongoing Project? Yes No
 Sampler: KRF/GCD

Sample Receipt
 Total No. of Containers: 78
 COC Seals/Intact? Y/N/NA
 Received Good Cond./Cold
 Temp:
 Delivery Method:

Relinquished By: 1.
 Signature: [Signature] Time: 1548
 Printed Name: KRISTEN FRIEDBERG
 Company: SEW

Relinquished By: 2.
 Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Relinquished By: 3.
 Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Notes:
 PFAS by 5371 - 18 analytes list sent to David Altucher via email

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file

Received By: 1.
 Signature: [Signature] Time: 1610
 Printed Name: JENNIFER BUCKLEY
 Company: Corn

Received By: 2.
 Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Received By: 3.
 Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____



320-55420 Chain of Custody

No. 411429

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

5.50% / 5.60% / 4.40% / 4.50% (6.10% / 6.80% / 4.70% / 4.80%) 5.40% / 5.50%
 5.90% / 6.00%

Waters
Project: site characterization

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
 2355 Hill Road
 Fairbanks, AK 99709
 (907) 479-0600
 www.shannonwilson.com

Laboratory Attn:

Analytical Methods (include preservative if used)

PFAS - G371 List	Coaler # 2	Coaler # 1
---------------------	------------	------------

Quote No: _____

J-Flags: Yes No

Turn Around Time: Normal Rush

Please Specify _____

Sample Identity	Lab No.	Time	Date Sampled	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.	Remarks/Matrix Composition/Grab? Sample Containers
SW-19-09		1250	10/10/19	X	X	X	Surface water
EB-19-09		1410	10/10/19	X	X	X	Surface water
MW-4-20		1000	10/10/19	X	X	X	Groundwater
MW-1-15		1741	10/10/19	X	X	X	Groundwater
MW-1-40		1447	10/10/19	X	X	X	Groundwater
MW-2-30		1440	10/11/19	X	X	X	Groundwater
MW-2-20		1545	10/11/19	X	X	X	Groundwater
MW-5-20		1810	10/11/19	X	X	X	Groundwater
TWP-01		1349	10/11/19	X	X	X	Groundwater
TWP-02		1600	10/11/19	X	X	X	Groundwater

Relinquished By: 1. Signature: _____ Time: _____
 Printed Name: See page 1 Date: _____
 Company: _____

Relinquished By: 2. Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Relinquished By: 3. Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Sample Receipt

Total No. of Containers: _____
 OOC Seals/Intact? Y/N/NA _____
 Received Good Cond./Cold _____
 Temp: _____
 Delivery Method: _____

Project Information

Number: 102599-008
 Name: Goshaws SC
 Contact: KRF
 Ongoing Project? Yes No
 Sampler: KRF/GCD/CAB

Notes:

Received By: 1. Signature: _____ Time: 10:10
 Printed Name: Jennifer Sellinger Date: 10/11/19
 Company: ETAW Inc

Received By: 2. Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Received By: 3. Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file



waters site characterization



SHANNON & WILSON, INC.
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
 2355 Hill Road
 Fairbanks, AK 99709
 (907) 479-0600
 www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory Test America Page 3 of 45
 Attn: _____

Analytical Methods (include preservative if used)

PTS-5371	2 # 100	1 # 100	1 # 100
10/11/2019			

Quote No: _____
 J-Flags: Yes No

Turn Around Time:
 Normal Rush
 Please Specify _____

Sample Identity	Lab No.	Time	Date Sampled	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
TWP-03	1709	10/11/2019	X	2	Groundwater
MW-3-H0	1311	10/12/19	X	2	Groundwater
MW-3-15	1502	10/12/19	X	2	Groundwater
MW-3-140	1301	10/12/19	X	2	Groundwater
MW-6-20	1747	10/12/19	X	2	Groundwater
MW-10-20	1604	10/13/19	X	2	Groundwater
MW-9-30	1347	10/13/19	X	2	Groundwater
MW-7-20	1129	10/13/19	X	2	Groundwater
TWP-05	1755	10/13/19	X	2	Groundwater
TWP-04	1702	10/13/19	X	2	Groundwater

Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Number: _____ Name: _____ Contact: _____ Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/> Sampler: _____	Total No. of Containers: _____ COC Seals/Intact? Y/N/NA _____ Received Good/Cond./Cold _____ Temp: _____ Delivery Method: _____	Signature: _____ Printed Name: <u>see page</u> Company: _____	Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____
Notes:		Received By: 1. Signature: _____ Printed Name: _____ Company: _____	Received By: 2. Signature: _____ Printed Name: _____ Company: _____	Received By: 3. Signature: _____ Printed Name: <u>Jennifer Sal...</u> Company: <u>ETAJ Sec</u>

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file



Project: site characterization; waters



2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory _____

Page 4 of 45

Attn: _____

Quote No: _____

J-Flags: Yes No

Turn Around Time:
 Normal Rush
 Please Specify _____

Analytical Methods (include preservative if used)

PFAS-6371	Coaler #1	Coaler #4	Coaler #5
-----------	-----------	-----------	-----------

Remarks/Matrix Composition/Grab? Sample Containers

Date Sampled

Lab No. Time

Sample Identity	Lab No.	Time	Date Sampled	PFAS-6371	Coaler #1	Coaler #4	Coaler #5	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
TWP-08	1447	10/13/19	X					2	Groundwater
MW-8-20	1809	10/13/19	X					2	Groundwater
TWP-07	1715	10/14/19	X		X			2	Groundwater
TWP-107	1705	10/14/19	X		X			2	Groundwater
TWP-06	1624	10/14/19	X		X			2	Groundwater
MW-11-15	1129	10/14/19	X		X			2	Groundwater
MW-11-115	1119	10/14/19	X		X			2	Groundwater
MW-12-10	1327	10/14/19	X		X			2	Groundwater
GAC	1721	10/14/19	X					2	GAC effluent
SW-19-10	1343	10/14/19	X		X			2	Surface water

Project Information

Number: _____
 Name: _____
 Contact: _____
 Ongoing Project? Yes No
 Sampler: _____

Sample Receipt

Total No. of Containers: _____
 COC Seals/Intact? Y/N/NA _____
 Received Good Cond./Cold _____
 Temp: _____
 Delivery Method: _____

Relinquished By: 1.
 Signature: _____
 Printed Name: _____
 Company: _____

Relinquished By: 2.
 Signature: _____
 Printed Name: _____
 Company: _____

Relinquished By: 3.
 Signature: _____
 Printed Name: _____
 Company: _____

Notes:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file

Received By: 1.
 Signature: _____
 Printed Name: _____
 Company: _____

Received By: 2.
 Signature: _____
 Printed Name: _____
 Company: _____

Received By: 3.
 Signature: _____
 Printed Name: _____
 Company: _____



project: site characterization waters

Chain of Custody Record

328576

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (07/13)

Regulatory Program: DW RCRA RCRA Other:

Client Contact		Project Manager:		Site Contact:		Date:	
Company Name:		Tel/Fax:		Lab Contact:		Carrier:	
Address:		Analysis Turnaround Time		Perform MS / MSD (Y / N)		COC No.:	
City/State/Zip:		CALENDAR DAYS <input type="checkbox"/> WORKING DAYS <input type="checkbox"/>		Filtered Sample (Y / N)		5 of 5 COCs	
Phone:		TAT if different from Below		X PFAS		Sampler:	
Fax:		2 weeks <input type="checkbox"/>		X Cooler #s		For Lab Use Only:	
Project Name:		1 week <input type="checkbox"/>		X		Walk-in Client:	
Site:		2 days <input type="checkbox"/>				Lab Sampling:	
PO #		1 day <input type="checkbox"/>				Job / SDG No.:	
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	Sample Specific Notes:	
SW-19-11		10/14/13	1330	G	SW	Surface water	
Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3, 5=NaOH, 6= Other		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)					
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.		<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months					
Special Instructions/QC Requirements & Comments:		See Page 7					
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C):		Therm ID No.:	
Relinquished by:		Company:		Obs'd:		Date/Time:	
Relinquished by:		Company:		Received by:		Date/Time:	
Relinquished by:		Company:		Received in Laboratory by:		Date/Time:	
				ETA Sec		16 Oct 19 10:10	



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-55420-1

Login Number: 55420

List Source: Eurofins TestAmerica, Sacramento

List Number: 1

Creator: Kintaudi, Pauline W

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
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	gel packs
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 <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

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

Laboratory Job ID: 320-55422-1
Client Project/Site: Gust SC

For:

Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:
11/29/2019 8:39:19 AM

David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



Table of Contents

Cover Page	1
Table of Contents	2
Definitions/Glossary	3
Case Narrative	4
Detection Summary	7
Client Sample Results	18
Isotope Dilution Summary	76
QC Sample Results	80
QC Association Summary	94
Lab Chronicle	100
Certification Summary	119
Method Summary	120
Sample Summary	121
Chain of Custody	123
Receipt Checklists	129

Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*	Isotope Dilution analyte is outside acceptance limits.
B	Compound was found in the blank and sample.
cn	Refer to Case Narrative for further detail
E	Result exceeded calibration range.
F1	MS and/or MSD Recovery is outside acceptance limits.
H	Sample was prepped or analyzed beyond the specified holding time
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Job ID: 320-55422-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative 320-55422-1

Receipt

The samples were received on 10/16/2019 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 5 coolers at receipt time were 4.5° C, 4.8° C, 5.5° C, 5.6° C and 6.0° C.

Receipt Exceptions

The following sample was submitted for analysis; however, it was not listed on the Chain-of-Custody (COC): SS-19-29 (320-55422-55). ID of SS-19-29. ID looked the same as Sample#51 but had a different time. Client was contacted and this was identified as a separate sample for analysis.

LCMS

Methods 537 (modified), EPA 537 (Mod): Due to a shortage in the marketplace for 13C3-PFBS, the target analyte PFBS and/or Perfluoropentanesulfonic acid (PFPeS) could not be quantitated against 13C3-PFBS (its labeled variant) as listed in the SOP. PFBS and Perfluoropentanesulfonic acid (PFPeS) was quantitated versus 18O2-PFHxS instead.

Method 537 (modified): The laboratory control sample (LCS) for preparation batch 320-333289 and analytical batch 320-337140 recovered outside control limits for the following analytes: Perfluorooctanesulfonic acid (PFOS). These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported. SS-19-24 (320-55422-42), SS-19-27 (320-55422-45), SS-19-28 (320-55422-46) and (LCS 320-333289/2-A)

Method 537 (modified): The laboratory control sample (LCS) for preparation batch 320-333289 and analytical batch 320-337140 recovered outside control limits for the following analytes: Perfluorooctanesulfonic acid (PFOS). The associated samples were re-prepared outside holding time. Both sets of data have been reported. SS-19-21 (320-55422-39), SS-19-22 (320-55422-40), SS-19-23 (320-55422-41), SS-19-24 (320-55422-42), SS-19-25 (320-55422-43), SS-19-26 (320-55422-44), SS-19-27 (320-55422-45), SW-19-10 (320-55422-47), SW-19-11 (320-55422-48), SS-19-30 (320-55422-50), SS-19-29 (320-55422-51), Culvert 3 (320-55422-52), SS-19-31 (320-55422-53), Culvert 2 (320-55422-54) and (LCS 320-333289/2-A)

Method 537 (modified): The matrix spike (MS) recoveries for Perfluorododecanoic acid (PFDoA) and Perfluorotridecanoic acid (PFTriA) for preparation batch 320-332685 and analytical batch 320-337433 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 537 (modified): The matrix spike (MS) recovery, 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid for preparation batch 320-333286 and analytical batch 320-337121 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 537 (modified): The matrix spike duplicate (MSD) recoveries for 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid for preparation batch 320-333289 and analytical batch 320-337140 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte(s) has/have some degree of uncertainty. However, analyst judgement was used to positively identify the analyte(s). SW-19-02 (320-55422-2), SW-19-04 (320-55422-4), SB-12-0 (320-55422-13), SB-112-0 (320-55422-14) and (320-55422-A-1-C MSD)

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analytes were outside of the established ratio limits. The qualitative identification of the analytes have some degree of uncertainty. However, analyst judgment was used to positively identify the analytes for the following samples: SS-19-12 (320-55422-30) and SS-19-19 (320-55422-37) .

Method 537 (modified): The concentration of Perfluorooctanesulfonic acid (PFOS) analyte associated with the following sample exceeded the instrument calibration range: SS-19-05 (320-55422-23). This analyte has been qualified; however, the peak did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Job ID: 320-55422-1 (Continued)

Laboratory: Eurofins TestAmerica, Sacramento (Continued)

Method 537 (modified): Results for sample Culvert 1 (320-55422-49) were reported from the analysis of a diluted extract due to high concentration and matrix interference of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following samples exceeded the instrument calibration range: Culvert 1 (320-55422-49). These analytes have been qualified; however, the peak(s) did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

Method 537 (modified): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following samples exceeded the instrument calibration range: SS-19-30 (320-55422-50), Culvert 3 (320-55422-52), SS-19-31 (320-55422-53) and Culvert 2 (320-55422-54). This analyte has been qualified; however, the peaks did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

Method 537 (modified): Results for samples SS-19-31 (320-55422-53) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method 537 (modified): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following samples exceeded the instrument calibration range: SS-19-29 (320-55422-51) and Culvert 2 (320-55422-54). These analytes have been qualified; however, the peak(s) did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

Method 537 (modified): Internal standard (ISTD) response for the following sample was outside control limits: SB-12-13 (320-55422-17). The sample was re-analyzed with concurring results, and the original set of data has been reported. The internal standard is not used to quantitate target analytes; therefore, there is no impact to the data.

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for $^{13}\text{C}_3$ HFPO-DA and d5-NEtFOSAA the following sample: SS-19-30 (320-55422-50). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit for $^{13}\text{C}_3$ HFPO-DA: Culvert 3 (320-55422-52). 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).

Method 537 (modified): Internal standard (ISTD) response for the following samples was outside control limits: SS-19-30 (320-55422-50), Culvert 3 (320-55422-52) and SS-19-31 (320-55422-53). The sample was re-analyzed with concurring results. The ISTD is not used to quantitate target analytes; therefore, there is no impact to the data.

Method 537 (modified): The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit for $^{13}\text{C}_2$ PFTeDA: Culvert 2 (320-55422-54). 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.

Method 537 (modified): The transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgement was used to positively identify the analyte. SS-19-21 (320-55422-39), SS-19-22 (320-55422-40), SS-19-23 (320-55422-41) and SW-19-10 (320-55422-47)

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

General Chemistry

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

Organic Prep

Method SHAKE: The following samples were yellow after extraction: SS-19-04 (320-55422-22), SS-19-05 (320-55422-23), SS-19-06

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Job ID: 320-55422-1 (Continued)

Laboratory: Eurofins TestAmerica, Sacramento (Continued)

(320-55422-24), SS-19-07 (320-55422-25), SS-19-09 (320-55422-27), SS-19-14 (320-55422-32), SS-19-19 (320-55422-37) and SS-19-20 (320-55422-38)

Method SHAKE: The following samples SW-19-03 (320-55422-3), SW-19-04 (320-55422-4), SW-19-07 (320-55422-6), SW-19-08 (320-55422-7), SW-19-09 (320-55422-8), SB-12-0 (320-55422-13), SB-112-0 (320-55422-14) and SS-19-02 (320-55422-20) were yellow after the final volume.

Method SHAKE: The following samples Culvert 1 (320-55422-49), SS-19-30 (320-55422-50), SS-19-29 (320-55422-51), Culvert 3 (320-55422-52), SS-19-31 (320-55422-53) and Culvert 2 (320-55422-54) were orange after the final volume.

Method SHAKE: The following samples were re-prepared outside of preparation holding time due to high levels of PFOS in LCS: SS-19-21 (320-55422-39), SS-19-22 (320-55422-40), SS-19-23 (320-55422-41), SS-19-24 (320-55422-42), SS-19-25 (320-55422-43), SS-19-26 (320-55422-44), SS-19-27 (320-55422-45), SW-19-10 (320-55422-47), SW-19-11 (320-55422-48), Culvert 1 (320-55422-49), SS-19-30 (320-55422-50), SS-19-29 (320-55422-51), Culvert 3 (320-55422-52), SS-19-31 (320-55422-53), Culvert 2 (320-55422-54), SS-19-29 (320-55422-55), (320-55422-A-39 MS) and (320-55422-A-39 MSD).

Method SHAKE: The following samples: SS-19-26 (320-55422-44), Culvert 1 (320-55422-49), SS-19-30 (320-55422-50), SS-19-29 (320-55422-51), Culvert 3 (320-55422-52), SS-19-31 (320-55422-53) and Culvert 2 (320-55422-54) were yellow after the final volume.

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



Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-01

Lab Sample ID: 320-55422-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.30	J	0.70	0.28	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SW-19-02

Lab Sample ID: 320-55422-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.049	J I	0.25	0.039	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SW-19-03

Lab Sample ID: 320-55422-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.18	J	0.26	0.054	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.15	J	0.26	0.037	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.14	J	0.26	0.11	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.11	J	0.26	0.046	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.14	J	0.26	0.028	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.15	J	0.26	0.046	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.14	J	0.26	0.086	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.13	J	0.26	0.065	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.16	J	0.26	0.069	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.10	J	0.26	0.032	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.31		0.26	0.040	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.4		0.64	0.26	ug/Kg	1	☒	537 (modified)	Total/NA
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	0.11	J	0.26	0.035	ug/Kg	1	☒	537 (modified)	Total/NA
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	0.32	B	0.32	0.14	ug/Kg	1	☒	537 (modified)	Total/NA
11-Chloroeicosafuoro-3-oxaundecan e-1-sulfonic acid	0.081	J	0.26	0.028	ug/Kg	1	☒	537 (modified)	Total/NA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	0.11	J	0.26	0.023	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SW-19-04

Lab Sample ID: 320-55422-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.13	J I	0.35	0.055	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.50	J	0.89	0.35	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SW-19-06

Lab Sample ID: 320-55422-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.089	J	0.27	0.058	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.041	J	0.27	0.040	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.058	J	0.27	0.030	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.13	J	0.27	0.043	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.6		0.69	0.27	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SW-19-07

Lab Sample ID: 320-55422-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.17	J	0.28	0.044	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.7		0.71	0.28	ug/Kg	1	☒	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-08

Lab Sample ID: 320-55422-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.9		1.1	0.16	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	13		2.6	1.1	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SW-19-09

Lab Sample ID: 320-55422-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.18	J	0.62	0.096	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6		1.5	0.62	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SB-11-1

Lab Sample ID: 320-55422-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.26	J	0.28	0.059	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.24	J	0.28	0.041	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.12	J	0.28	0.051	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.056	J	0.28	0.051	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.16	J	0.28	0.044	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.6		0.70	0.28	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SB-11-3.5

Lab Sample ID: 320-55422-10

No Detections.

Client Sample ID: SB-11-12

Lab Sample ID: 320-55422-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.049	J	0.23	0.049	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.29		0.23	0.036	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.3		0.58	0.23	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SB-11-19

Lab Sample ID: 320-55422-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.049	J	0.26	0.040	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.43	J	0.65	0.26	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SB-12-0

Lab Sample ID: 320-55422-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	4.4		0.24	0.051	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.60		0.24	0.035	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.9		0.24	0.10	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.30		0.24	0.044	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.95		0.24	0.027	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.60		0.24	0.044	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.22	J	0.24	0.081	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.15	J	0.24	0.065	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.13	J I	0.24	0.030	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.3		0.24	0.037	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	14		0.60	0.24	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SB-112-0

Lab Sample ID: 320-55422-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.75		0.24	0.050	ug/Kg	1	☒	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-112-0 (Continued)

Lab Sample ID: 320-55422-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.15	J	0.24	0.034	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.38		0.24	0.10	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.094	J	0.24	0.043	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.22	J	0.24	0.026	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.63	I	0.24	0.043	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.34		0.24	0.080	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.094	J	0.24	0.064	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.055	J I	0.24	0.030	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.80		0.24	0.037	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.6		0.59	0.24	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SB-12-1.5

Lab Sample ID: 320-55422-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.28		0.23	0.049	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.041	J	0.23	0.034	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.14	J	0.23	0.10	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.039	J	0.23	0.029	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.95		0.23	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.3		0.58	0.23	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SB-12-7

Lab Sample ID: 320-55422-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.063	J	0.24	0.037	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.30	J	0.60	0.24	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SB-12-13

Lab Sample ID: 320-55422-17

No Detections.

Client Sample ID: SB-12-17

Lab Sample ID: 320-55422-18

No Detections.

Client Sample ID: SS-19-01

Lab Sample ID: 320-55422-19

No Detections.

Client Sample ID: SS-19-02

Lab Sample ID: 320-55422-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.052	J	0.21	0.045	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.25		0.21	0.033	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.8		0.53	0.21	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-03

Lab Sample ID: 320-55422-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.11	J	0.20	0.042	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.18	J	0.20	0.029	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.17	J	0.20	0.086	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.16	J	0.20	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.10	J	0.20	0.022	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.068	J	0.20	0.036	ug/Kg	1	☼	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-03 (Continued)

Lab Sample ID: 320-55422-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.063	J	0.20	0.031	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.53		0.50	0.20	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-04

Lab Sample ID: 320-55422-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.068	J	0.21	0.043	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.088	J	0.21	0.030	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.070	J	0.21	0.037	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.050	J	0.21	0.023	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.054	J	0.21	0.037	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.038	J	0.21	0.032	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-05

Lab Sample ID: 320-55422-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.74		0.21	0.044	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.29		0.21	0.030	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.71		0.21	0.090	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.23		0.21	0.038	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.99		0.21	0.023	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.61		0.21	0.038	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.34		0.21	0.070	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.062	J	0.21	0.053	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.067	J	0.21	0.056	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.070	J	0.21	0.026	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.2		0.21	0.032	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	29	E	0.52	0.21	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-06

Lab Sample ID: 320-55422-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.18	J	0.20	0.042	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.17	J	0.20	0.029	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.20		0.20	0.086	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.16	J	0.20	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	1.2		0.20	0.022	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.13	J	0.20	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.32		0.20	0.031	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.3		0.50	0.20	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-07

Lab Sample ID: 320-55422-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.059	J	0.21	0.043	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.097	J	0.21	0.030	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.075	J	0.21	0.037	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.047	J	0.21	0.023	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.072	J	0.21	0.037	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.043	J	0.21	0.032	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.26	J	0.52	0.21	ug/Kg	1	☼	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-08

Lab Sample ID: 320-55422-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.15	J	0.21	0.044	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.13	J	0.21	0.030	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.28		0.21	0.090	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.12	J	0.21	0.038	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.20	J	0.21	0.023	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.075	J	0.21	0.070	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.54		0.21	0.032	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.9		0.52	0.21	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-09

Lab Sample ID: 320-55422-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.96		0.25	0.052	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8		0.25	0.036	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.0		0.25	0.11	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.93		0.25	0.045	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	3.1		0.25	0.027	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	3.9		0.25	0.045	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	1.3		0.25	0.083	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.13	J	0.25	0.067	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.53		0.25	0.039	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.0		0.62	0.25	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-10

Lab Sample ID: 320-55422-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.14	J	0.20	0.042	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.099	J	0.20	0.029	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.35		0.20	0.085	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.10	J	0.20	0.036	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.30		0.20	0.022	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.29		0.20	0.036	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.11	J	0.20	0.066	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.36		0.20	0.031	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.5		0.50	0.20	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-11

Lab Sample ID: 320-55422-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.079	J	0.22	0.046	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.091	J	0.22	0.032	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.12	J	0.22	0.094	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.050	J	0.22	0.039	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.077	J	0.22	0.024	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.089	J	0.22	0.039	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.31		0.22	0.034	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.8		0.54	0.22	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-12

Lab Sample ID: 320-55422-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.23	J	0.25	0.053	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.25	0.037	ug/Kg	1	☒	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-12 (Continued)

Lab Sample ID: 320-55422-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.29		0.25	0.11	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.079	J	0.25	0.045	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.099	J	0.25	0.028	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.14	J	0.25	0.045	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.082	J I	0.25	0.068	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.79		0.25	0.039	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.0		0.63	0.25	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-13

Lab Sample ID: 320-55422-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.32		0.25	0.052	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.085	J	0.25	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.22	J	0.25	0.11	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.079	J	0.25	0.044	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.076	J	0.25	0.027	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.054	J	0.25	0.031	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.94		0.25	0.038	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.8		0.62	0.25	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-14

Lab Sample ID: 320-55422-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.43		0.25	0.053	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.25	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.27		0.25	0.11	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.089	J	0.25	0.045	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.089	J	0.25	0.028	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.049	J	0.25	0.031	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.5		0.25	0.039	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.2		0.63	0.25	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-15

Lab Sample ID: 320-55422-33

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.13	J	0.25	0.051	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.087	J	0.25	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.13	J	0.25	0.11	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.047	J	0.25	0.044	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.055	J	0.25	0.044	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.38		0.25	0.038	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.76		0.61	0.25	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-16

Lab Sample ID: 320-55422-34

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.094	J	0.25	0.052	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.053	J	0.25	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.17	J	0.25	0.11	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.034	J	0.25	0.027	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.037	J	0.25	0.031	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.58		0.25	0.039	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.5		0.62	0.25	ug/Kg	1	☼	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-17

Lab Sample ID: 320-55422-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.34		0.26	0.054	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.074	J	0.26	0.037	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.34		0.26	0.11	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.062	J	0.26	0.028	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.060	J	0.26	0.046	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.86		0.26	0.040	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.8		0.64	0.26	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-18

Lab Sample ID: 320-55422-36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.38		0.24	0.050	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.069	J	0.24	0.034	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.30		0.24	0.10	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.073	J	0.24	0.026	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.061	J	0.24	0.043	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.78		0.24	0.037	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.3		0.59	0.24	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-19

Lab Sample ID: 320-55422-37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.27		0.24	0.051	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.072	J	0.24	0.035	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.26		0.24	0.10	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.044	J	0.24	0.044	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.073	J	0.24	0.027	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.091	J	0.24	0.044	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.055	J I	0.24	0.030	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.4		0.24	0.038	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.2		0.61	0.24	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-20

Lab Sample ID: 320-55422-38

No Detections.

Client Sample ID: SS-19-21

Lab Sample ID: 320-55422-39

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.057	J	0.20	0.042	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.030	J	0.20	0.029	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.032	J cn	0.20	0.031	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.84	B *	0.50	0.20	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-22

Lab Sample ID: 320-55422-40

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.059	J cn	0.20	0.043	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.034	J	0.20	0.030	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.033	J	0.20	0.026	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.033	J	0.20	0.032	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.56	B *	0.51	0.20	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.25	J H B	0.53	0.21	ug/Kg	1	☼	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-23

Lab Sample ID: 320-55422-41

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.051	J	0.20	0.042	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.035	J cn	0.20	0.025	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.50	B *	0.50	0.20	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-24

Lab Sample ID: 320-55422-42

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.49	J B *	0.57	0.23	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.47	J H B	0.57	0.23	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-25

Lab Sample ID: 320-55422-43

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.027	J	0.20	0.025	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.51	B *	0.50	0.20	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.56	H B	0.53	0.21	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-26

Lab Sample ID: 320-55422-44

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.046	J	0.21	0.032	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.87	B *	0.52	0.21	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-27

Lab Sample ID: 320-55422-45

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroundecanoic acid (PFUnA)	0.036	J	0.20	0.036	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.034	J	0.20	0.031	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.44	J B *	0.50	0.20	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.28	J H B	0.51	0.20	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SS-19-28

Lab Sample ID: 320-55422-46

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.25	J B *	0.50	0.20	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SW-19-10

Lab Sample ID: 320-55422-47

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.036	J cn	0.26	0.033	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.15	J	0.26	0.041	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6	B *	0.66	0.26	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	2.5	H B	0.70	0.28	ug/Kg	1	☒	537 (modified)	Total/NA

Client Sample ID: SW-19-11

Lab Sample ID: 320-55422-48

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.059	J	0.23	0.049	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.12	J	0.23	0.036	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.5	B *	0.59	0.23	ug/Kg	1	☒	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	2.4	H B	0.66	0.26	ug/Kg	1	☒	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: Culvert 1

Lab Sample ID: 320-55422-49

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	23		1.5	0.32	ug/Kg	5	*	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8		1.5	0.22	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	3.9		1.5	0.66	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.43	J	1.5	0.17	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.91	J	1.5	0.51	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.57	J	1.5	0.39	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	1.6		1.5	0.41	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	12		1.5	0.19	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	53		1.5	0.24	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	520	E B *	3.8	1.5	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	390	H E B	0.87	0.35	ug/Kg	1	*	537 (modified)	Total/NA

Client Sample ID: SS-19-30

Lab Sample ID: 320-55422-50

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	23		0.34	0.072	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4		0.34	0.050	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.2		0.34	0.15	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.48		0.34	0.062	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.90		0.34	0.038	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.7		0.34	0.062	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	1.5		0.34	0.11	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.86		0.34	0.087	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	3.0		0.34	0.092	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.7		0.34	0.043	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	17		0.34	0.053	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	130	E B *	0.86	0.34	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	120	H E B	0.96	0.38	ug/Kg	1	*	537 (modified)	Total/NA

Client Sample ID: SS-19-29

Lab Sample ID: 320-55422-51

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	3.3		0.24	0.051	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.61		0.24	0.035	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.4		0.24	0.10	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.10	J	0.24	0.027	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.19	J	0.24	0.044	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.15	J	0.24	0.082	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.098	J	0.24	0.062	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.16	J	0.24	0.066	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.8		0.24	0.031	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	17		0.24	0.038	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	100	E B *	0.61	0.24	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	85	H E B	0.64	0.26	ug/Kg	1	*	537 (modified)	Total/NA

Client Sample ID: Culvert 3

Lab Sample ID: 320-55422-52

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.5		0.31	0.066	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.41		0.31	0.045	ug/Kg	1	*	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: Culvert 3 (Continued)

Lab Sample ID: 320-55422-52

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.5		0.31	0.13	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.24	J	0.31	0.056	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.43		0.31	0.034	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.59		0.31	0.056	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.39		0.31	0.10	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.33		0.31	0.080	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.49		0.31	0.084	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.60		0.31	0.039	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.8		0.31	0.048	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	63	E B *	0.78	0.31	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - RE	2.7	H	0.34	0.071	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	0.68	H	0.34	0.049	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	1.4	H	0.34	0.14	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA) - RE	0.21	J H	0.34	0.061	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA) - RE	0.48	H	0.34	0.037	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.55	H I	0.34	0.061	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA) - RE	0.54	H	0.34	0.11	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA) - RE	0.25	J H	0.34	0.086	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA) - RE	0.51	H	0.34	0.091	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	0.50	H	0.34	0.042	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	7.7	H	0.34	0.052	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	71	H E B	0.84	0.34	ug/Kg	1	*	537 (modified)	Total/NA

Client Sample ID: SS-19-31

Lab Sample ID: 320-55422-53

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	6.5		0.31	0.065	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.6		0.31	0.045	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	4.5		0.31	0.13	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.72		0.31	0.056	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	1.6		0.31	0.034	ug/Kg	1	*	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.6		0.31	0.056	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	2.0		0.31	0.10	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	1.1		0.31	0.079	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	1.9		0.31	0.083	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.7		0.31	0.039	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12		0.31	0.048	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	160	E B *	0.77	0.31	ug/Kg	1	*	537 (modified)	Total/NA
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.3	J	3.1	0.60	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - RE	5.3	H	1.7	0.36	ug/Kg	5	*	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	1.4	J H	1.7	0.25	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	3.9	H	1.7	0.74	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA) - RE	0.45	J H	1.7	0.31	ug/Kg	5	*	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA) - RE	1.4	J H	1.7	0.19	ug/Kg	5	*	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	1.2	J H	1.7	0.31	ug/Kg	5	*	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-31 (Continued)

Lab Sample ID: 320-55422-53

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorododecanoic acid (PFDoA) - RE	1.3	J H	1.7	0.58	ug/Kg	5	☼	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA) - RE	0.77	J H	1.7	0.44	ug/Kg	5	☼	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA) - RE	1.1	J H	1.7	0.46	ug/Kg	5	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	1.3	J H	1.7	0.22	ug/Kg	5	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	11	H	1.7	0.27	ug/Kg	5	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	130	H E B	4.3	1.7	ug/Kg	5	☼	537 (modified)	Total/NA

Client Sample ID: Culvert 2

Lab Sample ID: 320-55422-54

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	3.2		0.30	0.062	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.87		0.30	0.13	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.54		0.30	0.099	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.43	I	0.30	0.075	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.79		0.30	0.080	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.7		0.30	0.046	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	69	E B *	0.74	0.30	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	48	H E B	0.76	0.30	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: SS-19-29

Lab Sample ID: 320-55422-55

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.045	J	0.21	0.032	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.75	B *	0.52	0.21	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.38	J H B	0.49	0.20	ug/Kg	1	☼	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-01

Lab Sample ID: 320-55422-1

Date Collected: 10/09/19 14:17

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 70.5

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.28	0.059	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluoroheptanoic acid (PFHpA)	ND		0.28	0.041	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorooctanoic acid (PFOA)	ND		0.28	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorononanoic acid (PFNA)	ND		0.28	0.050	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorodecanoic acid (PFDA)	ND		0.28	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluoroundecanoic acid (PFUnA)	ND		0.28	0.050	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorododecanoic acid (PFDoA)	ND	F1	0.28	0.094	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorotridecanoic acid (PFTriA)	ND	F1	0.28	0.071	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.28	0.075	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.28	0.035	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.28	0.043	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Perfluorooctanesulfonic acid (PFOS)	0.30	J	0.70	0.28	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.8	0.54	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.8	0.52	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.28	0.038	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.35	0.15	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.28	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.28	0.025	ug/Kg	☼	10/22/19 06:38	11/10/19 01:04	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C4 PFHpA	85		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C4 PFOA	91		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C5 PFNA	73		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C2 PFDA	96		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C2 PFUnA	76		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C2 PFDoA	63		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C2 PFTeDA	74		25 - 150	10/22/19 06:38	11/10/19 01:04	1
18O2 PFHxS	90		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C4 PFOS	86		25 - 150	10/22/19 06:38	11/10/19 01:04	1
d3-NMeFOSAA	80		25 - 150	10/22/19 06:38	11/10/19 01:04	1
d5-NEtFOSAA	71		25 - 150	10/22/19 06:38	11/10/19 01:04	1
13C3 HFPO-DA	57		25 - 150	10/22/19 06:38	11/10/19 01:04	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-02

Lab Sample ID: 320-55422-2

Date Collected: 10/09/19 15:03

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 78.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.25	0.053	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluoroheptanoic acid (PFHpA)	ND		0.25	0.036	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorooctanoic acid (PFOA)	ND		0.25	0.11	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorononanoic acid (PFNA)	ND		0.25	0.045	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorodecanoic acid (PFDA)	ND		0.25	0.028	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluoroundecanoic acid (PFUnA)	ND		0.25	0.045	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorododecanoic acid (PFDoA)	ND		0.25	0.084	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.064	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25	0.068	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorohexanesulfonic acid (PFHxS)	0.049	J I	0.25	0.039	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.63	0.25	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.49	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.46	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.034	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.14	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.028	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.023	ug/Kg	☼	10/22/19 06:38	11/10/19 01:33	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	106		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C4 PFHpA	102		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C4 PFOA	103		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C5 PFNA	94		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C2 PFDA	114		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C2 PFUnA	104		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C2 PFDoA	88		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C2 PFTeDA	110		25 - 150	10/22/19 06:38	11/10/19 01:33	1
18O2 PFHxS	115		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C4 PFOS	106		25 - 150	10/22/19 06:38	11/10/19 01:33	1
d3-NMeFOSAA	100		25 - 150	10/22/19 06:38	11/10/19 01:33	1
d5-NEtFOSAA	103		25 - 150	10/22/19 06:38	11/10/19 01:33	1
13C3 HFPO-DA	108		25 - 150	10/22/19 06:38	11/10/19 01:33	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-03

Lab Sample ID: 320-55422-3

Date Collected: 10/09/19 15:46

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 74.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.18	J	0.26	0.054	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluoroheptanoic acid (PFHpA)	0.15	J	0.26	0.037	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorooctanoic acid (PFOA)	0.14	J	0.26	0.11	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorononanoic acid (PFNA)	0.11	J	0.26	0.046	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorodecanoic acid (PFDA)	0.14	J	0.26	0.028	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluoroundecanoic acid (PFUnA)	0.15	J	0.26	0.046	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorododecanoic acid (PFDoA)	0.14	J	0.26	0.086	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorotridecanoic acid (PFTriA)	0.13	J	0.26	0.065	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorotetradecanoic acid (PFTeA)	0.16	J	0.26	0.069	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorobutanesulfonic acid (PFBS)	0.10	J	0.26	0.032	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorohexanesulfonic acid (PFHxS)	0.31		0.26	0.040	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Perfluorooctanesulfonic acid (PFOS)	3.4		0.64	0.26	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	ND		2.6	0.50	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	ND		2.6	0.47	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
9-Chlorohexadecafluoro-3-oxonane-1-sulfonic acid	0.11	J	0.26	0.035	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	0.32	B	0.32	0.14	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	0.081	J	0.26	0.028	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	0.11	J	0.26	0.023	ug/Kg	☼	10/22/19 06:38	11/10/19 01:42	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	89		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C4 PFHpA	98		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C4 PFOA	105		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C5 PFNA	100		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C2 PFDA	87		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C2 PFUnA	98		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C2 PFDoA	77		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C2 PFTeDA	29		25 - 150	10/22/19 06:38	11/10/19 01:42	1
18O2 PFHxS	107		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C4 PFOS	101		25 - 150	10/22/19 06:38	11/10/19 01:42	1
d3-NMeFOSAA	81		25 - 150	10/22/19 06:38	11/10/19 01:42	1
d5-NEtFOSAA	102		25 - 150	10/22/19 06:38	11/10/19 01:42	1
13C3 HFPO-DA	56		25 - 150	10/22/19 06:38	11/10/19 01:42	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-04

Lab Sample ID: 320-55422-4

Date Collected: 10/09/19 16:50

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 53.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.35	0.074	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluoroheptanoic acid (PFHpA)	ND		0.35	0.051	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorooctanoic acid (PFOA)	ND		0.35	0.15	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorononanoic acid (PFNA)	ND		0.35	0.064	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorodecanoic acid (PFDA)	ND		0.35	0.039	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluoroundecanoic acid (PFUnA)	ND		0.35	0.064	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorododecanoic acid (PFDoA)	ND		0.35	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorotridecanoic acid (PFTriA)	ND		0.35	0.090	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.35	0.096	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.35	0.044	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorohexanesulfonic acid (PFHxS)	0.13	J I	0.35	0.055	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Perfluorooctanesulfonic acid (PFOS)	0.50	J	0.89	0.35	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		3.5	0.69	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		3.5	0.66	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.35	0.048	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.44	0.19	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.35	0.039	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.35	0.032	ug/Kg	☼	10/22/19 06:38	11/10/19 01:52	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	78		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C4 PFHpA	79		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C4 PFOA	94		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C5 PFNA	86		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C2 PFDA	88		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C2 PFUnA	85		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C2 PFDoA	77		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C2 PFTeDA	77		25 - 150	10/22/19 06:38	11/10/19 01:52	1
18O2 PFHxS	96		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C4 PFOS	94		25 - 150	10/22/19 06:38	11/10/19 01:52	1
d3-NMeFOSAA	80		25 - 150	10/22/19 06:38	11/10/19 01:52	1
d5-NEtFOSAA	95		25 - 150	10/22/19 06:38	11/10/19 01:52	1
13C3 HFPO-DA	61		25 - 150	10/22/19 06:38	11/10/19 01:52	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-06

Lab Sample ID: 320-55422-5

Date Collected: 10/10/19 09:58

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 68.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.089	J	0.27	0.058	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluoroheptanoic acid (PFHpA)	0.041	J	0.27	0.040	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorooctanoic acid (PFOA)	ND		0.27	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorononanoic acid (PFNA)	ND		0.27	0.049	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorodecanoic acid (PFDA)	0.058	J	0.27	0.030	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluoroundecanoic acid (PFUnA)	ND		0.27	0.049	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorododecanoic acid (PFDoA)	ND		0.27	0.092	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorotridecanoic acid (PFTriA)	ND		0.27	0.070	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.27	0.074	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.27	0.034	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorohexanesulfonic acid (PFHxS)	0.13	J	0.27	0.043	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Perfluorooctanesulfonic acid (PFOS)	5.6		0.69	0.27	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.7	0.54	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.7	0.51	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.27	0.037	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.34	0.15	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.27	0.030	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.27	0.025	ug/Kg	☼	10/22/19 06:38	11/10/19 02:01	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	95		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C4 PFHpA	86		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C4 PFOA	114		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C5 PFNA	89		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C2 PFDA	101		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C2 PFUnA	108		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C2 PFDoA	83		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C2 PFTeDA	89		25 - 150	10/22/19 06:38	11/10/19 02:01	1
18O2 PFHxS	102		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C4 PFOS	95		25 - 150	10/22/19 06:38	11/10/19 02:01	1
d3-NMeFOSAA	89		25 - 150	10/22/19 06:38	11/10/19 02:01	1
d5-NEtFOSAA	86		25 - 150	10/22/19 06:38	11/10/19 02:01	1
13C3 HFPO-DA	68		25 - 150	10/22/19 06:38	11/10/19 02:01	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-07

Lab Sample ID: 320-55422-6

Date Collected: 10/10/19 10:40

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 65.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.28	0.060	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluoroheptanoic acid (PFHpA)	ND		0.28	0.041	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorooctanoic acid (PFOA)	ND		0.28	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorononanoic acid (PFNA)	ND		0.28	0.051	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorodecanoic acid (PFDA)	ND		0.28	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluoroundecanoic acid (PFUnA)	ND		0.28	0.051	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorododecanoic acid (PFDoA)	ND		0.28	0.095	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorotridecanoic acid (PFTriA)	ND		0.28	0.072	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.28	0.077	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.28	0.036	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorohexanesulfonic acid (PFHxS)	0.17	J	0.28	0.044	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Perfluorooctanesulfonic acid (PFOS)	1.7		0.71	0.28	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.8	0.55	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.8	0.53	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.28	0.038	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.36	0.16	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.28	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.28	0.026	ug/Kg	☼	10/22/19 06:38	11/10/19 02:11	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	84		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C4 PFHpA	103		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C4 PFOA	100		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C5 PFNA	91		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C2 PFDA	84		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C2 PFUnA	93		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C2 PFDoA	71		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C2 PFTeDA	74		25 - 150	10/22/19 06:38	11/10/19 02:11	1
18O2 PFHxS	103		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C4 PFOS	94		25 - 150	10/22/19 06:38	11/10/19 02:11	1
d3-NMeFOSAA	87		25 - 150	10/22/19 06:38	11/10/19 02:11	1
d5-NEtFOSAA	82		25 - 150	10/22/19 06:38	11/10/19 02:11	1
13C3 HFPO-DA	81		25 - 150	10/22/19 06:38	11/10/19 02:11	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-08

Lab Sample ID: 320-55422-7

Date Collected: 10/10/19 11:54

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 18.6

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.1	0.22	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluoroheptanoic acid (PFHpA)	ND		1.1	0.15	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorooctanoic acid (PFOA)	ND		1.1	0.45	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorononanoic acid (PFNA)	ND		1.1	0.19	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorodecanoic acid (PFDA)	ND		1.1	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluoroundecanoic acid (PFUnA)	ND		1.1	0.19	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorododecanoic acid (PFDoA)	ND		1.1	0.35	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorotridecanoic acid (PFTriA)	ND		1.1	0.27	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.1	0.28	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.1	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorohexanesulfonic acid (PFHxS)	2.9		1.1	0.16	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Perfluorooctanesulfonic acid (PFOS)	13		2.6	1.1	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		11	2.1	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		11	1.9	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.1	0.14	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		1.3	0.58	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.1	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.1	0.095	ug/Kg	☼	10/22/19 06:38	11/10/19 02:39	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C4 PFHpA	94		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C4 PFOA	99		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C5 PFNA	89		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C2 PFDA	96		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C2 PFUnA	80		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C2 PFDoA	75		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C2 PFTeDA	61		25 - 150	10/22/19 06:38	11/10/19 02:39	1
18O2 PFHxS	107		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C4 PFOS	100		25 - 150	10/22/19 06:38	11/10/19 02:39	1
d3-NMeFOSAA	86		25 - 150	10/22/19 06:38	11/10/19 02:39	1
d5-NEtFOSAA	90		25 - 150	10/22/19 06:38	11/10/19 02:39	1
13C3 HFPO-DA	44		25 - 150	10/22/19 06:38	11/10/19 02:39	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-09

Lab Sample ID: 320-55422-8

Date Collected: 10/10/19 12:54

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 31.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.62	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluoroheptanoic acid (PFHpA)	ND		0.62	0.090	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorooctanoic acid (PFOA)	ND		0.62	0.27	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorononanoic acid (PFNA)	ND		0.62	0.11	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorodecanoic acid (PFDA)	ND		0.62	0.068	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluoroundecanoic acid (PFUnA)	ND		0.62	0.11	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorododecanoic acid (PFDoA)	ND		0.62	0.21	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorotridecanoic acid (PFTriA)	ND		0.62	0.16	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.62	0.17	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.62	0.077	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.18	J	0.62	0.096	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Perfluorooctanesulfonic acid (PFOS)	1.6		1.5	0.62	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		6.2	1.2	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		6.2	1.1	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.62	0.083	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.77	0.34	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.62	0.068	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.62	0.056	ug/Kg	☼	10/22/19 06:38	11/10/19 02:49	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C4 PFHpA	104		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C4 PFOA	105		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C5 PFNA	102		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C2 PFDA	94		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C2 PFUnA	89		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C2 PFDoA	67		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C2 PFTeDA	87		25 - 150	10/22/19 06:38	11/10/19 02:49	1
18O2 PFHxS	116		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C4 PFOS	107		25 - 150	10/22/19 06:38	11/10/19 02:49	1
d3-NMeFOSAA	81		25 - 150	10/22/19 06:38	11/10/19 02:49	1
d5-NEtFOSAA	94		25 - 150	10/22/19 06:38	11/10/19 02:49	1
13C3 HFPO-DA	72		25 - 150	10/22/19 06:38	11/10/19 02:49	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-11-1

Lab Sample ID: 320-55422-9

Date Collected: 10/12/19 08:25

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 66.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.26	J	0.28	0.059	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluoroheptanoic acid (PFHpA)	0.24	J	0.28	0.041	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorooctanoic acid (PFOA)	ND		0.28	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorononanoic acid (PFNA)	0.12	J	0.28	0.051	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorodecanoic acid (PFDA)	ND		0.28	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluoroundecanoic acid (PFUnA)	0.056	J	0.28	0.051	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorododecanoic acid (PFDoA)	ND		0.28	0.094	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorotridecanoic acid (PFTriA)	ND		0.28	0.072	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.28	0.076	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.28	0.035	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorohexanesulfonic acid (PFHxS)	0.16	J	0.28	0.044	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Perfluorooctanesulfonic acid (PFOS)	3.6		0.70	0.28	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.8	0.55	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.8	0.52	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.28	0.038	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.35	0.15	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.28	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.28	0.025	ug/Kg	☼	10/22/19 06:38	11/10/19 02:58	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	83		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C4 PFHpA	89		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C4 PFOA	100		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C5 PFNA	103		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C2 PFDA	101		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C2 PFUnA	85		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C2 PFDoA	77		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C2 PFTeDA	57		25 - 150	10/22/19 06:38	11/10/19 02:58	1
18O2 PFHxS	108		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C4 PFOS	102		25 - 150	10/22/19 06:38	11/10/19 02:58	1
d3-NMeFOSAA	67		25 - 150	10/22/19 06:38	11/10/19 02:58	1
d5-NEtFOSAA	80		25 - 150	10/22/19 06:38	11/10/19 02:58	1
13C3 HFPO-DA	41		25 - 150	10/22/19 06:38	11/10/19 02:58	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-11-3.5

Lab Sample ID: 320-55422-10

Date Collected: 10/12/19 08:27

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 67.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.30	0.062	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluoroheptanoic acid (PFHpA)	ND		0.30	0.043	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorooctanoic acid (PFOA)	ND		0.30	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorononanoic acid (PFNA)	ND		0.30	0.054	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorodecanoic acid (PFDA)	ND		0.30	0.033	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluoroundecanoic acid (PFUnA)	ND		0.30	0.054	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorododecanoic acid (PFDoA)	ND		0.30	0.10	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorotridecanoic acid (PFTriA)	ND		0.30	0.076	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.30	0.080	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.30	0.037	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.30	0.046	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.74	0.30	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		3.0	0.58	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		3.0	0.55	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.30	0.040	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.37	0.16	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.30	0.033	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.30	0.027	ug/Kg	☼	10/22/19 06:38	11/10/19 03:08	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	95		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C4 PFHpA	90		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C4 PFOA	95		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C5 PFNA	94		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C2 PFDA	95		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C2 PFUnA	90		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C2 PFDoA	74		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C2 PFTeDA	77		25 - 150	10/22/19 06:38	11/10/19 03:08	1
18O2 PFHxS	105		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C4 PFOS	92		25 - 150	10/22/19 06:38	11/10/19 03:08	1
d3-NMeFOSAA	90		25 - 150	10/22/19 06:38	11/10/19 03:08	1
d5-NEtFOSAA	92		25 - 150	10/22/19 06:38	11/10/19 03:08	1
13C3 HFPO-DA	110		25 - 150	10/22/19 06:38	11/10/19 03:08	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-11-12

Lab Sample ID: 320-55422-11

Date Collected: 10/12/19 08:30

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 80.5

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.049	J	0.23	0.049	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.034	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorooctanoic acid (PFOA)	ND		0.23	0.10	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorononanoic acid (PFNA)	ND		0.23	0.042	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorodecanoic acid (PFDA)	ND		0.23	0.026	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23	0.042	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.078	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.060	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.063	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.029	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorohexanesulfonic acid (PFHxS)	0.29		0.23	0.036	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Perfluorooctanesulfonic acid (PFOS)	1.3		0.58	0.23	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.3	0.46	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.3	0.43	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.032	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.29	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
11-Chloroeicosadecafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.026	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.021	ug/Kg	☼	10/22/19 06:38	11/10/19 03:17	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	85		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C4 PFHpA	105		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C4 PFOA	109		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C5 PFNA	91		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C2 PFDA	92		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C2 PFUnA	92		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C2 PFDoA	79		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C2 PFTeDA	91		25 - 150	10/22/19 06:38	11/10/19 03:17	1
18O2 PFHxS	101		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C4 PFOS	95		25 - 150	10/22/19 06:38	11/10/19 03:17	1
d3-NMeFOSAA	89		25 - 150	10/22/19 06:38	11/10/19 03:17	1
d5-NEtFOSAA	87		25 - 150	10/22/19 06:38	11/10/19 03:17	1
13C3 HFPO-DA	79		25 - 150	10/22/19 06:38	11/10/19 03:17	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-11-19

Lab Sample ID: 320-55422-12

Date Collected: 10/12/19 08:32

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 71.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.26	0.054	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluoroheptanoic acid (PFHpA)	ND		0.26	0.037	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorooctanoic acid (PFOA)	ND		0.26	0.11	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorononanoic acid (PFNA)	ND		0.26	0.047	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorodecanoic acid (PFDA)	ND		0.26	0.028	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluoroundecanoic acid (PFUnA)	ND		0.26	0.047	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorododecanoic acid (PFDoA)	ND		0.26	0.087	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorotridecanoic acid (PFTriA)	ND		0.26	0.066	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.26	0.070	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.26	0.032	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorohexanesulfonic acid (PFHxS)	0.049	J	0.26	0.040	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Perfluorooctanesulfonic acid (PFOS)	0.43	J	0.65	0.26	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.6	0.50	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.6	0.48	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.26	0.035	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.32	0.14	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.26	0.028	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.26	0.023	ug/Kg	☼	10/22/19 06:38	11/10/19 03:27	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	89		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C4 PFHpA	87		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C4 PFOA	101		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C5 PFNA	94		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C2 PFDA	81		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C2 PFUnA	72		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C2 PFDoA	85		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C2 PFTeDA	96		25 - 150	10/22/19 06:38	11/10/19 03:27	1
18O2 PFHxS	100		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C4 PFOS	88		25 - 150	10/22/19 06:38	11/10/19 03:27	1
d3-NMeFOSAA	85		25 - 150	10/22/19 06:38	11/10/19 03:27	1
d5-NEtFOSAA	88		25 - 150	10/22/19 06:38	11/10/19 03:27	1
13C3 HFPO-DA	78		25 - 150	10/22/19 06:38	11/10/19 03:27	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-12-0

Lab Sample ID: 320-55422-13

Date Collected: 10/12/19 10:10

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 79.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	4.4		0.24	0.051	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluoroheptanoic acid (PFHpA)	0.60		0.24	0.035	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorooctanoic acid (PFOA)	1.9		0.24	0.10	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorononanoic acid (PFNA)	0.30		0.24	0.044	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorodecanoic acid (PFDA)	0.95		0.24	0.027	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluoroundecanoic acid (PFUnA)	0.60		0.24	0.044	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorododecanoic acid (PFDoA)	0.22	J	0.24	0.081	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.062	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorotetradecanoic acid (PFTeA)	0.15	J	0.24	0.065	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorobutanesulfonic acid (PFBS)	0.13	J I	0.24	0.030	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorohexanesulfonic acid (PFHxS)	2.3		0.24	0.037	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Perfluorooctanesulfonic acid (PFOS)	14		0.60	0.24	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.47	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.45	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.033	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.30	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
11-Chloroeicosadufluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.027	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.022	ug/Kg	☼	10/22/19 06:38	11/10/19 03:36	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	66		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C4 PFHpA	78		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C4 PFOA	73		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C5 PFNA	74		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C2 PFDA	70		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C2 PFUnA	67		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C2 PFDoA	63		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C2 PFTeDA	52		25 - 150	10/22/19 06:38	11/10/19 03:36	1
18O2 PFHxS	86		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C4 PFOS	84		25 - 150	10/22/19 06:38	11/10/19 03:36	1
d3-NMeFOSAA	65		25 - 150	10/22/19 06:38	11/10/19 03:36	1
d5-NEtFOSAA	71		25 - 150	10/22/19 06:38	11/10/19 03:36	1
13C3 HFPO-DA	48		25 - 150	10/22/19 06:38	11/10/19 03:36	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-112-0

Lab Sample ID: 320-55422-14

Date Collected: 10/12/19 10:00

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 80.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.75		0.24	0.050	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluoroheptanoic acid (PFHpA)	0.15	J	0.24	0.034	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorooctanoic acid (PFOA)	0.38		0.24	0.10	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorononanoic acid (PFNA)	0.094	J	0.24	0.043	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorodecanoic acid (PFDA)	0.22	J	0.24	0.026	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluoroundecanoic acid (PFUnA)	0.63	I	0.24	0.043	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorododecanoic acid (PFDoA)	0.34		0.24	0.080	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.061	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorotetradecanoic acid (PFTeA)	0.094	J	0.24	0.064	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorobutanesulfonic acid (PFBS)	0.055	J I	0.24	0.030	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorohexanesulfonic acid (PFHxS)	0.80		0.24	0.037	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Perfluorooctanesulfonic acid (PFOS)	8.6		0.59	0.24	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.46	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.44	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.032	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.30	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.026	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.021	ug/Kg	☼	10/22/19 06:38	11/10/19 03:46	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	76		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C4 PFHpA	100		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C4 PFOA	99		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C5 PFNA	92		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C2 PFDA	82		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C2 PFUnA	66		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C2 PFDoA	50		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C2 PFTeDA	39		25 - 150	10/22/19 06:38	11/10/19 03:46	1
18O2 PFHxS	111		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C4 PFOS	96		25 - 150	10/22/19 06:38	11/10/19 03:46	1
d3-NMeFOSAA	56		25 - 150	10/22/19 06:38	11/10/19 03:46	1
d5-NEtFOSAA	63		25 - 150	10/22/19 06:38	11/10/19 03:46	1
13C3 HFPO-DA	48		25 - 150	10/22/19 06:38	11/10/19 03:46	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-12-1.5

Lab Sample ID: 320-55422-15

Date Collected: 10/12/19 10:12

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 82.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.28		0.23	0.049	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluoroheptanoic acid (PFHpA)	0.041	J	0.23	0.034	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorooctanoic acid (PFOA)	0.14	J	0.23	0.10	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorononanoic acid (PFNA)	ND		0.23	0.042	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorodecanoic acid (PFDA)	ND		0.23	0.026	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23	0.042	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.078	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.060	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.063	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorobutanesulfonic acid (PFBS)	0.039	J	0.23	0.029	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorohexanesulfonic acid (PFHxS)	0.95		0.23	0.036	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Perfluorooctanesulfonic acid (PFOS)	5.3		0.58	0.23	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.3	0.46	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.3	0.43	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.032	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.29	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.026	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.021	ug/Kg	☼	10/22/19 06:38	11/10/19 03:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	97		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C4 PFHpA	101		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C4 PFOA	106		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C5 PFNA	116		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C2 PFDA	121		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C2 PFUnA	96		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C2 PFDoA	87		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C2 PFTeDA	94		25 - 150	10/22/19 06:38	11/10/19 03:55	1
18O2 PFHxS	106		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C4 PFOS	98		25 - 150	10/22/19 06:38	11/10/19 03:55	1
d3-NMeFOSAA	91		25 - 150	10/22/19 06:38	11/10/19 03:55	1
d5-NEtFOSAA	105		25 - 150	10/22/19 06:38	11/10/19 03:55	1
13C3 HFPO-DA	67		25 - 150	10/22/19 06:38	11/10/19 03:55	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-12-7

Lab Sample ID: 320-55422-16

Date Collected: 10/12/19 10:15

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 80.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.24	0.051	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluoroheptanoic acid (PFHpA)	ND		0.24	0.035	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorooctanoic acid (PFOA)	ND		0.24	0.10	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorononanoic acid (PFNA)	ND		0.24	0.043	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorodecanoic acid (PFDA)	ND		0.24	0.027	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluoroundecanoic acid (PFUnA)	ND		0.24	0.043	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.081	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.061	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.065	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.030	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorohexanesulfonic acid (PFHxS)	0.063	J	0.24	0.037	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Perfluorooctanesulfonic acid (PFOS)	0.30	J	0.60	0.24	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.47	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.45	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.033	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.30	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.027	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.022	ug/Kg	☼	10/22/19 06:38	11/10/19 04:24	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	106		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C4 PFHpA	108		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C4 PFOA	106		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C5 PFNA	108		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C2 PFDA	108		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C2 PFUnA	117		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C2 PFDoA	99		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C2 PFTeDA	113		25 - 150	10/22/19 06:38	11/10/19 04:24	1
18O2 PFHxS	115		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C4 PFOS	100		25 - 150	10/22/19 06:38	11/10/19 04:24	1
d3-NMeFOSAA	90		25 - 150	10/22/19 06:38	11/10/19 04:24	1
d5-NEtFOSAA	96		25 - 150	10/22/19 06:38	11/10/19 04:24	1
13C3 HFPO-DA	109		25 - 150	10/22/19 06:38	11/10/19 04:24	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-12-13

Lab Sample ID: 320-55422-17

Date Collected: 10/12/19 10:20

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 85.5

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.046	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.032	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.094	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorononanoic acid (PFNA)	ND		0.22	0.039	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorodecanoic acid (PFDA)	ND		0.22	0.024	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluoroundecanoic acid (PFUnA)	ND		0.22	0.039	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.073	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorotridecanoic acid (PFTriA)	ND		0.22	0.056	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.059	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.027	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.034	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.55	0.22	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.2	0.43	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.2	0.41	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.030	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.27	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.024	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.020	ug/Kg	☼	10/22/19 06:38	11/10/19 04:34	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	94		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C4 PFHpA	92		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C4 PFOA	93		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C5 PFNA	87		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C2 PFDA	98		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C2 PFUnA	93		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C2 PFDoA	76		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C2 PFTeDA	95		25 - 150	10/22/19 06:38	11/10/19 04:34	1
18O2 PFHxS	92		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C4 PFOS	85		25 - 150	10/22/19 06:38	11/10/19 04:34	1
d3-NMeFOSAA	92		25 - 150	10/22/19 06:38	11/10/19 04:34	1
d5-NEtFOSAA	86		25 - 150	10/22/19 06:38	11/10/19 04:34	1
13C3 HFPO-DA	72		25 - 150	10/22/19 06:38	11/10/19 04:34	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-12-17

Lab Sample ID: 320-55422-18

Date Collected: 10/12/19 10:22

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 83.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.23	0.048	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.033	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorooctanoic acid (PFOA)	ND		0.23	0.099	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorononanoic acid (PFNA)	ND		0.23	0.042	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorodecanoic acid (PFDA)	ND		0.23	0.025	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23	0.042	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.077	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.059	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.062	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.029	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.036	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.58	0.23	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.3	0.45	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.3	0.43	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.29	0.13	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.025	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.021	ug/Kg	☼	10/22/19 06:38	11/10/19 04:43	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	103		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C4 PFHpA	114		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C4 PFOA	107		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C5 PFNA	106		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C2 PFDA	111		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C2 PFUnA	106		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C2 PFDoA	98		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C2 PFTeDA	103		25 - 150	10/22/19 06:38	11/10/19 04:43	1
18O2 PFHxS	113		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C4 PFOS	99		25 - 150	10/22/19 06:38	11/10/19 04:43	1
d3-NMeFOSAA	88		25 - 150	10/22/19 06:38	11/10/19 04:43	1
d5-NEtFOSAA	94		25 - 150	10/22/19 06:38	11/10/19 04:43	1
13C3 HFPO-DA	99		25 - 150	10/22/19 06:38	11/10/19 04:43	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-01

Lab Sample ID: 320-55422-19

Date Collected: 10/14/19 08:09

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 95.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.044	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.030	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.090	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.038	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.023	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.038	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.070	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.053	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.056	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.032	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.52	0.21	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.41	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.39	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/22/19 06:38	11/10/19 04:53	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	100		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C4 PFHpA	103		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C4 PFOA	105		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C5 PFNA	102		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C2 PFDA	96		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C2 PFUnA	104		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C2 PFDoA	87		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C2 PFTeDA	52		25 - 150	10/22/19 06:38	11/10/19 04:53	1
18O2 PFHxS	103		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C4 PFOS	94		25 - 150	10/22/19 06:38	11/10/19 04:53	1
d3-NMeFOSAA	88		25 - 150	10/22/19 06:38	11/10/19 04:53	1
d5-NEtFOSAA	92		25 - 150	10/22/19 06:38	11/10/19 04:53	1
13C3 HFPO-DA	83		25 - 150	10/22/19 06:38	11/10/19 04:53	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-02

Lab Sample ID: 320-55422-20

Date Collected: 10/14/19 08:28

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.052	J	0.21	0.045	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.031	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.092	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.039	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.024	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.039	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.072	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.055	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.058	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.027	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorohexanesulfonic acid (PFHxS)	0.25		0.21	0.033	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Perfluorooctanesulfonic acid (PFOS)	3.8		0.53	0.21	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.42	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.40	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.029	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.27	0.12	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.024	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/22/19 06:38	11/10/19 05:02	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C4 PFHpA	94		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C4 PFOA	90		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C5 PFNA	75		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C2 PFDA	81		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C2 PFUnA	62		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C2 PFDoA	67		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C2 PFTeDA	47		25 - 150	10/22/19 06:38	11/10/19 05:02	1
18O2 PFHxS	100		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C4 PFOS	79		25 - 150	10/22/19 06:38	11/10/19 05:02	1
d3-NMeFOSAA	67		25 - 150	10/22/19 06:38	11/10/19 05:02	1
d5-NEtFOSAA	68		25 - 150	10/22/19 06:38	11/10/19 05:02	1
13C3 HFPO-DA	96		25 - 150	10/22/19 06:38	11/10/19 05:02	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-03

Lab Sample ID: 320-55422-21

Date Collected: 10/14/19 08:40

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.11	J	0.20	0.042	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluoroheptanoic acid (PFHpA)	0.18	J	0.20	0.029	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorooctanoic acid (PFOA)	0.17	J	0.20	0.086	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorononanoic acid (PFNA)	0.16	J	0.20	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorodecanoic acid (PFDA)	0.10	J	0.20	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluoroundecanoic acid (PFUnA)	0.068	J	0.20	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorohexanesulfonic acid (PFHxS)	0.063	J	0.20	0.031	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Perfluorooctanesulfonic acid (PFOS)	0.53		0.50	0.20	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND	F1	0.20	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:25	11/09/19 12:08	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	82		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C4 PFHpA	86		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C4 PFOA	85		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C5 PFNA	78		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C2 PFDA	81		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C2 PFUnA	81		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C2 PFDoA	79		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C2 PFTeDA	82		25 - 150	10/24/19 07:25	11/09/19 12:08	1
18O2 PFHxS	77		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C4 PFOS	74		25 - 150	10/24/19 07:25	11/09/19 12:08	1
d3-NMeFOSAA	84		25 - 150	10/24/19 07:25	11/09/19 12:08	1
d5-NEtFOSAA	74		25 - 150	10/24/19 07:25	11/09/19 12:08	1
13C3 HFPO-DA	81		25 - 150	10/24/19 07:25	11/09/19 12:08	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-04

Lab Sample ID: 320-55422-22

Date Collected: 10/14/19 08:51

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.7

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.068	J	0.21	0.043	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluoroheptanoic acid (PFHpA)	0.088	J	0.21	0.030	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.089	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorononanoic acid (PFNA)	0.070	J	0.21	0.037	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorodecanoic acid (PFDA)	0.050	J	0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluoroundecanoic acid (PFUnA)	0.054	J	0.21	0.037	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.069	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.053	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.056	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorohexanesulfonic acid (PFHxS)	0.038	J	0.21	0.032	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.52	0.21	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.40	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.38	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/24/19 07:25	11/09/19 12:37	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C4 PFHpA	91		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C4 PFOA	91		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C5 PFNA	86		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C2 PFDA	88		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C2 PFUnA	85		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C2 PFDoA	79		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C2 PFTeDA	70		25 - 150	10/24/19 07:25	11/09/19 12:37	1
18O2 PFHxS	84		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C4 PFOS	84		25 - 150	10/24/19 07:25	11/09/19 12:37	1
d3-NMeFOSAA	82		25 - 150	10/24/19 07:25	11/09/19 12:37	1
d5-NEtFOSAA	86		25 - 150	10/24/19 07:25	11/09/19 12:37	1
13C3 HFPO-DA	77		25 - 150	10/24/19 07:25	11/09/19 12:37	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-05

Lab Sample ID: 320-55422-23

Date Collected: 10/14/19 08:54

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.74		0.21	0.044	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluoroheptanoic acid (PFHpA)	0.29		0.21	0.030	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorooctanoic acid (PFOA)	0.71		0.21	0.090	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorononanoic acid (PFNA)	0.23		0.21	0.038	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorodecanoic acid (PFDA)	0.99		0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluoroundecanoic acid (PFUnA)	0.61		0.21	0.038	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorododecanoic acid (PFDoA)	0.34		0.21	0.070	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorotridecanoic acid (PFTriA)	0.062	J	0.21	0.053	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorotetradecanoic acid (PFTeA)	0.067	J	0.21	0.056	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorobutanesulfonic acid (PFBS)	0.070	J	0.21	0.026	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorohexanesulfonic acid (PFHxS)	2.2		0.21	0.032	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Perfluorooctanesulfonic acid (PFOS)	29	E	0.52	0.21	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.41	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.39	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.12	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/24/19 07:25	11/09/19 12:47	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	91		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C4 PFHpA	92		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C4 PFOA	88		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C5 PFNA	79		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C2 PFDA	78		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C2 PFUnA	79		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C2 PFDoA	66		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C2 PFTeDA	61		25 - 150	10/24/19 07:25	11/09/19 12:47	1
18O2 PFHxS	90		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C4 PFOS	86		25 - 150	10/24/19 07:25	11/09/19 12:47	1
d3-NMeFOSAA	62		25 - 150	10/24/19 07:25	11/09/19 12:47	1
d5-NEtFOSAA	60		25 - 150	10/24/19 07:25	11/09/19 12:47	1
13C3 HFPO-DA	99		25 - 150	10/24/19 07:25	11/09/19 12:47	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-06

Lab Sample ID: 320-55422-24

Date Collected: 10/14/19 09:01

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.18	J	0.20	0.042	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluoroheptanoic acid (PFHpA)	0.17	J	0.20	0.029	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorooctanoic acid (PFOA)	0.20		0.20	0.086	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorononanoic acid (PFNA)	0.16	J	0.20	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorodecanoic acid (PFDA)	1.2		0.20	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluoroundecanoic acid (PFUnA)	0.13	J	0.20	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorohexanesulfonic acid (PFHxS)	0.32		0.20	0.031	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Perfluorooctanesulfonic acid (PFOS)	3.3		0.50	0.20	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:25	11/09/19 12:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	87		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C4 PFHpA	90		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C4 PFOA	90		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C5 PFNA	82		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C2 PFDA	84		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C2 PFUnA	81		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C2 PFDoA	75		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C2 PFTeDA	68		25 - 150	10/24/19 07:25	11/09/19 12:57	1
18O2 PFHxS	81		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C4 PFOS	83		25 - 150	10/24/19 07:25	11/09/19 12:57	1
d3-NMeFOSAA	73		25 - 150	10/24/19 07:25	11/09/19 12:57	1
d5-NEtFOSAA	75		25 - 150	10/24/19 07:25	11/09/19 12:57	1
13C3 HFPO-DA	89		25 - 150	10/24/19 07:25	11/09/19 12:57	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-07

Lab Sample ID: 320-55422-25

Date Collected: 10/14/19 09:13

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.059	J	0.21	0.043	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluoroheptanoic acid (PFHpA)	0.097	J	0.21	0.030	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.089	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorononanoic acid (PFNA)	0.075	J	0.21	0.037	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorodecanoic acid (PFDA)	0.047	J	0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluoroundecanoic acid (PFUnA)	0.072	J	0.21	0.037	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.069	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.053	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.056	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorohexanesulfonic acid (PFHxS)	0.043	J	0.21	0.032	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Perfluorooctanesulfonic acid (PFOS)	0.26	J	0.52	0.21	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.40	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.38	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/24/19 07:25	11/09/19 13:06	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	80		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C4 PFHpA	87		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C4 PFOA	86		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C5 PFNA	79		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C2 PFDA	87		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C2 PFUnA	77		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C2 PFDoA	76		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C2 PFTeDA	72		25 - 150	10/24/19 07:25	11/09/19 13:06	1
18O2 PFHxS	78		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C4 PFOS	81		25 - 150	10/24/19 07:25	11/09/19 13:06	1
d3-NMeFOSAA	72		25 - 150	10/24/19 07:25	11/09/19 13:06	1
d5-NEtFOSAA	80		25 - 150	10/24/19 07:25	11/09/19 13:06	1
13C3 HFPO-DA	87		25 - 150	10/24/19 07:25	11/09/19 13:06	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-08

Lab Sample ID: 320-55422-26

Date Collected: 10/14/19 09:43

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.15	J	0.21	0.044	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluoroheptanoic acid (PFHpA)	0.13	J	0.21	0.030	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorooctanoic acid (PFOA)	0.28		0.21	0.090	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorononanoic acid (PFNA)	0.12	J	0.21	0.038	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorodecanoic acid (PFDA)	0.20	J	0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.038	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorododecanoic acid (PFDoA)	0.075	J	0.21	0.070	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.053	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.056	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorohexanesulfonic acid (PFHxS)	0.54		0.21	0.032	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Perfluorooctanesulfonic acid (PFOS)	8.9		0.52	0.21	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.41	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.39	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/24/19 07:25	11/09/19 13:16	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	69		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C4 PFHpA	72		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C4 PFOA	72		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C5 PFNA	67		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C2 PFDA	71		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C2 PFUnA	67		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C2 PFDoA	70		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C2 PFTeDA	75		25 - 150	10/24/19 07:25	11/09/19 13:16	1
18O2 PFHxS	71		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C4 PFOS	67		25 - 150	10/24/19 07:25	11/09/19 13:16	1
d3-NMeFOSAA	67		25 - 150	10/24/19 07:25	11/09/19 13:16	1
d5-NEtFOSAA	65		25 - 150	10/24/19 07:25	11/09/19 13:16	1
13C3 HFPO-DA	75		25 - 150	10/24/19 07:25	11/09/19 13:16	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-09

Lab Sample ID: 320-55422-27

Date Collected: 10/14/19 09:48

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.96		0.25	0.052	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluoroheptanoic acid (PFHpA)	1.8		0.25	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorooctanoic acid (PFOA)	1.0		0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorononanoic acid (PFNA)	0.93		0.25	0.045	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorodecanoic acid (PFDA)	3.1		0.25	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluoroundecanoic acid (PFUnA)	3.9		0.25	0.045	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorododecanoic acid (PFDoA)	1.3		0.25	0.083	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.063	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorotetradecanoic acid (PFTeA)	0.13	J	0.25	0.067	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25	0.031	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorohexanesulfonic acid (PFHxS)	0.53		0.25	0.039	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Perfluorooctanesulfonic acid (PFOS)	2.0		0.62	0.25	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.49	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.46	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.034	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.14	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 13:45	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	80		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C4 PFHpA	87		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C4 PFOA	91		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C5 PFNA	84		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C2 PFDA	85		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C2 PFUnA	91		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C2 PFDoA	79		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C2 PFTeA	68		25 - 150	10/24/19 07:25	11/09/19 13:45	1
18O2 PFHxS	86		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C4 PFOS	89		25 - 150	10/24/19 07:25	11/09/19 13:45	1
d3-NMeFOSAA	69		25 - 150	10/24/19 07:25	11/09/19 13:45	1
d5-NEtFOSAA	83		25 - 150	10/24/19 07:25	11/09/19 13:45	1
13C3 HFPO-DA	84		25 - 150	10/24/19 07:25	11/09/19 13:45	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-10

Lab Sample ID: 320-55422-28

Date Collected: 10/14/19 09:51

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.14	J	0.20	0.042	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluoroheptanoic acid (PFHpA)	0.099	J	0.20	0.029	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorooctanoic acid (PFOA)	0.35		0.20	0.085	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorononanoic acid (PFNA)	0.10	J	0.20	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorodecanoic acid (PFDA)	0.30		0.20	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluoroundecanoic acid (PFUnA)	0.29		0.20	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorododecanoic acid (PFDoA)	0.11	J	0.20	0.066	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.053	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorohexanesulfonic acid (PFHxS)	0.36		0.20	0.031	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Perfluorooctanesulfonic acid (PFOS)	1.5		0.50	0.20	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
11-Chloroeicosfluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:25	11/09/19 13:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C4 PFHpA	95		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C4 PFOA	93		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C5 PFNA	91		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C2 PFDA	92		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C2 PFUnA	90		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C2 PFDoA	83		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C2 PFTeDA	84		25 - 150	10/24/19 07:25	11/09/19 13:55	1
18O2 PFHxS	85		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C4 PFOS	85		25 - 150	10/24/19 07:25	11/09/19 13:55	1
d3-NMeFOSAA	71		25 - 150	10/24/19 07:25	11/09/19 13:55	1
d5-NEtFOSAA	75		25 - 150	10/24/19 07:25	11/09/19 13:55	1
13C3 HFPO-DA	88		25 - 150	10/24/19 07:25	11/09/19 13:55	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-11

Lab Sample ID: 320-55422-29

Date Collected: 10/14/19 09:59

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 89.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.079	J	0.22	0.046	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluoroheptanoic acid (PFHpA)	0.091	J	0.22	0.032	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorooctanoic acid (PFOA)	0.12	J	0.22	0.094	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorononanoic acid (PFNA)	0.050	J	0.22	0.039	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorodecanoic acid (PFDA)	0.077	J	0.22	0.024	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluoroundecanoic acid (PFUnA)	0.089	J	0.22	0.039	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.073	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorotridecanoic acid (PFTriA)	ND		0.22	0.056	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.059	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorohexanesulfonic acid (PFHxS)	0.31		0.22	0.034	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Perfluorooctanesulfonic acid (PFOS)	1.8		0.54	0.22	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.2	0.42	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.2	0.40	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.029	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.27	0.12	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.024	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.020	ug/Kg	☼	10/24/19 07:25	11/09/19 14:04	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	84		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C4 PFHpA	93		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C4 PFOA	92		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C5 PFNA	88		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C2 PFDA	90		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C2 PFUnA	90		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C2 PFDoA	83		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C2 PFTeDA	84		25 - 150				10/24/19 07:25	11/09/19 14:04	1
18O2 PFHxS	87		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C4 PFOS	82		25 - 150				10/24/19 07:25	11/09/19 14:04	1
d3-NMeFOSAA	79		25 - 150				10/24/19 07:25	11/09/19 14:04	1
d5-NEtFOSAA	76		25 - 150				10/24/19 07:25	11/09/19 14:04	1
13C3 HFPO-DA	82		25 - 150				10/24/19 07:25	11/09/19 14:04	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-12

Lab Sample ID: 320-55422-30

Date Collected: 10/14/19 10:07

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 74.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.23	J	0.25	0.053	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.25	0.037	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorooctanoic acid (PFOA)	0.29		0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorononanoic acid (PFNA)	0.079	J	0.25	0.045	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorodecanoic acid (PFDA)	0.099	J	0.25	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluoroundecanoic acid (PFUnA)	0.14	J	0.25	0.045	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorododecanoic acid (PFDoA)	ND		0.25	0.085	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.064	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorotetradecanoic acid (PFTeA)	0.082	J I	0.25	0.068	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25	0.032	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorohexanesulfonic acid (PFHxS)	0.79		0.25	0.039	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Perfluorooctanesulfonic acid (PFOS)	5.0		0.63	0.25	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.49	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.47	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.034	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.32	0.14	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 14:14	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	83		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C4 PFHpA	91		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C4 PFOA	88		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C5 PFNA	84		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C2 PFDA	85		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C2 PFUnA	85		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C2 PFDoA	83		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C2 PFTeDA	80		25 - 150	10/24/19 07:25	11/09/19 14:14	1
18O2 PFHxS	85		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C4 PFOS	83		25 - 150	10/24/19 07:25	11/09/19 14:14	1
d3-NMeFOSAA	84		25 - 150	10/24/19 07:25	11/09/19 14:14	1
d5-NEtFOSAA	86		25 - 150	10/24/19 07:25	11/09/19 14:14	1
13C3 HFPO-DA	87		25 - 150	10/24/19 07:25	11/09/19 14:14	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-13

Lab Sample ID: 320-55422-31

Date Collected: 10/14/19 10:13

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.5

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.32		0.25	0.052	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluoroheptanoic acid (PFHpA)	0.085	J	0.25	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorooctanoic acid (PFOA)	0.22	J	0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorononanoic acid (PFNA)	0.079	J	0.25	0.044	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorodecanoic acid (PFDA)	0.076	J	0.25	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluoroundecanoic acid (PFUnA)	ND		0.25	0.044	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorododecanoic acid (PFDoA)	ND		0.25	0.082	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.063	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25	0.066	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorobutanesulfonic acid (PFBS)	0.054	J	0.25	0.031	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorohexanesulfonic acid (PFHxS)	0.94		0.25	0.038	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Perfluorooctanesulfonic acid (PFOS)	6.8		0.62	0.25	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.48	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.46	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.033	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.14	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 14:24	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	85		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C4 PFHpA	93		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C4 PFOA	90		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C5 PFNA	85		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C2 PFDA	92		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C2 PFUnA	88		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C2 PFDoA	87		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C2 PFTeDA	83		25 - 150	10/24/19 07:25	11/09/19 14:24	1
18O2 PFHxS	85		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C4 PFOS	82		25 - 150	10/24/19 07:25	11/09/19 14:24	1
d3-NMeFOSAA	84		25 - 150	10/24/19 07:25	11/09/19 14:24	1
d5-NEtFOSAA	87		25 - 150	10/24/19 07:25	11/09/19 14:24	1
13C3 HFPO-DA	82		25 - 150	10/24/19 07:25	11/09/19 14:24	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-14

Lab Sample ID: 320-55422-32

Date Collected: 10/14/19 10:00

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 75.6

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.43		0.25	0.053	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.25	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorooctanoic acid (PFOA)	0.27		0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorononanoic acid (PFNA)	0.089	J	0.25	0.045	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorodecanoic acid (PFDA)	0.089	J	0.25	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluoroundecanoic acid (PFUnA)	ND		0.25	0.045	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorododecanoic acid (PFDoA)	ND		0.25	0.084	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.064	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25	0.068	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorobutanesulfonic acid (PFBS)	0.049	J	0.25	0.031	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorohexanesulfonic acid (PFHxS)	1.5		0.25	0.039	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Perfluorooctanesulfonic acid (PFOS)	9.2		0.63	0.25	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.49	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.46	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.034	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.14	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 14:33	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	87		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C4 PFHpA	90		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C4 PFOA	88		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C5 PFNA	82		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C2 PFDA	88		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C2 PFUnA	85		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C2 PFDoA	85		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C2 PFTeDA	83		25 - 150	10/24/19 07:25	11/09/19 14:33	1
18O2 PFHxS	82		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C4 PFOS	79		25 - 150	10/24/19 07:25	11/09/19 14:33	1
d3-NMeFOSAA	84		25 - 150	10/24/19 07:25	11/09/19 14:33	1
d5-NEtFOSAA	81		25 - 150	10/24/19 07:25	11/09/19 14:33	1
13C3 HFPO-DA	89		25 - 150	10/24/19 07:25	11/09/19 14:33	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-15

Lab Sample ID: 320-55422-33

Date Collected: 10/14/19 10:23

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.13	J	0.25	0.051	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluoroheptanoic acid (PFHpA)	0.087	J	0.25	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorooctanoic acid (PFOA)	0.13	J	0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorononanoic acid (PFNA)	0.047	J	0.25	0.044	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorodecanoic acid (PFDA)	ND		0.25	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluoroundecanoic acid (PFUnA)	0.055	J	0.25	0.044	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorododecanoic acid (PFDoA)	ND		0.25	0.082	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.063	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25	0.066	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25	0.031	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorohexanesulfonic acid (PFHxS)	0.38		0.25	0.038	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Perfluorooctanesulfonic acid (PFOS)	0.76		0.61	0.25	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.48	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.45	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.033	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.13	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 14:43	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	84		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C4 PFHpA	91		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C4 PFOA	91		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C5 PFNA	83		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C2 PFDA	88		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C2 PFUnA	90		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C2 PFDoA	87		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C2 PFTeDA	82		25 - 150	10/24/19 07:25	11/09/19 14:43	1
18O2 PFHxS	85		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C4 PFOS	82		25 - 150	10/24/19 07:25	11/09/19 14:43	1
d3-NMeFOSAA	84		25 - 150	10/24/19 07:25	11/09/19 14:43	1
d5-NEtFOSAA	87		25 - 150	10/24/19 07:25	11/09/19 14:43	1
13C3 HFPO-DA	92		25 - 150	10/24/19 07:25	11/09/19 14:43	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-16

Lab Sample ID: 320-55422-34

Date Collected: 10/14/19 10:29

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.5

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.094	J	0.25	0.052	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluoroheptanoic acid (PFHpA)	0.053	J	0.25	0.036	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorooctanoic acid (PFOA)	0.17	J	0.25	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorononanoic acid (PFNA)	ND		0.25	0.045	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorodecanoic acid (PFDA)	0.034	J	0.25	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluoroundecanoic acid (PFUnA)	ND		0.25	0.045	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorododecanoic acid (PFDoA)	ND		0.25	0.083	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.063	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25	0.067	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorobutanesulfonic acid (PFBS)	0.037	J	0.25	0.031	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorohexanesulfonic acid (PFHxS)	0.58		0.25	0.039	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Perfluorooctanesulfonic acid (PFOS)	2.5		0.62	0.25	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.48	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.46	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.034	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.14	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 14:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	91		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C4 PFHpA	97		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C4 PFOA	92		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C5 PFNA	88		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C2 PFDA	92		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C2 PFUnA	88		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C2 PFDoA	88		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C2 PFTeDA	90		25 - 150				10/24/19 07:25	11/09/19 14:53	1
18O2 PFHxS	89		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C4 PFOS	83		25 - 150				10/24/19 07:25	11/09/19 14:53	1
d3-NMeFOSAA	88		25 - 150				10/24/19 07:25	11/09/19 14:53	1
d5-NEtFOSAA	87		25 - 150				10/24/19 07:25	11/09/19 14:53	1
13C3 HFPO-DA	88		25 - 150				10/24/19 07:25	11/09/19 14:53	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-17

Lab Sample ID: 320-55422-35

Date Collected: 10/14/19 10:34

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 75.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.34		0.26	0.054	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluoroheptanoic acid (PFHpA)	0.074	J	0.26	0.037	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorooctanoic acid (PFOA)	0.34		0.26	0.11	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorononanoic acid (PFNA)	ND		0.26	0.046	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorodecanoic acid (PFDA)	0.062	J	0.26	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluoroundecanoic acid (PFUnA)	0.060	J	0.26	0.046	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorododecanoic acid (PFDoA)	ND		0.26	0.086	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorotridecanoic acid (PFTriA)	ND		0.26	0.065	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.26	0.069	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.26	0.032	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorohexanesulfonic acid (PFHxS)	0.86		0.26	0.040	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Perfluorooctanesulfonic acid (PFOS)	3.8		0.64	0.26	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.6	0.50	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.6	0.47	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.26	0.035	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.32	0.14	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.26	0.028	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.26	0.023	ug/Kg	☼	10/24/19 07:25	11/09/19 15:22	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	82		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C4 PFHpA	94		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C4 PFOA	87		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C5 PFNA	88		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C2 PFDA	87		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C2 PFUnA	85		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C2 PFDoA	85		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C2 PFTeDA	85		25 - 150	10/24/19 07:25	11/09/19 15:22	1
18O2 PFHxS	83		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C4 PFOS	83		25 - 150	10/24/19 07:25	11/09/19 15:22	1
d3-NMeFOSAA	91		25 - 150	10/24/19 07:25	11/09/19 15:22	1
d5-NEtFOSAA	88		25 - 150	10/24/19 07:25	11/09/19 15:22	1
13C3 HFPO-DA	89		25 - 150	10/24/19 07:25	11/09/19 15:22	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-18

Lab Sample ID: 320-55422-36

Date Collected: 10/14/19 10:20

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.38		0.24	0.050	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluoroheptanoic acid (PFHpA)	0.069	J	0.24	0.034	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorooctanoic acid (PFOA)	0.30		0.24	0.10	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorononanoic acid (PFNA)	ND		0.24	0.043	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorodecanoic acid (PFDA)	0.073	J	0.24	0.026	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluoroundecanoic acid (PFUnA)	0.061	J	0.24	0.043	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.080	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.061	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.064	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.030	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorohexanesulfonic acid (PFHxS)	0.78		0.24	0.037	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Perfluorooctanesulfonic acid (PFOS)	3.3		0.59	0.24	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.46	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.44	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.032	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.30	0.13	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.026	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.021	ug/Kg	☼	10/24/19 07:25	11/09/19 15:31	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	84		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C4 PFHpA	88		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C4 PFOA	91		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C5 PFNA	83		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C2 PFDA	90		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C2 PFUnA	85		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C2 PFDoA	85		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C2 PFTeDA	83		25 - 150	10/24/19 07:25	11/09/19 15:31	1
18O2 PFHxS	83		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C4 PFOS	82		25 - 150	10/24/19 07:25	11/09/19 15:31	1
d3-NMeFOSAA	87		25 - 150	10/24/19 07:25	11/09/19 15:31	1
d5-NEtFOSAA	83		25 - 150	10/24/19 07:25	11/09/19 15:31	1
13C3 HFPO-DA	87		25 - 150	10/24/19 07:25	11/09/19 15:31	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-19

Lab Sample ID: 320-55422-37

Date Collected: 10/14/19 10:46

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.6

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.27		0.24	0.051	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluoroheptanoic acid (PFHpA)	0.072	J	0.24	0.035	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorooctanoic acid (PFOA)	0.26		0.24	0.10	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorononanoic acid (PFNA)	0.044	J	0.24	0.044	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorodecanoic acid (PFDA)	0.073	J	0.24	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluoroundecanoic acid (PFUnA)	0.091	J	0.24	0.044	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.081	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.062	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.065	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorobutanesulfonic acid (PFBS)	0.055	J I	0.24	0.030	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorohexanesulfonic acid (PFHxS)	2.4		0.24	0.038	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Perfluorooctanesulfonic acid (PFOS)	3.2		0.61	0.24	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.47	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.45	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.033	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.30	0.13	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.027	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.022	ug/Kg	☼	10/24/19 07:25	11/09/19 15:41	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	69		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C4 PFHpA	77		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C4 PFOA	78		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C5 PFNA	74		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C2 PFDA	75		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C2 PFUnA	72		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C2 PFDoA	72		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C2 PFTeDA	73		25 - 150	10/24/19 07:25	11/09/19 15:41	1
18O2 PFHxS	72		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C4 PFOS	72		25 - 150	10/24/19 07:25	11/09/19 15:41	1
d3-NMeFOSAA	64		25 - 150	10/24/19 07:25	11/09/19 15:41	1
d5-NEtFOSAA	62		25 - 150	10/24/19 07:25	11/09/19 15:41	1
13C3 HFPO-DA	79		25 - 150	10/24/19 07:25	11/09/19 15:41	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-20

Lab Sample ID: 320-55422-38

Date Collected: 10/14/19 12:16

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.044	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.030	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.089	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.037	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.037	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.069	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.053	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.056	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.032	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.52	0.21	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.40	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.38	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/24/19 07:25	11/20/19 20:46	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	86		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C4 PFHpA	89		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C4 PFOA	94		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C5 PFNA	92		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C2 PFDA	100		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C2 PFUnA	96		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C2 PFDoA	100		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C2 PFTeDA	94		25 - 150	10/24/19 07:25	11/20/19 20:46	1
18O2 PFHxS	76		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C4 PFOS	82		25 - 150	10/24/19 07:25	11/20/19 20:46	1
d3-NMeFOSAA	98		25 - 150	10/24/19 07:25	11/20/19 20:46	1
d5-NEtFOSAA	107		25 - 150	10/24/19 07:25	11/20/19 20:46	1
13C3 HFPO-DA	78		25 - 150	10/24/19 07:25	11/20/19 20:46	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-21

Lab Sample ID: 320-55422-39

Date Collected: 10/14/19 12:28

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.057	J	0.20	0.042	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluoroheptanoic acid (PFHpA)	0.030	J	0.20	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.087	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.068	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorohexanesulfonic acid (PFHxS)	0.032	J cn	0.20	0.031	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Perfluorooctanesulfonic acid (PFOS)	0.84	B *	0.50	0.20	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND	F1	0.20	0.027	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:33	11/10/19 01:59	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	79		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C4 PFHpA	77		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C4 PFOA	86		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C5 PFNA	80		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C2 PFDA	79		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C2 PFUnA	69		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C2 PFDoA	68		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C2 PFTeDA	67		25 - 150	10/24/19 07:33	11/10/19 01:59	1
18O2 PFHxS	76		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C4 PFOS	75		25 - 150	10/24/19 07:33	11/10/19 01:59	1
d3-NMeFOSAA	27		25 - 150	10/24/19 07:33	11/10/19 01:59	1
d5-NEtFOSAA	26		25 - 150	10/24/19 07:33	11/10/19 01:59	1
13C3 HFPO-DA	85		25 - 150	10/24/19 07:33	11/10/19 01:59	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND	H	0.56	0.23	ug/Kg	☼	11/22/19 11:47	11/26/19 18:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	47		25 - 150	11/22/19 11:47	11/26/19 18:28	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-22

Lab Sample ID: 320-55422-40

Date Collected: 10/14/19 12:35

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.059	J cn	0.20	0.043	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluoroheptanoic acid (PFHpA)	0.034	J	0.20	0.030	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.088	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.037	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.037	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.069	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.052	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.055	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorobutanesulfonic acid (PFBS)	0.033	J	0.20	0.026	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorohexanesulfonic acid (PFHxS)	0.033	J	0.20	0.032	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Perfluorooctanesulfonic acid (PFOS)	0.56	B *	0.51	0.20	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.40	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.38	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.028	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:33	11/10/19 02:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	89		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C4 PFHpA	92		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C4 PFOA	94		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C5 PFNA	90		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C2 PFDA	85		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C2 PFUnA	77		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C2 PFDoA	65		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C2 PFTeDA	54		25 - 150	10/24/19 07:33	11/10/19 02:28	1
18O2 PFHxS	85		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C4 PFOS	83		25 - 150	10/24/19 07:33	11/10/19 02:28	1
d3-NMeFOSAA	32		25 - 150	10/24/19 07:33	11/10/19 02:28	1
d5-NEtFOSAA	30		25 - 150	10/24/19 07:33	11/10/19 02:28	1
13C3 HFPO-DA	102		25 - 150	10/24/19 07:33	11/10/19 02:28	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.25	J H B	0.53	0.21	ug/Kg	☼	11/22/19 11:47	11/26/19 18:58	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	54		25 - 150	11/22/19 11:47	11/26/19 18:58	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-23

Lab Sample ID: 320-55422-41

Date Collected: 10/14/19 12:00

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.051	J	0.20	0.042	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorobutanesulfonic acid (PFBS)	0.035	J cn	0.20	0.025	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Perfluorooctanesulfonic acid (PFOS)	0.50	B *	0.50	0.20	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
11-Chloroeicosadecafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:33	11/10/19 02:38	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	82		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C4 PFHpA	86		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C4 PFOA	87		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C5 PFNA	84		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C2 PFDA	86		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C2 PFUnA	77		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C2 PFDoA	78		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C2 PFTeDA	75		25 - 150	10/24/19 07:33	11/10/19 02:38	1
18O2 PFHxS	80		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C4 PFOS	80		25 - 150	10/24/19 07:33	11/10/19 02:38	1
d3-NMeFOSAA	52		25 - 150	10/24/19 07:33	11/10/19 02:38	1
d5-NEtFOSAA	46		25 - 150	10/24/19 07:33	11/10/19 02:38	1
13C3 HFPO-DA	93		25 - 150	10/24/19 07:33	11/10/19 02:38	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND	H	0.55	0.22	ug/Kg	☼	11/22/19 11:47	11/26/19 19:08	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	64		25 - 150	11/22/19 11:47	11/26/19 19:08	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-24

Lab Sample ID: 320-55422-42

Date Collected: 10/14/19 12:49

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 82.7

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.23	0.048	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.033	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorooctanoic acid (PFOA)	ND		0.23	0.098	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorononanoic acid (PFNA)	ND		0.23	0.041	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorodecanoic acid (PFDA)	ND		0.23	0.025	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23	0.041	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.077	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.058	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.062	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.035	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Perfluorooctanesulfonic acid (PFOS)	0.49	J B *	0.57	0.23	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.3	0.45	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.3	0.42	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.031	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.29	0.13	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.025	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.021	ug/Kg	☼	10/24/19 07:33	11/10/19 02:47	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	83		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C4 PFHpA	87		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C4 PFOA	89		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C5 PFNA	81		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C2 PFDA	87		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C2 PFUnA	79		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C2 PFDoA	71		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C2 PFTeDA	64		25 - 150	10/24/19 07:33	11/10/19 02:47	1
18O2 PFHxS	81		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C4 PFOS	82		25 - 150	10/24/19 07:33	11/10/19 02:47	1
d3-NMeFOSAA	57		25 - 150	10/24/19 07:33	11/10/19 02:47	1
d5-NEtFOSAA	57		25 - 150	10/24/19 07:33	11/10/19 02:47	1
13C3 HFPO-DA	85		25 - 150	10/24/19 07:33	11/10/19 02:47	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.47	J H B	0.57	0.23	ug/Kg	☼	11/22/19 11:47	11/26/19 19:18	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	76		25 - 150	11/22/19 11:47	11/26/19 19:18	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-25

Lab Sample ID: 320-55422-43

Date Collected: 10/14/19 12:59

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.085	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorobutanesulfonic acid (PFBS)	0.027	J	0.20	0.025	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Perfluorooctanesulfonic acid (PFOS)	0.51	B *	0.50	0.20	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:33	11/10/19 02:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	89		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C4 PFHpA	94		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C4 PFOA	92		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C5 PFNA	93		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C2 PFDA	84		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C2 PFUnA	80		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C2 PFDoA	77		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C2 PFTeDA	75		25 - 150	10/24/19 07:33	11/10/19 02:57	1
18O2 PFHxS	88		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C4 PFOS	80		25 - 150	10/24/19 07:33	11/10/19 02:57	1
d3-NMeFOSAA	52		25 - 150	10/24/19 07:33	11/10/19 02:57	1
d5-NEtFOSAA	54		25 - 150	10/24/19 07:33	11/10/19 02:57	1
13C3 HFPO-DA	99		25 - 150	10/24/19 07:33	11/10/19 02:57	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.56	H B	0.53	0.21	ug/Kg	☼	11/22/19 11:47	11/26/19 19:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	39		25 - 150	11/22/19 11:47	11/26/19 19:28	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-26

Lab Sample ID: 320-55422-44

Date Collected: 10/14/19 13:06

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.5

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.044	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.030	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.090	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.038	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.038	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.070	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.053	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.057	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorohexanesulfonic acid (PFHxS)	0.046	J	0.21	0.032	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Perfluorooctanesulfonic acid (PFOS)	0.87	B *	0.52	0.21	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.41	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.39	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.12	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/24/19 07:33	11/10/19 03:07	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	76		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C4 PFHpA	81		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C4 PFOA	82		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C5 PFNA	82		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C2 PFDA	84		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C2 PFUnA	78		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C2 PFDoA	68		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C2 PFTeDA	59		25 - 150	10/24/19 07:33	11/10/19 03:07	1
18O2 PFHxS	77		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C4 PFOS	81		25 - 150	10/24/19 07:33	11/10/19 03:07	1
d3-NMeFOSAA	42		25 - 150	10/24/19 07:33	11/10/19 03:07	1
d5-NEtFOSAA	44		25 - 150	10/24/19 07:33	11/10/19 03:07	1
13C3 HFPO-DA	81		25 - 150	10/24/19 07:33	11/10/19 03:07	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND	H	0.50	0.20	ug/Kg	☼	11/22/19 11:47	11/26/19 19:38	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	77		25 - 150	11/22/19 11:47	11/26/19 19:38	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-27

Lab Sample ID: 320-55422-45

Date Collected: 10/14/19 13:18

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 95.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluoroundecanoic acid (PFUnA)	0.036	J	0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorohexanesulfonic acid (PFHxS)	0.034	J	0.20	0.031	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Perfluorooctanesulfonic acid (PFOS)	0.44	J B *	0.50	0.20	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:33	11/10/19 03:36	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	82		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C4 PFHpA	86		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C4 PFOA	87		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C5 PFNA	80		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C2 PFDA	81		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C2 PFUnA	70		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C2 PFDoA	69		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C2 PFTeDA	67		25 - 150	10/24/19 07:33	11/10/19 03:36	1
18O2 PFHxS	81		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C4 PFOS	72		25 - 150	10/24/19 07:33	11/10/19 03:36	1
d3-NMeFOSAA	50		25 - 150	10/24/19 07:33	11/10/19 03:36	1
d5-NEtFOSAA	50		25 - 150	10/24/19 07:33	11/10/19 03:36	1
13C3 HFPO-DA	89		25 - 150	10/24/19 07:33	11/10/19 03:36	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.28	J H B	0.51	0.20	ug/Kg	☼	11/22/19 11:47	11/26/19 20:09	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	70		25 - 150	11/22/19 11:47	11/26/19 20:09	1

Eurolins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-28

Lab Sample ID: 320-55422-46

Date Collected: 10/14/19 13:26

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Perfluorooctanesulfonic acid (PFOS)	0.25	J B *	0.50	0.20	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/24/19 07:33	11/10/19 03:45	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	89		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C4 PFHpA	95		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C4 PFOA	93		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C5 PFNA	87		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C2 PFDA	83		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C2 PFUnA	77		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C2 PFDoA	70		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C2 PFTeDA	58		25 - 150	10/24/19 07:33	11/10/19 03:45	1
18O2 PFHxS	88		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C4 PFOS	77		25 - 150	10/24/19 07:33	11/10/19 03:45	1
d3-NMeFOSAA	54		25 - 150	10/24/19 07:33	11/10/19 03:45	1
d5-NEtFOSAA	53		25 - 150	10/24/19 07:33	11/10/19 03:45	1
13C3 HFPO-DA	92		25 - 150	10/24/19 07:33	11/10/19 03:45	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-10

Lab Sample ID: 320-55422-47

Date Collected: 10/14/19 13:50

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 70.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.26	0.055	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluoroheptanoic acid (PFHpA)	ND		0.26	0.038	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorooctanoic acid (PFOA)	ND		0.26	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorononanoic acid (PFNA)	ND		0.26	0.047	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorodecanoic acid (PFDA)	ND		0.26	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluoroundecanoic acid (PFUnA)	ND		0.26	0.047	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorododecanoic acid (PFDoA)	ND		0.26	0.088	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorotridecanoic acid (PFTriA)	ND		0.26	0.067	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.26	0.071	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorobutanesulfonic acid (PFBS)	0.036	J cn	0.26	0.033	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorohexanesulfonic acid (PFHxS)	0.15	J	0.26	0.041	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Perfluorooctanesulfonic acid (PFOS)	1.6	B *	0.66	0.26	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.6	0.51	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.6	0.49	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.26	0.035	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.33	0.14	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.26	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.26	0.024	ug/Kg	☼	10/24/19 07:33	11/10/19 03:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C4 PFHpA	95		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C4 PFOA	95		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C5 PFNA	92		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C2 PFDA	100		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C2 PFUnA	95		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C2 PFDoA	90		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C2 PFTeDA	76		25 - 150	10/24/19 07:33	11/10/19 03:55	1
18O2 PFHxS	91		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C4 PFOS	94		25 - 150	10/24/19 07:33	11/10/19 03:55	1
d3-NMeFOSAA	81		25 - 150	10/24/19 07:33	11/10/19 03:55	1
d5-NEtFOSAA	93		25 - 150	10/24/19 07:33	11/10/19 03:55	1
13C3 HFPO-DA	102		25 - 150	10/24/19 07:33	11/10/19 03:55	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	2.5	H B	0.70	0.28	ug/Kg	☼	11/22/19 11:47	11/26/19 20:19	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	79		25 - 150	11/22/19 11:47	11/26/19 20:19	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-11

Lab Sample ID: 320-55422-48

Date Collected: 10/14/19 13:40

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 78.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.059	J	0.23	0.049	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.034	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorooctanoic acid (PFOA)	ND		0.23	0.10	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorononanoic acid (PFNA)	ND		0.23	0.042	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorodecanoic acid (PFDA)	ND		0.23	0.026	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23	0.042	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.079	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.060	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.063	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.029	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorohexanesulfonic acid (PFHxS)	0.12	J	0.23	0.036	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Perfluorooctanesulfonic acid (PFOS)	1.5	B *	0.59	0.23	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.3	0.46	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.3	0.43	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.032	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.29	0.13	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.026	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.021	ug/Kg	☼	10/24/19 07:33	11/10/19 04:05	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	85		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C4 PFHpA	96		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C4 PFOA	95		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C5 PFNA	93		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C2 PFDA	98		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C2 PFUnA	91		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C2 PFDoA	93		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C2 PFTeDA	88		25 - 150	10/24/19 07:33	11/10/19 04:05	1
18O2 PFHxS	87		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C4 PFOS	89		25 - 150	10/24/19 07:33	11/10/19 04:05	1
d3-NMeFOSAA	73		25 - 150	10/24/19 07:33	11/10/19 04:05	1
d5-NEtFOSAA	83		25 - 150	10/24/19 07:33	11/10/19 04:05	1
13C3 HFPO-DA	93		25 - 150	10/24/19 07:33	11/10/19 04:05	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	2.4	H B	0.66	0.26	ug/Kg	☼	11/22/19 11:47	11/26/19 20:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	89		25 - 150	11/22/19 11:47	11/26/19 20:28	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: Culvert 1

Lab Sample ID: 320-55422-49

Date Collected: 10/14/19 14:40

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 60.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	23		1.5	0.32	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluoroheptanoic acid (PFHpA)	1.8		1.5	0.22	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorooctanoic acid (PFOA)	3.9		1.5	0.66	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorononanoic acid (PFNA)	ND		1.5	0.27	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorodecanoic acid (PFDA)	0.43	J	1.5	0.17	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluoroundecanoic acid (PFUnA)	ND		1.5	0.27	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorododecanoic acid (PFDoA)	0.91	J	1.5	0.51	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorotridecanoic acid (PFTriA)	0.57	J	1.5	0.39	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorotetradecanoic acid (PFTeA)	1.6		1.5	0.41	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorobutanesulfonic acid (PFBS)	12		1.5	0.19	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorohexanesulfonic acid (PFHxS)	53		1.5	0.24	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Perfluorooctanesulfonic acid (PFOS)	520	E B *	3.8	1.5	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	ND		15	3.0	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	ND		15	2.8	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.5	0.21	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		1.9	0.84	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
11-Chloroeicosadecafluoro-3-oxaundecane-1-sulfonic acid	ND		1.5	0.17	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.5	0.14	ug/Kg	☼	10/24/19 07:33	11/20/19 17:33	5

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C4 PFHpA	71		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C4 PFOA	80		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C5 PFNA	75		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C2 PFDA	78		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C2 PFUnA	81		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C2 PFDoA	66		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C2 PFTeDA	25		25 - 150	10/24/19 07:33	11/20/19 17:33	5
18O2 PFHxS	82		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C4 PFOS	81		25 - 150	10/24/19 07:33	11/20/19 17:33	5
d3-NMeFOSAA	73		25 - 150	10/24/19 07:33	11/20/19 17:33	5
d5-NEtFOSAA	80		25 - 150	10/24/19 07:33	11/20/19 17:33	5
13C3 HFPO-DA	40		25 - 150	10/24/19 07:33	11/20/19 17:33	5

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	390	H E B	0.87	0.35	ug/Kg	☼	11/22/19 11:47	11/26/19 22:39	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	71		25 - 150	11/22/19 11:47	11/26/19 22:39	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-30

Lab Sample ID: 320-55422-50

Date Collected: 10/14/19 14:50

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 53.6

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	23		0.34	0.072	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluoroheptanoic acid (PFHpA)	1.4		0.34	0.050	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorooctanoic acid (PFOA)	2.2		0.34	0.15	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorononanoic acid (PFNA)	0.48		0.34	0.062	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorodecanoic acid (PFDA)	0.90		0.34	0.038	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluoroundecanoic acid (PFUnA)	1.7		0.34	0.062	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorododecanoic acid (PFDoA)	1.5		0.34	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorotridecanoic acid (PFTriA)	0.86		0.34	0.087	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorotetradecanoic acid (PFTeA)	3.0		0.34	0.092	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorobutanesulfonic acid (PFBS)	2.7		0.34	0.043	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorohexanesulfonic acid (PFHxS)	17		0.34	0.053	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Perfluorooctanesulfonic acid (PFOS)	130	E B *	0.86	0.34	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		3.4	0.67	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		3.4	0.63	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.34	0.046	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.43	0.19	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
11-Chloroeicosadecafluoro-3-oxaundecane-1-sulfonic acid	ND		0.34	0.038	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.34	0.031	ug/Kg	☼	10/24/19 07:33	11/10/19 04:24	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	84		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C4 PFHpA	95		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C4 PFOA	91		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C5 PFNA	88		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C2 PFDA	87		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C2 PFUnA	78		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C2 PFDoA	69		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C2 PFTeDA	38		25 - 150	10/24/19 07:33	11/10/19 04:24	1
18O2 PFHxS	118		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C4 PFOS	121		25 - 150	10/24/19 07:33	11/10/19 04:24	1
d3-NMeFOSAA	43		25 - 150	10/24/19 07:33	11/10/19 04:24	1
d5-NEtFOSAA	40		25 - 150	10/24/19 07:33	11/10/19 04:24	1
13C3 HFPO-DA	84		25 - 150	10/24/19 07:33	11/10/19 04:24	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	120	H E B	0.96	0.38	ug/Kg	☼	11/22/19 11:47	11/26/19 20:38	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	67		25 - 150	11/22/19 11:47	11/26/19 20:38	1
13C4 PFHpA	75		25 - 150	11/22/19 11:47	11/26/19 20:38	1

Eurolins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-30

Lab Sample ID: 320-55422-50

Date Collected: 10/14/19 14:50

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 53.6

Method: 537 (modified) - Fluorinated Alkyl Substances - RE (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4 PFOA	70		25 - 150	11/22/19 11:47	11/26/19 20:38	1
13C5 PFNA	67		25 - 150	11/22/19 11:47	11/26/19 20:38	1
13C2 PFDA	64		25 - 150	11/22/19 11:47	11/26/19 20:38	1
13C2 PFUnA	63		25 - 150	11/22/19 11:47	11/26/19 20:38	1
13C2 PFDoA	59		25 - 150	11/22/19 11:47	11/26/19 20:38	1
13C2 PFTeDA	39		25 - 150	11/22/19 11:47	11/26/19 20:38	1
18O2 PFHxS	99		25 - 150	11/22/19 11:47	11/26/19 20:38	1
13C4 PFOS	92		25 - 150	11/22/19 11:47	11/26/19 20:38	1
d3-NMeFOSAA	37		25 - 150	11/22/19 11:47	11/26/19 20:38	1
d5-NEFOSAA	37		25 - 150	11/22/19 11:47	11/26/19 20:38	1
13C3 HFPO-DA	74		25 - 150	11/22/19 11:47	11/26/19 20:38	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-29

Lab Sample ID: 320-55422-51

Date Collected: 10/14/19 14:47

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	3.3		0.24	0.051	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluoroheptanoic acid (PFHpA)	0.61		0.24	0.035	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorooctanoic acid (PFOA)	1.4		0.24	0.10	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorononanoic acid (PFNA)	ND		0.24	0.044	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorodecanoic acid (PFDA)	0.10	J	0.24	0.027	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluoroundecanoic acid (PFUnA)	0.19	J	0.24	0.044	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorododecanoic acid (PFDoA)	0.15	J	0.24	0.082	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorotridecanoic acid (PFTriA)	0.098	J	0.24	0.062	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorotetradecanoic acid (PFTeA)	0.16	J	0.24	0.066	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorobutanesulfonic acid (PFBS)	2.8		0.24	0.031	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorohexanesulfonic acid (PFHxS)	17		0.24	0.038	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Perfluorooctanesulfonic acid (PFOS)	100	E B *	0.61	0.24	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.48	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.45	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.033	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.13	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.027	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.022	ug/Kg	☼	10/24/19 07:33	11/10/19 04:33	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	94		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C4 PFHpA	97		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C4 PFOA	97		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C5 PFNA	88		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C2 PFDA	97		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C2 PFUnA	91		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C2 PFDoA	88		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C2 PFTeDA	52		25 - 150	10/24/19 07:33	11/10/19 04:33	1
18O2 PFHxS	111		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C4 PFOS	113		25 - 150	10/24/19 07:33	11/10/19 04:33	1
d3-NMeFOSAA	46		25 - 150	10/24/19 07:33	11/10/19 04:33	1
d5-NEtFOSAA	48		25 - 150	10/24/19 07:33	11/10/19 04:33	1
13C3 HFPO-DA	96		25 - 150	10/24/19 07:33	11/10/19 04:33	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	85	H E B	0.64	0.26	ug/Kg	☼	11/22/19 11:47	11/26/19 22:49	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	66		25 - 150	11/22/19 11:47	11/26/19 22:49	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: Culvert 3

Lab Sample ID: 320-55422-52

Date Collected: 10/14/19 15:10

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 61.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	1.5		0.31	0.066	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluoroheptanoic acid (PFHpA)	0.41		0.31	0.045	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorooctanoic acid (PFOA)	1.5		0.31	0.13	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorononanoic acid (PFNA)	0.24	J	0.31	0.056	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorodecanoic acid (PFDA)	0.43		0.31	0.034	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluoroundecanoic acid (PFUnA)	0.59		0.31	0.056	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorododecanoic acid (PFDoA)	0.39		0.31	0.10	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorotridecanoic acid (PFTriA)	0.33		0.31	0.080	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorotetradecanoic acid (PFTeA)	0.49		0.31	0.084	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorobutanesulfonic acid (PFBS)	0.60		0.31	0.039	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorohexanesulfonic acid (PFHxS)	5.8		0.31	0.048	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Perfluorooctanesulfonic acid (PFOS)	63	E B *	0.78	0.31	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		3.1	0.61	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		3.1	0.58	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.31	0.042	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.39	0.17	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.31	0.034	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.31	0.028	ug/Kg	☼	10/24/19 07:33	11/21/19 23:37	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	53		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C4 PFHpA	89		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C4 PFOA	94		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C5 PFNA	82		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C2 PFDA	78		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C2 PFUnA	74		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C2 PFDoA	68		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C2 PFTeDA	30		25 - 150	10/24/19 07:33	11/21/19 23:37	1
18O2 PFHxS	137		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C4 PFOS	136		25 - 150	10/24/19 07:33	11/21/19 23:37	1
d3-NMeFOSAA	58		25 - 150	10/24/19 07:33	11/21/19 23:37	1
d5-NEtFOSAA	54		25 - 150	10/24/19 07:33	11/21/19 23:37	1
13C3 HFPO-DA	21	*	25 - 150	10/24/19 07:33	11/21/19 23:37	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	2.7	H	0.34	0.071	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluoroheptanoic acid (PFHpA)	0.68	H	0.34	0.049	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorooctanoic acid (PFOA)	1.4	H	0.34	0.14	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorononanoic acid (PFNA)	0.21	J H	0.34	0.061	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorodecanoic acid (PFDA)	0.48	H	0.34	0.037	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: Culvert 3

Lab Sample ID: 320-55422-52

Date Collected: 10/14/19 15:10

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 61.9

Method: 537 (modified) - Fluorinated Alkyl Substances - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	0.55	H I	0.34	0.061	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorododecanoic acid (PFDoA)	0.54	H	0.34	0.11	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorotridecanoic acid (PFTriA)	0.25	J H	0.34	0.086	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorotetradecanoic acid (PFTeA)	0.51	H	0.34	0.091	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorobutanesulfonic acid (PFBS)	0.50	H	0.34	0.042	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorohexanesulfonic acid (PFHxS)	7.7	H	0.34	0.052	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Perfluorooctanesulfonic acid (PFOS)	71	H E B	0.84	0.34	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	3.4	0.66	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	3.4	0.62	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND	H	0.34	0.045	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	0.42	0.19	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND	H	0.34	0.037	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	0.34	0.030	ug/Kg	☼	11/22/19 11:47	11/26/19 22:59	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	38		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C4 PFHpA	44		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C4 PFOA	44		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C5 PFNA	41		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C2 PFDA	38		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C2 PFUnA	39		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C2 PFDoA	38		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C2 PFTeDA	20 *		25 - 150				11/22/19 11:47	11/26/19 22:59	1
18O2 PFHxS	65		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C4 PFOS	57		25 - 150				11/22/19 11:47	11/26/19 22:59	1
d3-NMeFOSAA	27		25 - 150				11/22/19 11:47	11/26/19 22:59	1
d5-NEtFOSAA	27		25 - 150				11/22/19 11:47	11/26/19 22:59	1
13C3 HFPO-DA	42		25 - 150				11/22/19 11:47	11/26/19 22:59	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-31

Lab Sample ID: 320-55422-53

Date Collected: 10/14/19 15:12

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 60.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	6.5		0.31	0.065	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluoroheptanoic acid (PFHpA)	1.6		0.31	0.045	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorooctanoic acid (PFOA)	4.5		0.31	0.13	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorononanoic acid (PFNA)	0.72		0.31	0.056	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorodecanoic acid (PFDA)	1.6		0.31	0.034	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluoroundecanoic acid (PFUnA)	1.6		0.31	0.056	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorododecanoic acid (PFDoA)	2.0		0.31	0.10	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorotridecanoic acid (PFTriA)	1.1		0.31	0.079	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorotetradecanoic acid (PFTeA)	1.9		0.31	0.083	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorobutanesulfonic acid (PFBS)	1.7		0.31	0.039	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorohexanesulfonic acid (PFHxS)	12		0.31	0.048	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Perfluorooctanesulfonic acid (PFOS)	160	E B *	0.77	0.31	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.3	J	3.1	0.60	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		3.1	0.57	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.31	0.042	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.39	0.17	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.31	0.034	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.31	0.028	ug/Kg	☼	10/24/19 07:33	11/21/19 23:47	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	82		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C4 PFHpA	97		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C4 PFOA	94		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C5 PFNA	90		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C2 PFDA	81		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C2 PFUnA	75		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C2 PFDoA	67		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C2 PFTeDA	39		25 - 150	10/24/19 07:33	11/21/19 23:47	1
18O2 PFHxS	147		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C4 PFOS	131		25 - 150	10/24/19 07:33	11/21/19 23:47	1
d3-NMeFOSAA	52		25 - 150	10/24/19 07:33	11/21/19 23:47	1
d5-NEtFOSAA	48		25 - 150	10/24/19 07:33	11/21/19 23:47	1
13C3 HFPO-DA	37		25 - 150	10/24/19 07:33	11/21/19 23:47	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	5.3	H	1.7	0.36	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluoroheptanoic acid (PFHpA)	1.4	J H	1.7	0.25	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorooctanoic acid (PFOA)	3.9	H	1.7	0.74	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorononanoic acid (PFNA)	0.45	J H	1.7	0.31	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorodecanoic acid (PFDA)	1.4	J H	1.7	0.19	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-31

Lab Sample ID: 320-55422-53

Date Collected: 10/14/19 15:12

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 60.4

Method: 537 (modified) - Fluorinated Alkyl Substances - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	1.2	J H	1.7	0.31	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorododecanoic acid (PFDoA)	1.3	J H	1.7	0.58	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorotridecanoic acid (PFTriA)	0.77	J H	1.7	0.44	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorotetradecanoic acid (PFTeA)	1.1	J H	1.7	0.46	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorobutanesulfonic acid (PFBS)	1.3	J H	1.7	0.22	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorohexanesulfonic acid (PFHxS)	11	H	1.7	0.27	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Perfluorooctanesulfonic acid (PFOS)	130	H E B	4.3	1.7	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	17	3.4	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	17	3.2	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND	H	1.7	0.23	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	2.2	0.95	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND	H	1.7	0.19	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	1.7	0.15	ug/Kg	☼	11/22/19 11:47	11/26/19 22:19	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	65		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C4 PFHpA	69		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C4 PFOA	69		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C5 PFNA	68		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C2 PFDA	65		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C2 PFUnA	67		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C2 PFDoA	67		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C2 PFTeDA	35		25 - 150				11/22/19 11:47	11/26/19 22:19	5
18O2 PFHxS	79		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C4 PFOS	72		25 - 150				11/22/19 11:47	11/26/19 22:19	5
d3-NMeFOSAA	50		25 - 150				11/22/19 11:47	11/26/19 22:19	5
d5-NEtFOSAA	56		25 - 150				11/22/19 11:47	11/26/19 22:19	5
13C3 HFPO-DA	75		25 - 150				11/22/19 11:47	11/26/19 22:19	5

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: Culvert 2

Lab Sample ID: 320-55422-54

Date Collected: 10/14/19 14:55

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 66.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	3.2		0.30	0.062	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluoroheptanoic acid (PFHpA)	ND		0.30	0.043	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorooctanoic acid (PFOA)	0.87		0.30	0.13	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorononanoic acid (PFNA)	ND		0.30	0.053	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorodecanoic acid (PFDA)	ND		0.30	0.032	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluoroundecanoic acid (PFUnA)	ND		0.30	0.053	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorododecanoic acid (PFDoA)	0.54		0.30	0.099	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorotridecanoic acid (PFTriA)	0.43 I		0.30	0.075	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorotetradecanoic acid (PFTeA)	0.79		0.30	0.080	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.30	0.037	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorohexanesulfonic acid (PFHxS)	5.7		0.30	0.046	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Perfluorooctanesulfonic acid (PFOS)	69 E B *		0.74	0.30	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		3.0	0.58	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		3.0	0.55	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.30	0.040	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.37	0.16	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.30	0.032	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.30	0.027	ug/Kg	☼	10/24/19 07:33	11/21/19 23:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	60		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C4 PFHpA	88		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C4 PFOA	93		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C5 PFNA	81		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C2 PFDA	78		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C2 PFUnA	65		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C2 PFDoA	56		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C2 PFTeDA	24 *		25 - 150	10/24/19 07:33	11/21/19 23:57	1
18O2 PFHxS	119		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C4 PFOS	100		25 - 150	10/24/19 07:33	11/21/19 23:57	1
d3-NMeFOSAA	51		25 - 150	10/24/19 07:33	11/21/19 23:57	1
d5-NEtFOSAA	51		25 - 150	10/24/19 07:33	11/21/19 23:57	1
13C3 HFPO-DA	26		25 - 150	10/24/19 07:33	11/21/19 23:57	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	48	H E B	0.76	0.30	ug/Kg	☼	11/22/19 11:47	11/26/19 23:19	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	79		25 - 150	11/22/19 11:47	11/26/19 23:19	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-29

Lab Sample ID: 320-55422-55

Date Collected: 10/14/19 13:38

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.6

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.044	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.030	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.090	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.038	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.038	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.070	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.053	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.056	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorohexanesulfonic acid (PFHxS)	0.045	J	0.21	0.032	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Perfluorooctanesulfonic acid (PFOS)	0.75	B *	0.52	0.21	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.41	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.39	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/24/19 07:33	11/10/19 05:31	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C4 PFHpA	96		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C4 PFOA	93		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C5 PFNA	90		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C2 PFDA	93		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C2 PFUnA	90		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C2 PFDoA	79		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C2 PFTeDA	66		25 - 150	10/24/19 07:33	11/10/19 05:31	1
18O2 PFHxS	90		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C4 PFOS	86		25 - 150	10/24/19 07:33	11/10/19 05:31	1
d3-NMeFOSAA	47		25 - 150	10/24/19 07:33	11/10/19 05:31	1
d5-NEtFOSAA	50		25 - 150	10/24/19 07:33	11/10/19 05:31	1
13C3 HFPO-DA	89		25 - 150	10/24/19 07:33	11/10/19 05:31	1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.38	J H B	0.49	0.20	ug/Kg	☼	11/22/19 11:47	11/26/19 20:49	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	54		25 - 150	11/22/19 11:47	11/26/19 20:49	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)
320-55422-1	SW-19-01	88	85	91	73	96	76	63	74
320-55422-1 MS	SW-19-01	82	88	88	85	89	104	67	70
320-55422-1 MSD	SW-19-01	88	93	102	93	100	90	89	90
320-55422-2	SW-19-02	106	102	103	94	114	104	88	110
320-55422-3	SW-19-03	89	98	105	100	87	98	77	29
320-55422-4	SW-19-04	78	79	94	86	88	85	77	77
320-55422-5	SW-19-06	95	86	114	89	101	108	83	89
320-55422-6	SW-19-07	84	103	100	91	84	93	71	74
320-55422-7	SW-19-08	90	94	99	89	96	80	75	61
320-55422-8	SW-19-09	90	104	105	102	94	89	67	87
320-55422-9	SB-11-1	83	89	100	103	101	85	77	57
320-55422-10	SB-11-3.5	95	90	95	94	95	90	74	77
320-55422-11	SB-11-12	85	105	109	91	92	92	79	91
320-55422-12	SB-11-19	89	87	101	94	81	72	85	96
320-55422-13	SB-12-0	66	78	73	74	70	67	63	52
320-55422-14	SB-112-0	76	100	99	92	82	66	50	39
320-55422-15	SB-12-1.5	97	101	106	116	121	96	87	94
320-55422-16	SB-12-7	106	108	106	108	108	117	99	113
320-55422-17	SB-12-13	94	92	93	87	98	93	76	95
320-55422-18	SB-12-17	103	114	107	106	111	106	98	103
320-55422-19	SS-19-01	100	103	105	102	96	104	87	52
320-55422-20	SS-19-02	88	94	90	75	81	62	67	47
320-55422-21	SS-19-03	82	86	85	78	81	81	79	82
320-55422-21 MS	SS-19-03	88	93	92	85	90	88	86	88
320-55422-21 MSD	SS-19-03	90	92	91	88	90	90	85	91
320-55422-22	SS-19-04	88	91	91	86	88	85	79	70
320-55422-23	SS-19-05	91	92	88	79	78	79	66	61
320-55422-24	SS-19-06	87	90	90	82	84	81	75	68
320-55422-25	SS-19-07	80	87	86	79	87	77	76	72
320-55422-26	SS-19-08	69	72	72	67	71	67	70	75
320-55422-27	SS-19-09	80	87	91	84	85	91	79	68
320-55422-28	SS-19-10	88	95	93	91	92	90	83	84
320-55422-29	SS-19-11	84	93	92	88	90	90	83	84
320-55422-30	SS-19-12	83	91	88	84	85	85	83	80
320-55422-31	SS-19-13	85	93	90	85	92	88	87	83
320-55422-32	SS-19-14	87	90	88	82	88	85	85	83
320-55422-33	SS-19-15	84	91	91	83	88	90	87	82
320-55422-34	SS-19-16	91	97	92	88	92	88	88	90
320-55422-35	SS-19-17	82	94	87	88	87	85	85	85
320-55422-36	SS-19-18	84	88	91	83	90	85	85	83
320-55422-37	SS-19-19	69	77	78	74	75	72	72	73
320-55422-38	SS-19-20	86	89	94	92	100	96	100	94
320-55422-39	SS-19-21	79	77	86	80	79	69	68	67
320-55422-39 - RE	SS-19-21								
320-55422-39 MS	SS-19-21	84	88	91	84	86	78	72	68
320-55422-39 MS - RE	SS-19-21								
320-55422-39 MSD	SS-19-21	88	90	91	86	85	75	69	59
320-55422-39 MSD - RE	SS-19-21								
320-55422-40	SS-19-22	89	92	94	90	85	77	65	54

Eurofins TestAmerica, Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)
320-55422-40 - RE	SS-19-22								
320-55422-41	SS-19-23	82	86	87	84	86	77	78	75
320-55422-41 - RE	SS-19-23								
320-55422-42	SS-19-24	83	87	89	81	87	79	71	64
320-55422-42 - RE	SS-19-24								
320-55422-43	SS-19-25	89	94	92	93	84	80	77	75
320-55422-43 - RE	SS-19-25								
320-55422-44	SS-19-26	76	81	82	82	84	78	68	59
320-55422-44 - RE	SS-19-26								
320-55422-45	SS-19-27	82	86	87	80	81	70	69	67
320-55422-45 - RE	SS-19-27								
320-55422-46	SS-19-28	89	95	93	87	83	77	70	58
320-55422-47	SW-19-10	90	95	95	92	100	95	90	76
320-55422-47 - RE	SW-19-10								
320-55422-48	SW-19-11	85	96	95	93	98	91	93	88
320-55422-48 - RE	SW-19-11								
320-55422-49	Culvert 1	74	71	80	75	78	81	66	25
320-55422-49 - RE	Culvert 1								
320-55422-50	SS-19-30	84	95	91	88	87	78	69	38
320-55422-50 - RE	SS-19-30	67	75	70	67	64	63	59	39
320-55422-51	SS-19-29	94	97	97	88	97	91	88	52
320-55422-51 - RE	SS-19-29								
320-55422-52	Culvert 3	53	89	94	82	78	74	68	30
320-55422-52 - RE	Culvert 3	38	44	44	41	38	39	38	20 *
320-55422-53	SS-19-31	82	97	94	90	81	75	67	39
320-55422-53 - RE	SS-19-31	65	69	69	68	65	67	67	35
320-55422-54	Culvert 2	60	88	93	81	78	65	56	24 *
320-55422-54 - RE	Culvert 2								
320-55422-55	SS-19-29	90	96	93	90	93	90	79	66
320-55422-55 - RE	SS-19-29								
LCS 320-332685/2-A	Lab Control Sample	95	100	98	81	87	101	99	98
LCS 320-333286/2-A	Lab Control Sample	89	96	90	87	90	88	87	84
LCS 320-333289/2-A	Lab Control Sample	81	88	85	84	79	76	77	74
LCS 320-340760/2-A	Lab Control Sample	47	49	46	44	45	48	53	52
MB 320-332685/1-A	Method Blank	81	79	84	73	81	92	63	67
MB 320-333286/1-A	Method Blank	86	93	89	82	83	82	86	76
MB 320-333289/1-A	Method Blank	71	75	77	72	67	66	65	63
MB 320-340760/1-A	Method Blank	44	47	45	44	46	47	52	51

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFOS (25-150)	-NMeFOS/ (25-150)	-NEtFOS/ (25-150)	HFPODA (25-150)
320-55422-1	SW-19-01	90	86	80	71	57
320-55422-1 MS	SW-19-01	99	91	95	83	58
320-55422-1 MSD	SW-19-01	101	93	100	87	78
320-55422-2	SW-19-02	115	106	100	103	108
320-55422-3	SW-19-03	107	101	81	102	56
320-55422-4	SW-19-04	96	94	80	95	61
320-55422-5	SW-19-06	102	95	89	86	68
320-55422-6	SW-19-07	103	94	87	82	81
320-55422-7	SW-19-08	107	100	86	90	44

Eurofins TestAmerica, Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFOS (25-150)	-NMeFOS (25-150)	-NEtFOS/ (25-150)	HFPODA (25-150)
320-55422-8	SW-19-09	116	107	81	94	72
320-55422-9	SB-11-1	108	102	67	80	41
320-55422-10	SB-11-3.5	105	92	90	92	110
320-55422-11	SB-11-12	101	95	89	87	79
320-55422-12	SB-11-19	100	88	85	88	78
320-55422-13	SB-12-0	86	84	65	71	48
320-55422-14	SB-112-0	111	96	56	63	48
320-55422-15	SB-12-1.5	106	98	91	105	67
320-55422-16	SB-12-7	115	100	90	96	109
320-55422-17	SB-12-13	92	85	92	86	72
320-55422-18	SB-12-17	113	99	88	94	99
320-55422-19	SS-19-01	103	94	88	92	83
320-55422-20	SS-19-02	100	79	67	68	96
320-55422-21	SS-19-03	77	74	84	74	81
320-55422-21 MS	SS-19-03	83	78	88	84	95
320-55422-21 MSD	SS-19-03	83	79	89	84	89
320-55422-22	SS-19-04	84	84	82	86	77
320-55422-23	SS-19-05	90	86	62	60	99
320-55422-24	SS-19-06	81	83	73	75	89
320-55422-25	SS-19-07	78	81	72	80	87
320-55422-26	SS-19-08	71	67	67	65	75
320-55422-27	SS-19-09	86	89	69	83	84
320-55422-28	SS-19-10	85	85	71	75	88
320-55422-29	SS-19-11	87	82	79	76	82
320-55422-30	SS-19-12	85	83	84	86	87
320-55422-31	SS-19-13	85	82	84	87	82
320-55422-32	SS-19-14	82	79	84	81	89
320-55422-33	SS-19-15	85	82	84	87	92
320-55422-34	SS-19-16	89	83	88	87	88
320-55422-35	SS-19-17	83	83	91	88	89
320-55422-36	SS-19-18	83	82	87	83	87
320-55422-37	SS-19-19	72	72	64	62	79
320-55422-38	SS-19-20	76	82	98	107	78
320-55422-39	SS-19-21	76	75	27	26	85
320-55422-39 - RE	SS-19-21		47			
320-55422-39 MS	SS-19-21	83	78	28	28	89
320-55422-39 MS - RE	SS-19-21		54			
320-55422-39 MSD	SS-19-21	85	77	27	27	92
320-55422-39 MSD - RE	SS-19-21		64			
320-55422-40	SS-19-22	85	83	32	30	102
320-55422-40 - RE	SS-19-22		54			
320-55422-41	SS-19-23	80	80	52	46	93
320-55422-41 - RE	SS-19-23		64			
320-55422-42	SS-19-24	81	82	57	57	85
320-55422-42 - RE	SS-19-24		76			
320-55422-43	SS-19-25	88	80	52	54	99
320-55422-43 - RE	SS-19-25		39			
320-55422-44	SS-19-26	77	81	42	44	81
320-55422-44 - RE	SS-19-26		77			
320-55422-45	SS-19-27	81	72	50	50	89

Eurofins TestAmerica, Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFOS (25-150)	-NMeFOS/ (25-150)	-NEtFOS/ (25-150)	HFPODA (25-150)
320-55422-45 - RE	SS-19-27		70			
320-55422-46	SS-19-28	88	77	54	53	92
320-55422-47	SW-19-10	91	94	81	93	102
320-55422-47 - RE	SW-19-10		79			
320-55422-48	SW-19-11	87	89	73	83	93
320-55422-48 - RE	SW-19-11		89			
320-55422-49	Culvert 1	82	81	73	80	40
320-55422-49 - RE	Culvert 1		71			
320-55422-50	SS-19-30	118	121	43	40	84
320-55422-50 - RE	SS-19-30	99	92	37	37	74
320-55422-51	SS-19-29	111	113	46	48	96
320-55422-51 - RE	SS-19-29		66			
320-55422-52	Culvert 3	137	136	58	54	21 *
320-55422-52 - RE	Culvert 3	65	57	27	27	42
320-55422-53	SS-19-31	147	131	52	48	37
320-55422-53 - RE	SS-19-31	79	72	50	56	75
320-55422-54	Culvert 2	119	100	51	51	26
320-55422-54 - RE	Culvert 2		79			
320-55422-55	SS-19-29	90	86	47	50	89
320-55422-55 - RE	SS-19-29		54			
LCS 320-332685/2-A	Lab Control Sample	101	88	81	86	87
LCS 320-333286/2-A	Lab Control Sample	88	81	82	83	85
LCS 320-333289/2-A	Lab Control Sample	82	77	40	39	88
LCS 320-340760/2-A	Lab Control Sample	54	48	36	37	53
MB 320-332685/1-A	Method Blank	84	78	59	68	70
MB 320-333286/1-A	Method Blank	81	78	75	84	72
MB 320-333289/1-A	Method Blank	76	66	42	45	89
MB 320-340760/1-A	Method Blank	49	45	36	39	50

Surrogate Legend

- PFHxA = 13C2 PFHxA
- PFHpA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3-NMeFOSAA = d3-NMeFOSAA
- d5-NEtFOSAA = d5-NEtFOSAA
- HFPODA = 13C3 HFPO-DA

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-332685/1-A
Matrix: Solid
Analysis Batch: 337433

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 332685

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.50	0.20	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	0.117	J	0.25	0.11	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg		10/22/19 06:38	11/10/19 00:45	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg		10/22/19 06:38	11/10/19 00:45	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	81		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C4 PFHpA	79		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C4 PFOA	84		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C5 PFNA	73		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C2 PFDA	81		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C2 PFUnA	92		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C2 PFDoA	63		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C2 PFTeDA	67		25 - 150	10/22/19 06:38	11/10/19 00:45	1
18O2 PFHxS	84		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C4 PFOS	78		25 - 150	10/22/19 06:38	11/10/19 00:45	1
d3-NMeFOSAA	59		25 - 150	10/22/19 06:38	11/10/19 00:45	1
d5-NEtFOSAA	68		25 - 150	10/22/19 06:38	11/10/19 00:45	1
13C3 HFPO-DA	70		25 - 150	10/22/19 06:38	11/10/19 00:45	1

Lab Sample ID: LCS 320-332685/2-A
Matrix: Solid
Analysis Batch: 337433

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332685

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorohexanoic acid (PFHxA)	2.00	2.10		ug/Kg		105	71 - 131
Perfluoroheptanoic acid (PFHpA)	2.00	1.96		ug/Kg		98	71 - 131
Perfluorooctanoic acid (PFOA)	2.00	1.88		ug/Kg		94	72 - 132
Perfluorononanoic acid (PFNA)	2.00	2.31		ug/Kg		115	73 - 133
Perfluorodecanoic acid (PFDA)	2.00	2.06		ug/Kg		103	72 - 132

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-332685/2-A
Matrix: Solid
Analysis Batch: 337433

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332685

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroundecanoic acid (PFUnA)	2.00	1.58		ug/Kg		79	66 - 126
Perfluorododecanoic acid (PFDoA)	2.00	1.69		ug/Kg		84	71 - 131
Perfluorotridecanoic acid (PFTriA)	2.00	1.78		ug/Kg		89	71 - 131
Perfluorotetradecanoic acid (PFTeA)	2.00	2.14		ug/Kg		107	67 - 127
Perfluorobutanesulfonic acid (PFBS)	1.77	1.64		ug/Kg		93	69 - 129
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.54		ug/Kg		85	62 - 122
Perfluorooctanesulfonic acid (PFOS)	1.86	1.91		ug/Kg		103	68 - 141
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	1.86	1.91		ug/Kg		102	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	2.51		ug/Kg		125	53 - 158
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	1.88	1.55		ug/Kg		82	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.88	2.06		ug/Kg		110	79 - 139

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	95		25 - 150
13C4 PFHpA	100		25 - 150
13C4 PFOA	98		25 - 150
13C5 PFNA	81		25 - 150
13C2 PFDA	87		25 - 150
13C2 PFUnA	101		25 - 150
13C2 PFDoA	99		25 - 150
13C2 PFTeDA	98		25 - 150
18O2 PFHxS	101		25 - 150
13C4 PFOS	88		25 - 150
d3-NMeFOSAA	81		25 - 150
d5-NEtFOSAA	86		25 - 150
13C3 HFPO-DA	87		25 - 150

Lab Sample ID: 320-55422-1 MS
Matrix: Solid
Analysis Batch: 337433

Client Sample ID: SW-19-01
Prep Type: Total/NA
Prep Batch: 332685

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	ND		2.82	3.09		ug/Kg	☼	109	71 - 131
Perfluoroheptanoic acid (PFHpA)	ND		2.82	2.89		ug/Kg	☼	102	71 - 131
Perfluorooctanoic acid (PFOA)	ND		2.82	2.77		ug/Kg	☼	98	72 - 132
Perfluorononanoic acid (PFNA)	ND		2.82	2.76		ug/Kg	☼	98	73 - 133
Perfluorodecanoic acid (PFDA)	ND		2.82	2.63		ug/Kg	☼	93	72 - 132
Perfluoroundecanoic acid (PFUnA)	ND		2.82	2.41		ug/Kg	☼	85	66 - 126
Perfluorododecanoic acid (PFDoA)	ND	F1	2.82	3.78	F1	ug/Kg	☼	134	71 - 131

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-55422-1 MS
Matrix: Solid
Analysis Batch: 337433

Client Sample ID: SW-19-01
Prep Type: Total/NA
Prep Batch: 332685

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotridecanoic acid (PFTriA)	ND	F1	2.82	4.03	F1	ug/Kg	☼	143	71 - 131
Perfluorotetradecanoic acid (PFTeA)	ND		2.82	3.02		ug/Kg	☼	107	67 - 127
Perfluorobutanesulfonic acid (PFBS)	ND		2.49	2.31		ug/Kg	☼	93	69 - 129
Perfluorohexanesulfonic acid (PFHxS)	ND		2.57	2.49		ug/Kg	☼	97	62 - 122
Perfluorooctanesulfonic acid (PFOS)	0.30	J	2.62	3.10		ug/Kg	☼	107	68 - 141
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	ND		2.63	2.64		ug/Kg	☼	100	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.82	3.92		ug/Kg	☼	139	53 - 158
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.66	2.00		ug/Kg	☼	75	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.66	2.56		ug/Kg	☼	96	79 - 139

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C2 PFHxA	82		25 - 150
13C4 PFHpA	88		25 - 150
13C4 PFOA	88		25 - 150
13C5 PFNA	85		25 - 150
13C2 PFDA	89		25 - 150
13C2 PFUnA	104		25 - 150
13C2 PFDoA	67		25 - 150
13C2 PFTeDA	70		25 - 150
18O2 PFHxS	99		25 - 150
13C4 PFOS	91		25 - 150
d3-NMeFOSAA	95		25 - 150
d5-NEtFOSAA	83		25 - 150
13C3 HFPO-DA	58		25 - 150

Lab Sample ID: 320-55422-1 MSD
Matrix: Solid
Analysis Batch: 337433

Client Sample ID: SW-19-01
Prep Type: Total/NA
Prep Batch: 332685

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	ND		2.79	3.12		ug/Kg	☼	112	71 - 131	1	30
Perfluoroheptanoic acid (PFHpA)	ND		2.79	2.63		ug/Kg	☼	94	71 - 131	9	30
Perfluorooctanoic acid (PFOA)	ND		2.79	2.45		ug/Kg	☼	88	72 - 132	12	30
Perfluorononanoic acid (PFNA)	ND		2.79	2.87		ug/Kg	☼	103	73 - 133	4	30
Perfluorodecanoic acid (PFDA)	ND		2.79	2.99		ug/Kg	☼	107	72 - 132	13	30
Perfluoroundecanoic acid (PFUnA)	ND		2.79	3.19		ug/Kg	☼	114	66 - 126	28	30
Perfluorododecanoic acid (PFDoA)	ND	F1	2.79	3.25		ug/Kg	☼	117	71 - 131	15	30
Perfluorotridecanoic acid (PFTriA)	ND	F1	2.79	3.17	I	ug/Kg	☼	114	71 - 131	24	30
Perfluorotetradecanoic acid (PFTeA)	ND		2.79	3.14	I	ug/Kg	☼	112	67 - 127	4	30

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-333286/1-A
Matrix: Solid
Analysis Batch: 339702

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333286

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg		10/24/19 07:25	11/18/19 15:28	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg		10/24/19 07:25	11/18/19 15:28	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg		10/24/19 07:25	11/18/19 15:28	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg		10/24/19 07:25	11/18/19 15:28	1
Isotope Dilution	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
¹³ C2 PFHxA	86		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C4 PFHpA	93		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C4 PFOA	89		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C5 PFNA	82		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C2 PFDA	83		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C2 PFUnA	82		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C2 PFDoA	86		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C2 PFTeDA	76		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹⁸ O2 PFHxS	81		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C4 PFOS	78		25 - 150				10/24/19 07:25	11/18/19 15:28	1
d3-NMeFOSAA	75		25 - 150				10/24/19 07:25	11/18/19 15:28	1
d5-NEtFOSAA	84		25 - 150				10/24/19 07:25	11/18/19 15:28	1
¹³ C3 HFPO-DA	72		25 - 150				10/24/19 07:25	11/18/19 15:28	1

Lab Sample ID: LCS 320-333286/2-A
Matrix: Solid
Analysis Batch: 337121

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333286

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorohexanoic acid (PFHxA)	2.00	2.10		ug/Kg		105	71 - 131
Perfluoroheptanoic acid (PFHpA)	2.00	2.31		ug/Kg		116	71 - 131
Perfluorooctanoic acid (PFOA)	2.00	2.31		ug/Kg		115	72 - 132
Perfluorononanoic acid (PFNA)	2.00	2.32		ug/Kg		116	73 - 133
Perfluorodecanoic acid (PFDA)	2.00	2.25		ug/Kg		112	72 - 132
Perfluoroundecanoic acid (PFUnA)	2.00	2.05		ug/Kg		103	66 - 126
Perfluorododecanoic acid (PFDoA)	2.00	2.12		ug/Kg		106	71 - 131
Perfluorotridecanoic acid (PFTriA)	2.00	2.06		ug/Kg		103	71 - 131
Perfluorotetradecanoic acid (PFTeA)	2.00	2.16		ug/Kg		108	67 - 127
Perfluorobutanesulfonic acid (PFBS)	1.77	1.81		ug/Kg		102	69 - 129
Perfluorohexanesulfonic acid (PFHxS)	1.82	2.03		ug/Kg		111	62 - 122
Perfluorooctanesulfonic acid (PFOS)	1.86	2.10		ug/Kg		113	68 - 141
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.86	2.19		ug/Kg		117	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	2.08		ug/Kg		104	53 - 158

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-333286/2-A
Matrix: Solid
Analysis Batch: 337121

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333286

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	1.88	1.67		ug/Kg		88	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.88	2.32		ug/Kg		123	79 - 139
Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits				
13C2 PFHxA	89		25 - 150				
13C4 PFHpA	96		25 - 150				
13C4 PFOA	90		25 - 150				
13C5 PFNA	87		25 - 150				
13C2 PFDA	90		25 - 150				
13C2 PFUnA	88		25 - 150				
13C2 PFDoA	87		25 - 150				
13C2 PFTeDA	84		25 - 150				
18O2 PFHxS	88		25 - 150				
13C4 PFOS	81		25 - 150				
d3-NMeFOSAA	82		25 - 150				
d5-NEtFOSAA	83		25 - 150				
13C3 HFPO-DA	85		25 - 150				

Lab Sample ID: 320-55422-21 MS
Matrix: Solid
Analysis Batch: 337121

Client Sample ID: SS-19-03
Prep Type: Total/NA
Prep Batch: 333286

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	0.11	J	1.98	2.21		ug/Kg	☼	106	71 - 131
Perfluoroheptanoic acid (PFHpA)	0.18	J	1.98	2.44		ug/Kg	☼	114	71 - 131
Perfluorooctanoic acid (PFOA)	0.17	J	1.98	2.40		ug/Kg	☼	112	72 - 132
Perfluorononanoic acid (PFNA)	0.16	J	1.98	2.34		ug/Kg	☼	110	73 - 133
Perfluorodecanoic acid (PFDA)	0.10	J	1.98	2.34		ug/Kg	☼	113	72 - 132
Perfluoroundecanoic acid (PFUnA)	0.068	J	1.98	2.14		ug/Kg	☼	105	66 - 126
Perfluorododecanoic acid (PFDoA)	ND		1.98	2.06		ug/Kg	☼	104	71 - 131
Perfluorotridecanoic acid (PFTriA)	ND		1.98	2.28		ug/Kg	☼	115	71 - 131
Perfluorotetradecanoic acid (PFTeA)	ND		1.98	2.26		ug/Kg	☼	114	67 - 127
Perfluorobutanesulfonic acid (PFBS)	ND		1.75	2.03		ug/Kg	☼	116	69 - 129
Perfluorohexanesulfonic acid (PFHxS)	0.063	J	1.80	2.21		ug/Kg	☼	119	62 - 122
Perfluorooctanesulfonic acid (PFOS)	0.53		1.84	2.67		ug/Kg	☼	116	68 - 141
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND	F1	1.85	2.53	F1	ug/Kg	☼	137	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		1.98	2.18		ug/Kg	☼	110	53 - 158
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.87	1.91		ug/Kg	☼	102	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.87	2.35		ug/Kg	☼	126	79 - 139

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>MS</i> <i>%Recovery</i>	<i>MS</i> <i>Qualifier</i>	<i>Limits</i>
13C2 PFHxA	88		25 - 150
13C4 PFHpA	93		25 - 150
13C4 PFOA	92		25 - 150
13C5 PFNA	85		25 - 150
13C2 PFDA	90		25 - 150
13C2 PFUnA	88		25 - 150
13C2 PFDaA	86		25 - 150
13C2 PFTeDA	88		25 - 150
18O2 PFHxS	83		25 - 150
13C4 PFOS	78		25 - 150
d3-NMeFOSAA	88		25 - 150
d5-NEtFOSAA	84		25 - 150
13C3 HFPO-DA	95		25 - 150

Lab Sample ID: 320-55422-21 MSD
Matrix: Solid
Analysis Batch: 337121

Client Sample ID: SS-19-03
Prep Type: Total/NA
Prep Batch: 333286

<i>Analyte</i>	<i>Sample</i> <i>Result</i>	<i>Sample</i> <i>Qualifier</i>	<i>Spike</i> <i>Added</i>	<i>MSD</i> <i>Result</i>	<i>MSD</i> <i>Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec.</i> <i>Limits</i>	<i>RPD</i>	<i>RPD</i> <i>Limit</i>
Perfluorohexanoic acid (PFHxA)	0.11	J	2.08	2.23		ug/Kg	☼	102	71 - 131	1	30
Perfluoroheptanoic acid (PFHpA)	0.18	J	2.08	2.47		ug/Kg	☼	110	71 - 131	1	30
Perfluorooctanoic acid (PFOA)	0.17	J	2.08	2.34		ug/Kg	☼	104	72 - 132	2	30
Perfluorononanoic acid (PFNA)	0.16	J	2.08	2.37		ug/Kg	☼	106	73 - 133	1	30
Perfluorodecanoic acid (PFDA)	0.10	J	2.08	2.41		ug/Kg	☼	111	72 - 132	3	30
Perfluoroundecanoic acid (PFUnA)	0.068	J	2.08	2.27		ug/Kg	☼	106	66 - 126	6	30
Perfluorododecanoic acid (PFDaA)	ND		2.08	2.24		ug/Kg	☼	107	71 - 131	8	30
Perfluorotridecanoic acid (PFTriA)	ND		2.08	2.32		ug/Kg	☼	111	71 - 131	1	30
Perfluorotetradecanoic acid (PFTeA)	ND		2.08	2.29		ug/Kg	☼	110	67 - 127	1	30
Perfluorobutanesulfonic acid (PFBS)	ND		1.84	2.03		ug/Kg	☼	111	69 - 129	0	30
Perfluorohexanesulfonic acid (PFHxS)	0.063	J	1.89	2.29		ug/Kg	☼	118	62 - 122	4	30
Perfluorooctanesulfonic acid (PFOS)	0.53		1.93	2.70		ug/Kg	☼	112	68 - 141	1	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND	F1	1.94	2.53		ug/Kg	☼	131	74 - 134	0	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.08	2.18		ug/Kg	☼	105	53 - 158	0	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.96	1.95		ug/Kg	☼	100	66 - 136	2	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.96	2.41		ug/Kg	☼	123	79 - 139	3	30

<i>Isotope Dilution</i>	<i>MSD</i> <i>%Recovery</i>	<i>MSD</i> <i>Qualifier</i>	<i>Limits</i>
13C2 PFHxA	90		25 - 150
13C4 PFHpA	92		25 - 150
13C4 PFOA	91		25 - 150
13C5 PFNA	88		25 - 150
13C2 PFDA	90		25 - 150
13C2 PFUnA	90		25 - 150
13C2 PFDaA	85		25 - 150

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-55422-21 MSD

Matrix: Solid

Analysis Batch: 337121

Client Sample ID: SS-19-03

Prep Type: Total/NA

Prep Batch: 333286

<i>Isotope Dilution</i>	<i>MSD %Recovery</i>	<i>MSD Qualifier</i>	<i>Limits</i>
13C2 PFTeDA	91		25 - 150
18O2 PFHxS	83		25 - 150
13C4 PFOS	79		25 - 150
d3-NMeFOSAA	89		25 - 150
d5-NEtFOSAA	84		25 - 150
13C3 HFPO-DA	89		25 - 150

Lab Sample ID: MB 320-333289/1-A

Matrix: Solid

Analysis Batch: 337140

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 333289

<i>Analyte</i>	<i>MB Result</i>	<i>MB Qualifier</i>	<i>RL</i>	<i>MDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Perfluorooctanesulfonic acid (PFOS)	0.428	J	0.50	0.20	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg		10/24/19 07:33	11/10/19 01:40	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg		10/24/19 07:33	11/10/19 01:40	1

<i>Isotope Dilution</i>	<i>MB %Recovery</i>	<i>MB Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C2 PFHxA	71		25 - 150	10/24/19 07:33	11/10/19 01:40	1
13C4 PFHpA	75		25 - 150	10/24/19 07:33	11/10/19 01:40	1
13C4 PFOA	77		25 - 150	10/24/19 07:33	11/10/19 01:40	1
13C5 PFNA	72		25 - 150	10/24/19 07:33	11/10/19 01:40	1
13C2 PFDA	67		25 - 150	10/24/19 07:33	11/10/19 01:40	1
13C2 PFUnA	66		25 - 150	10/24/19 07:33	11/10/19 01:40	1
13C2 PFDoA	65		25 - 150	10/24/19 07:33	11/10/19 01:40	1
13C2 PFTeDA	63		25 - 150	10/24/19 07:33	11/10/19 01:40	1
18O2 PFHxS	76		25 - 150	10/24/19 07:33	11/10/19 01:40	1
13C4 PFOS	66		25 - 150	10/24/19 07:33	11/10/19 01:40	1
d3-NMeFOSAA	42		25 - 150	10/24/19 07:33	11/10/19 01:40	1
d5-NEtFOSAA	45		25 - 150	10/24/19 07:33	11/10/19 01:40	1

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-333289/1-A
Matrix: Solid
Analysis Batch: 337140

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333289

<i>Isotope Dilution</i>	<i>MB MB</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C3 HFPO-DA	89		25 - 150	10/24/19 07:33	11/10/19 01:40	1

Lab Sample ID: LCS 320-333289/2-A
Matrix: Solid
Analysis Batch: 337140

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333289

<i>Analyte</i>	<i>Spike Added</i>	<i>LCS Result</i>	<i>LCS Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>Limits</i>
Perfluorohexanoic acid (PFHxA)	2.00	2.23		ug/Kg		111	71 - 131
Perfluoroheptanoic acid (PFHpA)	2.00	2.20		ug/Kg		110	71 - 131
Perfluorooctanoic acid (PFOA)	2.00	2.35		ug/Kg		117	72 - 132
Perfluorononanoic acid (PFNA)	2.00	2.10		ug/Kg		105	73 - 133
Perfluorodecanoic acid (PFDA)	2.00	2.19		ug/Kg		110	72 - 132
Perfluoroundecanoic acid (PFUnA)	2.00	2.08		ug/Kg		104	66 - 126
Perfluorododecanoic acid (PFDoA)	2.00	2.19		ug/Kg		109	71 - 131
Perfluorotridecanoic acid (PFTriA)	2.00	2.18		ug/Kg		109	71 - 131
Perfluorotetradecanoic acid (PFTeA)	2.00	2.16		ug/Kg		108	67 - 127
Perfluorobutanesulfonic acid (PFBS)	1.77	1.95		ug/Kg		110	69 - 129
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.94		ug/Kg		106	62 - 122
Perfluorooctanesulfonic acid (PFOS)	1.86	2.83 *		ug/Kg		152	68 - 141
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.86	2.11		ug/Kg		113	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	2.07		ug/Kg		104	53 - 158
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	1.88	2.06		ug/Kg		109	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.88	2.06		ug/Kg		110	79 - 139

<i>Isotope Dilution</i>	<i>LCS %Recovery</i>	<i>LCS Qualifier</i>	<i>Limits</i>
13C2 PFHxA	81		25 - 150
13C4 PFHpA	88		25 - 150
13C4 PFOA	85		25 - 150
13C5 PFNA	84		25 - 150
13C2 PFDA	79		25 - 150
13C2 PFUnA	76		25 - 150
13C2 PFDoA	77		25 - 150
13C2 PFTeA	74		25 - 150
18O2 PFHxS	82		25 - 150
13C4 PFOS	77		25 - 150
d3-NMeFOSAA	40		25 - 150
d5-NEtFOSAA	39		25 - 150
13C3 HFPO-DA	88		25 - 150

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-55422-39 MS

Matrix: Solid

Analysis Batch: 337140

Client Sample ID: SS-19-21

Prep Type: Total/NA

Prep Batch: 333289

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Perfluorohexanoic acid (PFHxA)	0.057	J	2.15	2.25		ug/Kg	☼	102	71 - 131
Perfluoroheptanoic acid (PFHpA)	0.030	J	2.15	2.50		ug/Kg	☼	115	71 - 131
Perfluorooctanoic acid (PFOA)	ND		2.15	2.37		ug/Kg	☼	110	72 - 132
Perfluorononanoic acid (PFNA)	ND		2.15	2.29		ug/Kg	☼	107	73 - 133
Perfluorodecanoic acid (PFDA)	ND		2.15	2.37		ug/Kg	☼	110	72 - 132
Perfluoroundecanoic acid (PFUnA)	ND		2.15	2.34		ug/Kg	☼	109	66 - 126
Perfluorododecanoic acid (PFDoA)	ND		2.15	2.38		ug/Kg	☼	111	71 - 131
Perfluorotridecanoic acid (PFTriA)	ND		2.15	2.37		ug/Kg	☼	110	71 - 131
Perfluorotetradecanoic acid (PFTeA)	ND		2.15	2.41		ug/Kg	☼	112	67 - 127
Perfluorobutanesulfonic acid (PFBS)	ND		1.90	2.15		ug/Kg	☼	113	69 - 129
Perfluorohexanesulfonic acid (PFHxS)	0.032	J cn	1.96	2.26		ug/Kg	☼	114	62 - 122
Perfluorooctanesulfonic acid (PFOS)	0.84	B *	1.99	3.26		ug/Kg	☼	121	68 - 141
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	ND	F1	2.00	2.62		ug/Kg	☼	131	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.15	2.27		ug/Kg	☼	106	53 - 158
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.02	2.10		ug/Kg	☼	104	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.02	2.12		ug/Kg	☼	105	79 - 139

Isotope Dilution	MS	MS	Limits
	%Recovery	Qualifier	
13C2 PFHxA	84		25 - 150
13C4 PFHpA	88		25 - 150
13C4 PFOA	91		25 - 150
13C5 PFNA	84		25 - 150
13C2 PFDA	86		25 - 150
13C2 PFUnA	78		25 - 150
13C2 PFDoA	72		25 - 150
13C2 PFTeDA	68		25 - 150
18O2 PFHxS	83		25 - 150
13C4 PFOS	78		25 - 150
d3-NMeFOSAA	28		25 - 150
d5-NEtFOSAA	28		25 - 150
13C3 HFPO-DA	89		25 - 150

Lab Sample ID: 320-55422-39 MSD

Matrix: Solid

Analysis Batch: 337140

Client Sample ID: SS-19-21

Prep Type: Total/NA

Prep Batch: 333289

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	
	Result	Qualifier	Added	Result	Qualifier					RPD	Limit
Perfluorohexanoic acid (PFHxA)	0.057	J	2.12	2.18		ug/Kg	☼	100	71 - 131	3	30
Perfluoroheptanoic acid (PFHpA)	0.030	J	2.12	2.40		ug/Kg	☼	112	71 - 131	4	30
Perfluorooctanoic acid (PFOA)	ND		2.12	2.37		ug/Kg	☼	112	72 - 132	0	30

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-55422-39 MSD

Matrix: Solid

Analysis Batch: 337140

Client Sample ID: SS-19-21

Prep Type: Total/NA

Prep Batch: 333289

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier		Result	Qualifier				Limits		
Perfluorononanoic acid (PFNA)	ND		2.12	2.36		ug/Kg	☼	112	73 - 133	3	30
Perfluorodecanoic acid (PFDA)	ND		2.12	2.28		ug/Kg	☼	108	72 - 132	4	30
Perfluoroundecanoic acid (PFUnA)	ND		2.12	2.36		ug/Kg	☼	112	66 - 126	1	30
Perfluorododecanoic acid (PFDoA)	ND		2.12	2.30		ug/Kg	☼	109	71 - 131	4	30
Perfluorotridecanoic acid (PFTriA)	ND		2.12	2.26		ug/Kg	☼	107	71 - 131	4	30
Perfluorotetradecanoic acid (PFTeA)	ND		2.12	2.30		ug/Kg	☼	109	67 - 127	5	30
Perfluorobutanesulfonic acid (PFBS)	ND		1.87	2.11		ug/Kg	☼	113	69 - 129	2	30
Perfluorohexanesulfonic acid (PFHxS)	0.032	J cn	1.92	2.32		ug/Kg	☼	119	62 - 122	2	30
Perfluorooctanesulfonic acid (PFOS)	0.84	B *	1.96	3.33		ug/Kg	☼	127	68 - 141	2	30
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	ND	F1	1.97	2.67	F1	ug/Kg	☼	135	74 - 134	2	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.12	2.29		ug/Kg	☼	108	53 - 158	1	30
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.99	2.03		ug/Kg	☼	102	66 - 136	3	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.99	2.11		ug/Kg	☼	106	79 - 139	1	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	MSD Limits
13C2 PFHxA	88		25 - 150
13C4 PFHpA	90		25 - 150
13C4 PFOA	91		25 - 150
13C5 PFNA	86		25 - 150
13C2 PFDA	85		25 - 150
13C2 PFUnA	75		25 - 150
13C2 PFDoA	69		25 - 150
13C2 PFTeDA	59		25 - 150
18O2 PFHxS	85		25 - 150
13C4 PFOS	77		25 - 150
d3-NMeFOSAA	27		25 - 150
d5-NEFOSAA	27		25 - 150
13C3 HFPO-DA	92		25 - 150

Lab Sample ID: MB 320-340760/1-A

Matrix: Solid

Analysis Batch: 341725

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 340760

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg		11/22/19 11:47	11/26/19 18:08	1

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-340760/1-A
Matrix: Solid
Analysis Batch: 341725

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 340760

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Perfluorooctanesulfonic acid (PFOS)	0.204	J	0.50	0.20	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
11-Chloroeicosadecafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg		11/22/19 11:47	11/26/19 18:08	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg		11/22/19 11:47	11/26/19 18:08	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	44		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C4 PFHpA	47		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C4 PFOA	45		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C5 PFNA	44		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C2 PFDA	46		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C2 PFUnA	47		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C2 PFDoA	52		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C2 PFTeDA	51		25 - 150	11/22/19 11:47	11/26/19 18:08	1
18O2 PFHxS	49		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C4 PFOS	45		25 - 150	11/22/19 11:47	11/26/19 18:08	1
d3-NMeFOSAA	36		25 - 150	11/22/19 11:47	11/26/19 18:08	1
d5-NEtFOSAA	39		25 - 150	11/22/19 11:47	11/26/19 18:08	1
13C3 HFPO-DA	50		25 - 150	11/22/19 11:47	11/26/19 18:08	1

Lab Sample ID: LCS 320-340760/2-A
Matrix: Solid
Analysis Batch: 341725

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 340760

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorohexanoic acid (PFHxA)	2.00	1.81		ug/Kg		91	71 - 131
Perfluoroheptanoic acid (PFHpA)	2.00	1.83		ug/Kg		92	71 - 131
Perfluorooctanoic acid (PFOA)	2.00	1.91		ug/Kg		95	72 - 132
Perfluorononanoic acid (PFNA)	2.00	2.10		ug/Kg		105	73 - 133
Perfluorodecanoic acid (PFDA)	2.00	2.01		ug/Kg		100	72 - 132
Perfluoroundecanoic acid (PFUnA)	2.00	1.68		ug/Kg		84	66 - 126
Perfluorododecanoic acid (PFDoA)	2.00	1.70		ug/Kg		85	71 - 131
Perfluorotridecanoic acid (PFTriA)	2.00	1.91		ug/Kg		95	71 - 131
Perfluorotetradecanoic acid (PFTeA)	2.00	1.55		ug/Kg		77	67 - 127

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-340760/2-A
Matrix: Solid
Analysis Batch: 341725

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 340760

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	1.77	1.50		ug/Kg		85	69 - 129
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.59		ug/Kg		87	62 - 122
Perfluorooctanesulfonic acid (PFOS)	1.86	1.88		ug/Kg		102	68 - 141
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	1.86	1.66		ug/Kg		89	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	1.48		ug/Kg		74	53 - 158
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	1.88	1.74		ug/Kg		93	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.88	1.81		ug/Kg		96	79 - 139

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	47		25 - 150
13C4 PFHpA	49		25 - 150
13C4 PFOA	46		25 - 150
13C5 PFNA	44		25 - 150
13C2 PFDA	45		25 - 150
13C2 PFUnA	48		25 - 150
13C2 PFDoA	53		25 - 150
13C2 PFTeDA	52		25 - 150
18O2 PFHxS	54		25 - 150
13C4 PFOS	48		25 - 150
d3-NMeFOSAA	36		25 - 150
d5-NEtFOSAA	37		25 - 150
13C3 HFPO-DA	53		25 - 150

Method: 537 (modified) - Fluorinated Alkyl Substances - RE

Lab Sample ID: 320-55422-39 MS
Matrix: Solid
Analysis Batch: 341725

Client Sample ID: SS-19-21
Prep Type: Total/NA
Prep Batch: 340760

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS) - RE	ND	H	2.05	2.10		ug/Kg	☼	102	68 - 141
Isotope Dilution	MS %Recovery	MS Qualifier	Limits						
13C4 PFOS - RE	54		25 - 150						

Lab Sample ID: 320-55422-39 MSD
Matrix: Solid
Analysis Batch: 341725

Client Sample ID: SS-19-21
Prep Type: Total/NA
Prep Batch: 340760

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS) - RE	ND	H	1.88	1.70		ug/Kg	☼	91	68 - 141	21	30

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method: 537 (modified) - Fluorinated Alkyl Substances - RE (Continued)

<i>Isotope Dilution</i>	<i>MSD</i>	<i>MSD</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C4 PFOS - RE	64		25 - 150

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

LCMS

Prep Batch: 332685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-1	SW-19-01	Total/NA	Solid	SHAKE	
320-55422-2	SW-19-02	Total/NA	Solid	SHAKE	
320-55422-3	SW-19-03	Total/NA	Solid	SHAKE	
320-55422-4	SW-19-04	Total/NA	Solid	SHAKE	
320-55422-5	SW-19-06	Total/NA	Solid	SHAKE	
320-55422-6	SW-19-07	Total/NA	Solid	SHAKE	
320-55422-7	SW-19-08	Total/NA	Solid	SHAKE	
320-55422-8	SW-19-09	Total/NA	Solid	SHAKE	
320-55422-9	SB-11-1	Total/NA	Solid	SHAKE	
320-55422-10	SB-11-3.5	Total/NA	Solid	SHAKE	
320-55422-11	SB-11-12	Total/NA	Solid	SHAKE	
320-55422-12	SB-11-19	Total/NA	Solid	SHAKE	
320-55422-13	SB-12-0	Total/NA	Solid	SHAKE	
320-55422-14	SB-112-0	Total/NA	Solid	SHAKE	
320-55422-15	SB-12-1.5	Total/NA	Solid	SHAKE	
320-55422-16	SB-12-7	Total/NA	Solid	SHAKE	
320-55422-17	SB-12-13	Total/NA	Solid	SHAKE	
320-55422-18	SB-12-17	Total/NA	Solid	SHAKE	
320-55422-19	SS-19-01	Total/NA	Solid	SHAKE	
320-55422-20	SS-19-02	Total/NA	Solid	SHAKE	
MB 320-332685/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-332685/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-55422-1 MS	SW-19-01	Total/NA	Solid	SHAKE	
320-55422-1 MSD	SW-19-01	Total/NA	Solid	SHAKE	

Prep Batch: 333286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-21	SS-19-03	Total/NA	Solid	SHAKE	
320-55422-22	SS-19-04	Total/NA	Solid	SHAKE	
320-55422-23	SS-19-05	Total/NA	Solid	SHAKE	
320-55422-24	SS-19-06	Total/NA	Solid	SHAKE	
320-55422-25	SS-19-07	Total/NA	Solid	SHAKE	
320-55422-26	SS-19-08	Total/NA	Solid	SHAKE	
320-55422-27	SS-19-09	Total/NA	Solid	SHAKE	
320-55422-28	SS-19-10	Total/NA	Solid	SHAKE	
320-55422-29	SS-19-11	Total/NA	Solid	SHAKE	
320-55422-30	SS-19-12	Total/NA	Solid	SHAKE	
320-55422-31	SS-19-13	Total/NA	Solid	SHAKE	
320-55422-32	SS-19-14	Total/NA	Solid	SHAKE	
320-55422-33	SS-19-15	Total/NA	Solid	SHAKE	
320-55422-34	SS-19-16	Total/NA	Solid	SHAKE	
320-55422-35	SS-19-17	Total/NA	Solid	SHAKE	
320-55422-36	SS-19-18	Total/NA	Solid	SHAKE	
320-55422-37	SS-19-19	Total/NA	Solid	SHAKE	
320-55422-38	SS-19-20	Total/NA	Solid	SHAKE	
MB 320-333286/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-333286/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-55422-21 MS	SS-19-03	Total/NA	Solid	SHAKE	
320-55422-21 MSD	SS-19-03	Total/NA	Solid	SHAKE	

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

LCMS

Prep Batch: 333289

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-39	SS-19-21	Total/NA	Solid	SHAKE	
320-55422-40	SS-19-22	Total/NA	Solid	SHAKE	
320-55422-41	SS-19-23	Total/NA	Solid	SHAKE	
320-55422-42	SS-19-24	Total/NA	Solid	SHAKE	
320-55422-43	SS-19-25	Total/NA	Solid	SHAKE	
320-55422-44	SS-19-26	Total/NA	Solid	SHAKE	
320-55422-45	SS-19-27	Total/NA	Solid	SHAKE	
320-55422-46	SS-19-28	Total/NA	Solid	SHAKE	
320-55422-47	SW-19-10	Total/NA	Solid	SHAKE	
320-55422-48	SW-19-11	Total/NA	Solid	SHAKE	
320-55422-49	Culvert 1	Total/NA	Solid	SHAKE	
320-55422-50	SS-19-30	Total/NA	Solid	SHAKE	
320-55422-51	SS-19-29	Total/NA	Solid	SHAKE	
320-55422-52	Culvert 3	Total/NA	Solid	SHAKE	
320-55422-53	SS-19-31	Total/NA	Solid	SHAKE	
320-55422-54	Culvert 2	Total/NA	Solid	SHAKE	
320-55422-55	SS-19-29	Total/NA	Solid	SHAKE	
MB 320-333289/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-333289/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-55422-39 MS	SS-19-21	Total/NA	Solid	SHAKE	
320-55422-39 MSD	SS-19-21	Total/NA	Solid	SHAKE	

Analysis Batch: 337121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-21	SS-19-03	Total/NA	Solid	537 (modified)	333286
320-55422-22	SS-19-04	Total/NA	Solid	537 (modified)	333286
320-55422-23	SS-19-05	Total/NA	Solid	537 (modified)	333286
320-55422-24	SS-19-06	Total/NA	Solid	537 (modified)	333286
320-55422-25	SS-19-07	Total/NA	Solid	537 (modified)	333286
320-55422-26	SS-19-08	Total/NA	Solid	537 (modified)	333286
320-55422-27	SS-19-09	Total/NA	Solid	537 (modified)	333286
320-55422-28	SS-19-10	Total/NA	Solid	537 (modified)	333286
320-55422-29	SS-19-11	Total/NA	Solid	537 (modified)	333286
320-55422-30	SS-19-12	Total/NA	Solid	537 (modified)	333286
320-55422-31	SS-19-13	Total/NA	Solid	537 (modified)	333286
320-55422-32	SS-19-14	Total/NA	Solid	537 (modified)	333286
320-55422-33	SS-19-15	Total/NA	Solid	537 (modified)	333286
320-55422-34	SS-19-16	Total/NA	Solid	537 (modified)	333286
320-55422-35	SS-19-17	Total/NA	Solid	537 (modified)	333286
320-55422-36	SS-19-18	Total/NA	Solid	537 (modified)	333286
320-55422-37	SS-19-19	Total/NA	Solid	537 (modified)	333286
LCS 320-333286/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	333286
320-55422-21 MS	SS-19-03	Total/NA	Solid	537 (modified)	333286
320-55422-21 MSD	SS-19-03	Total/NA	Solid	537 (modified)	333286

Analysis Batch: 337140

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-39	SS-19-21	Total/NA	Solid	537 (modified)	333289
320-55422-40	SS-19-22	Total/NA	Solid	537 (modified)	333289
320-55422-41	SS-19-23	Total/NA	Solid	537 (modified)	333289
320-55422-42	SS-19-24	Total/NA	Solid	537 (modified)	333289

Eurofins TestAmerica, Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

LCMS (Continued)

Analysis Batch: 337140 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-43	SS-19-25	Total/NA	Solid	537 (modified)	333289
320-55422-44	SS-19-26	Total/NA	Solid	537 (modified)	333289
320-55422-45	SS-19-27	Total/NA	Solid	537 (modified)	333289
320-55422-46	SS-19-28	Total/NA	Solid	537 (modified)	333289
320-55422-47	SW-19-10	Total/NA	Solid	537 (modified)	333289
320-55422-48	SW-19-11	Total/NA	Solid	537 (modified)	333289
320-55422-50	SS-19-30	Total/NA	Solid	537 (modified)	333289
320-55422-51	SS-19-29	Total/NA	Solid	537 (modified)	333289
320-55422-55	SS-19-29	Total/NA	Solid	537 (modified)	333289
MB 320-333289/1-A	Method Blank	Total/NA	Solid	537 (modified)	333289
LCS 320-333289/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	333289
320-55422-39 MS	SS-19-21	Total/NA	Solid	537 (modified)	333289
320-55422-39 MSD	SS-19-21	Total/NA	Solid	537 (modified)	333289

Analysis Batch: 337433

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-1	SW-19-01	Total/NA	Solid	537 (modified)	332685
320-55422-2	SW-19-02	Total/NA	Solid	537 (modified)	332685
320-55422-3	SW-19-03	Total/NA	Solid	537 (modified)	332685
320-55422-4	SW-19-04	Total/NA	Solid	537 (modified)	332685
320-55422-5	SW-19-06	Total/NA	Solid	537 (modified)	332685
320-55422-6	SW-19-07	Total/NA	Solid	537 (modified)	332685
320-55422-7	SW-19-08	Total/NA	Solid	537 (modified)	332685
320-55422-8	SW-19-09	Total/NA	Solid	537 (modified)	332685
320-55422-9	SB-11-1	Total/NA	Solid	537 (modified)	332685
320-55422-10	SB-11-3.5	Total/NA	Solid	537 (modified)	332685
320-55422-11	SB-11-12	Total/NA	Solid	537 (modified)	332685
320-55422-12	SB-11-19	Total/NA	Solid	537 (modified)	332685
320-55422-13	SB-12-0	Total/NA	Solid	537 (modified)	332685
320-55422-14	SB-112-0	Total/NA	Solid	537 (modified)	332685
320-55422-15	SB-12-1.5	Total/NA	Solid	537 (modified)	332685
320-55422-16	SB-12-7	Total/NA	Solid	537 (modified)	332685
320-55422-17	SB-12-13	Total/NA	Solid	537 (modified)	332685
320-55422-18	SB-12-17	Total/NA	Solid	537 (modified)	332685
320-55422-19	SS-19-01	Total/NA	Solid	537 (modified)	332685
320-55422-20	SS-19-02	Total/NA	Solid	537 (modified)	332685
MB 320-332685/1-A	Method Blank	Total/NA	Solid	537 (modified)	332685
LCS 320-332685/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	332685
320-55422-1 MS	SW-19-01	Total/NA	Solid	537 (modified)	332685
320-55422-1 MSD	SW-19-01	Total/NA	Solid	537 (modified)	332685

Analysis Batch: 339702

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-333286/1-A	Method Blank	Total/NA	Solid	537 (modified)	333286

Analysis Batch: 340266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-49	Culvert 1	Total/NA	Solid	537 (modified)	333289

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

LCMS

Analysis Batch: 340279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-38	SS-19-20	Total/NA	Solid	537 (modified)	333286

Analysis Batch: 340573

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-52	Culvert 3	Total/NA	Solid	537 (modified)	333289
320-55422-53	SS-19-31	Total/NA	Solid	537 (modified)	333289
320-55422-54	Culvert 2	Total/NA	Solid	537 (modified)	333289

Prep Batch: 340760

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-39 - RE	SS-19-21	Total/NA	Solid	SHAKE	
320-55422-40 - RE	SS-19-22	Total/NA	Solid	SHAKE	
320-55422-41 - RE	SS-19-23	Total/NA	Solid	SHAKE	
320-55422-42 - RE	SS-19-24	Total/NA	Solid	SHAKE	
320-55422-43 - RE	SS-19-25	Total/NA	Solid	SHAKE	
320-55422-44 - RE	SS-19-26	Total/NA	Solid	SHAKE	
320-55422-45 - RE	SS-19-27	Total/NA	Solid	SHAKE	
320-55422-47 - RE	SW-19-10	Total/NA	Solid	SHAKE	
320-55422-48 - RE	SW-19-11	Total/NA	Solid	SHAKE	
320-55422-49 - RE	Culvert 1	Total/NA	Solid	SHAKE	
320-55422-50 - RE	SS-19-30	Total/NA	Solid	SHAKE	
320-55422-51 - RE	SS-19-29	Total/NA	Solid	SHAKE	
320-55422-52 - RE	Culvert 3	Total/NA	Solid	SHAKE	
320-55422-53 - RE	SS-19-31	Total/NA	Solid	SHAKE	
320-55422-54 - RE	Culvert 2	Total/NA	Solid	SHAKE	
320-55422-55 - RE	SS-19-29	Total/NA	Solid	SHAKE	
MB 320-340760/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-340760/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-55422-39 MS - RE	SS-19-21	Total/NA	Solid	SHAKE	
320-55422-39 MSD - RE	SS-19-21	Total/NA	Solid	SHAKE	

Analysis Batch: 341725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-39 - RE	SS-19-21	Total/NA	Solid	537 (modified)	340760
320-55422-40 - RE	SS-19-22	Total/NA	Solid	537 (modified)	340760
320-55422-41 - RE	SS-19-23	Total/NA	Solid	537 (modified)	340760
320-55422-42 - RE	SS-19-24	Total/NA	Solid	537 (modified)	340760
320-55422-43 - RE	SS-19-25	Total/NA	Solid	537 (modified)	340760
320-55422-44 - RE	SS-19-26	Total/NA	Solid	537 (modified)	340760
320-55422-45 - RE	SS-19-27	Total/NA	Solid	537 (modified)	340760
320-55422-47 - RE	SW-19-10	Total/NA	Solid	537 (modified)	340760
320-55422-48 - RE	SW-19-11	Total/NA	Solid	537 (modified)	340760
320-55422-49 - RE	Culvert 1	Total/NA	Solid	537 (modified)	340760
320-55422-50 - RE	SS-19-30	Total/NA	Solid	537 (modified)	340760
320-55422-51 - RE	SS-19-29	Total/NA	Solid	537 (modified)	340760
320-55422-52 - RE	Culvert 3	Total/NA	Solid	537 (modified)	340760
320-55422-53 - RE	SS-19-31	Total/NA	Solid	537 (modified)	340760
320-55422-54 - RE	Culvert 2	Total/NA	Solid	537 (modified)	340760
320-55422-55 - RE	SS-19-29	Total/NA	Solid	537 (modified)	340760
MB 320-340760/1-A	Method Blank	Total/NA	Solid	537 (modified)	340760
LCS 320-340760/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	340760

Eurofins TestAmerica, Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

LCMS (Continued)

Analysis Batch: 341725 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-39 MS - RE	SS-19-21	Total/NA	Solid	537 (modified)	340760
320-55422-39 MSD - RE	SS-19-21	Total/NA	Solid	537 (modified)	340760

General Chemistry

Analysis Batch: 332520

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-1	SW-19-01	Total/NA	Solid	D 2216	
320-55422-2	SW-19-02	Total/NA	Solid	D 2216	
320-55422-3	SW-19-03	Total/NA	Solid	D 2216	
320-55422-4	SW-19-04	Total/NA	Solid	D 2216	
320-55422-5	SW-19-06	Total/NA	Solid	D 2216	
320-55422-6	SW-19-07	Total/NA	Solid	D 2216	
320-55422-7	SW-19-08	Total/NA	Solid	D 2216	
320-55422-8	SW-19-09	Total/NA	Solid	D 2216	
320-55422-10	SB-11-3.5	Total/NA	Solid	D 2216	

Analysis Batch: 332553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-11	SB-11-12	Total/NA	Solid	D 2216	
320-55422-12	SB-11-19	Total/NA	Solid	D 2216	
320-55422-13	SB-12-0	Total/NA	Solid	D 2216	
320-55422-14	SB-112-0	Total/NA	Solid	D 2216	
320-55422-15	SB-12-1.5	Total/NA	Solid	D 2216	
320-55422-16	SB-12-7	Total/NA	Solid	D 2216	
320-55422-17	SB-12-13	Total/NA	Solid	D 2216	
320-55422-18	SB-12-17	Total/NA	Solid	D 2216	
320-55422-19	SS-19-01	Total/NA	Solid	D 2216	
320-55422-20	SS-19-02	Total/NA	Solid	D 2216	
320-55422-21	SS-19-03	Total/NA	Solid	D 2216	
320-55422-22	SS-19-04	Total/NA	Solid	D 2216	
320-55422-23	SS-19-05	Total/NA	Solid	D 2216	
320-55422-24	SS-19-06	Total/NA	Solid	D 2216	
320-55422-25	SS-19-07	Total/NA	Solid	D 2216	
320-55422-26	SS-19-08	Total/NA	Solid	D 2216	
320-55422-27	SS-19-09	Total/NA	Solid	D 2216	
320-55422-28	SS-19-10	Total/NA	Solid	D 2216	
320-55422-29	SS-19-11	Total/NA	Solid	D 2216	
320-55422-30	SS-19-12	Total/NA	Solid	D 2216	
320-55422-11 DU	SB-11-12	Total/NA	Solid	D 2216	

Analysis Batch: 332559

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-31	SS-19-13	Total/NA	Solid	D 2216	
320-55422-32	SS-19-14	Total/NA	Solid	D 2216	
320-55422-33	SS-19-15	Total/NA	Solid	D 2216	
320-55422-34	SS-19-16	Total/NA	Solid	D 2216	
320-55422-35	SS-19-17	Total/NA	Solid	D 2216	
320-55422-36	SS-19-18	Total/NA	Solid	D 2216	
320-55422-37	SS-19-19	Total/NA	Solid	D 2216	
320-55422-38	SS-19-20	Total/NA	Solid	D 2216	

Eurofins TestAmerica, Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

General Chemistry (Continued)

Analysis Batch: 332559 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-39	SS-19-21	Total/NA	Solid	D 2216	
320-55422-40	SS-19-22	Total/NA	Solid	D 2216	
320-55422-41	SS-19-23	Total/NA	Solid	D 2216	
320-55422-42	SS-19-24	Total/NA	Solid	D 2216	
320-55422-43	SS-19-25	Total/NA	Solid	D 2216	
320-55422-44	SS-19-26	Total/NA	Solid	D 2216	
320-55422-45	SS-19-27	Total/NA	Solid	D 2216	
320-55422-46	SS-19-28	Total/NA	Solid	D 2216	
320-55422-47	SW-19-10	Total/NA	Solid	D 2216	
320-55422-48	SW-19-11	Total/NA	Solid	D 2216	
320-55422-49	Culvert 1	Total/NA	Solid	D 2216	
320-55422-50	SS-19-30	Total/NA	Solid	D 2216	
320-55422-31 DU	SS-19-13	Total/NA	Solid	D 2216	

Analysis Batch: 332630

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-51	SS-19-29	Total/NA	Solid	D 2216	
320-55422-52	Culvert 3	Total/NA	Solid	D 2216	
320-55422-53	SS-19-31	Total/NA	Solid	D 2216	
320-55422-54	Culvert 2	Total/NA	Solid	D 2216	
320-55422-55	SS-19-29	Total/NA	Solid	D 2216	
320-55422-51 DU	SS-19-29	Total/NA	Solid	D 2216	

Analysis Batch: 332875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55422-9	SB-11-1	Total/NA	Solid	D 2216	

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-01

Lab Sample ID: 320-55422-1

Date Collected: 10/09/19 14:17

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Client Sample ID: SW-19-01

Lab Sample ID: 320-55422-1

Date Collected: 10/09/19 14:17

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 70.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.08 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 01:04	D1R	TAL SAC

Client Sample ID: SW-19-02

Lab Sample ID: 320-55422-2

Date Collected: 10/09/19 15:03

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Client Sample ID: SW-19-02

Lab Sample ID: 320-55422-2

Date Collected: 10/09/19 15:03

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 78.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.10 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 01:33	D1R	TAL SAC

Client Sample ID: SW-19-03

Lab Sample ID: 320-55422-3

Date Collected: 10/09/19 15:46

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Client Sample ID: SW-19-03

Lab Sample ID: 320-55422-3

Date Collected: 10/09/19 15:46

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 74.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.26 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 01:42	D1R	TAL SAC

Client Sample ID: SW-19-04

Lab Sample ID: 320-55422-4

Date Collected: 10/09/19 16:50

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Eurofins TestAmerica, Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-04

Lab Sample ID: 320-55422-4

Date Collected: 10/09/19 16:50

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 53.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.30 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 01:52	D1R	TAL SAC

Client Sample ID: SW-19-06

Lab Sample ID: 320-55422-5

Date Collected: 10/10/19 09:58

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Client Sample ID: SW-19-06

Lab Sample ID: 320-55422-5

Date Collected: 10/10/19 09:58

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 68.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.29 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 02:01	D1R	TAL SAC

Client Sample ID: SW-19-07

Lab Sample ID: 320-55422-6

Date Collected: 10/10/19 10:40

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Client Sample ID: SW-19-07

Lab Sample ID: 320-55422-6

Date Collected: 10/10/19 10:40

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 65.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.39 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 02:11	D1R	TAL SAC

Client Sample ID: SW-19-08

Lab Sample ID: 320-55422-7

Date Collected: 10/10/19 11:54

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SW-19-08

Date Collected: 10/10/19 11:54

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-7

Matrix: Solid

Percent Solids: 18.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.09 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 02:39	D1R	TAL SAC

Client Sample ID: SW-19-09

Date Collected: 10/10/19 12:54

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Client Sample ID: SW-19-09

Date Collected: 10/10/19 12:54

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-8

Matrix: Solid

Percent Solids: 31.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.20 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 02:49	D1R	TAL SAC

Client Sample ID: SB-11-1

Date Collected: 10/12/19 08:25

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-9

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332875	10/22/19 15:30	HRB	TAL SAC

Client Sample ID: SB-11-1

Date Collected: 10/12/19 08:25

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-9

Matrix: Solid

Percent Solids: 66.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.37 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 02:58	D1R	TAL SAC

Client Sample ID: SB-11-3.5

Date Collected: 10/12/19 08:27

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332520	10/21/19 12:20	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-11-3.5

Lab Sample ID: 320-55422-10

Date Collected: 10/12/19 08:27

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 67.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.02 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 03:08	D1R	TAL SAC

Client Sample ID: SB-11-12

Lab Sample ID: 320-55422-11

Date Collected: 10/12/19 08:30

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SB-11-12

Lab Sample ID: 320-55422-11

Date Collected: 10/12/19 08:30

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 80.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.32 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 03:17	D1R	TAL SAC

Client Sample ID: SB-11-19

Lab Sample ID: 320-55422-12

Date Collected: 10/12/19 08:32

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SB-11-19

Lab Sample ID: 320-55422-12

Date Collected: 10/12/19 08:32

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 71.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.43 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 03:27	D1R	TAL SAC

Client Sample ID: SB-12-0

Lab Sample ID: 320-55422-13

Date Collected: 10/12/19 10:10

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-12-0

Date Collected: 10/12/19 10:10

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-13

Matrix: Solid

Percent Solids: 79.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.18 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 03:36	D1R	TAL SAC

Client Sample ID: SB-112-0

Date Collected: 10/12/19 10:00

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-14

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SB-112-0

Date Collected: 10/12/19 10:00

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-14

Matrix: Solid

Percent Solids: 80.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.23 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 03:46	D1R	TAL SAC

Client Sample ID: SB-12-1.5

Date Collected: 10/12/19 10:12

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-15

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SB-12-1.5

Date Collected: 10/12/19 10:12

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-15

Matrix: Solid

Percent Solids: 82.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.19 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 03:55	D1R	TAL SAC

Client Sample ID: SB-12-7

Date Collected: 10/12/19 10:15

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-16

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SB-12-7

Date Collected: 10/12/19 10:15

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-16

Matrix: Solid

Percent Solids: 80.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.16 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 04:24	D1R	TAL SAC

Client Sample ID: SB-12-13

Date Collected: 10/12/19 10:20

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-17

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SB-12-13

Date Collected: 10/12/19 10:20

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-17

Matrix: Solid

Percent Solids: 85.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 04:34	D1R	TAL SAC

Client Sample ID: SB-12-17

Date Collected: 10/12/19 10:22

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-18

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SB-12-17

Date Collected: 10/12/19 10:22

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-18

Matrix: Solid

Percent Solids: 83.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.20 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 04:43	D1R	TAL SAC

Client Sample ID: SS-19-01

Date Collected: 10/14/19 08:09

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-19

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-01

Lab Sample ID: 320-55422-19

Date Collected: 10/14/19 08:09

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 95.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.05 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 04:53	D1R	TAL SAC

Client Sample ID: SS-19-02

Lab Sample ID: 320-55422-20

Date Collected: 10/14/19 08:28

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SS-19-02

Lab Sample ID: 320-55422-20

Date Collected: 10/14/19 08:28

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.03 g	10.00 mL	332685	10/22/19 06:38	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337433	11/10/19 05:02	D1R	TAL SAC

Client Sample ID: SS-19-03

Lab Sample ID: 320-55422-21

Date Collected: 10/14/19 08:40

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SS-19-03

Lab Sample ID: 320-55422-21

Date Collected: 10/14/19 08:40

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.28 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 12:08	S1M	TAL SAC

Client Sample ID: SS-19-04

Lab Sample ID: 320-55422-22

Date Collected: 10/14/19 08:51

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-04

Lab Sample ID: 320-55422-22

Date Collected: 10/14/19 08:51

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.17 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 12:37	S1M	TAL SAC

Client Sample ID: SS-19-05

Lab Sample ID: 320-55422-23

Date Collected: 10/14/19 08:54

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SS-19-05

Lab Sample ID: 320-55422-23

Date Collected: 10/14/19 08:54

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.09 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 12:47	S1M	TAL SAC

Client Sample ID: SS-19-06

Lab Sample ID: 320-55422-24

Date Collected: 10/14/19 09:01

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SS-19-06

Lab Sample ID: 320-55422-24

Date Collected: 10/14/19 09:01

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.36 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 12:57	S1M	TAL SAC

Client Sample ID: SS-19-07

Lab Sample ID: 320-55422-25

Date Collected: 10/14/19 09:13

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-07

Lab Sample ID: 320-55422-25

Date Collected: 10/14/19 09:13

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.15 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 13:06	S1M	TAL SAC

Client Sample ID: SS-19-08

Lab Sample ID: 320-55422-26

Date Collected: 10/14/19 09:43

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SS-19-08

Lab Sample ID: 320-55422-26

Date Collected: 10/14/19 09:43

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.16 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 13:16	S1M	TAL SAC

Client Sample ID: SS-19-09

Lab Sample ID: 320-55422-27

Date Collected: 10/14/19 09:48

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SS-19-09

Lab Sample ID: 320-55422-27

Date Collected: 10/14/19 09:48

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.27 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 13:45	S1M	TAL SAC

Client Sample ID: SS-19-10

Lab Sample ID: 320-55422-28

Date Collected: 10/14/19 09:51

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-10

Lab Sample ID: 320-55422-28

Date Collected: 10/14/19 09:51

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.47 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 13:55	S1M	TAL SAC

Client Sample ID: SS-19-11

Lab Sample ID: 320-55422-29

Date Collected: 10/14/19 09:59

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SS-19-11

Lab Sample ID: 320-55422-29

Date Collected: 10/14/19 09:59

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 89.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.13 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 14:04	S1M	TAL SAC

Client Sample ID: SS-19-12

Lab Sample ID: 320-55422-30

Date Collected: 10/14/19 10:07

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332553	10/21/19 13:57	HRB	TAL SAC

Client Sample ID: SS-19-12

Lab Sample ID: 320-55422-30

Date Collected: 10/14/19 10:07

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 74.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.33 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 14:14	S1M	TAL SAC

Client Sample ID: SS-19-13

Lab Sample ID: 320-55422-31

Date Collected: 10/14/19 10:13

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-13

Lab Sample ID: 320-55422-31

Date Collected: 10/14/19 10:13

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.31 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 14:24	S1M	TAL SAC

Client Sample ID: SS-19-14

Lab Sample ID: 320-55422-32

Date Collected: 10/14/19 10:00

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-14

Lab Sample ID: 320-55422-32

Date Collected: 10/14/19 10:00

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 75.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.27 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 14:33	S1M	TAL SAC

Client Sample ID: SS-19-15

Lab Sample ID: 320-55422-33

Date Collected: 10/14/19 10:23

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-15

Lab Sample ID: 320-55422-33

Date Collected: 10/14/19 10:23

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 14:43	S1M	TAL SAC

Client Sample ID: SS-19-16

Lab Sample ID: 320-55422-34

Date Collected: 10/14/19 10:29

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-16

Lab Sample ID: 320-55422-34

Date Collected: 10/14/19 10:29

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.26 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 14:53	S1M	TAL SAC

Client Sample ID: SS-19-17

Lab Sample ID: 320-55422-35

Date Collected: 10/14/19 10:34

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-17

Lab Sample ID: 320-55422-35

Date Collected: 10/14/19 10:34

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 75.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.13 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 15:22	S1M	TAL SAC

Client Sample ID: SS-19-18

Lab Sample ID: 320-55422-36

Date Collected: 10/14/19 10:20

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-18

Lab Sample ID: 320-55422-36

Date Collected: 10/14/19 10:20

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.48 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 15:31	S1M	TAL SAC

Client Sample ID: SS-19-19

Lab Sample ID: 320-55422-37

Date Collected: 10/14/19 10:46

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-19

Lab Sample ID: 320-55422-37

Date Collected: 10/14/19 10:46

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 76.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.39 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337121	11/09/19 15:41	S1M	TAL SAC

Client Sample ID: SS-19-20

Lab Sample ID: 320-55422-38

Date Collected: 10/14/19 12:16

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-20

Lab Sample ID: 320-55422-38

Date Collected: 10/14/19 12:16

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.17 g	10.00 mL	333286	10/24/19 07:25	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			340279	11/20/19 20:46	S1M	TAL SAC

Client Sample ID: SS-19-21

Lab Sample ID: 320-55422-39

Date Collected: 10/14/19 12:28

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-21

Lab Sample ID: 320-55422-39

Date Collected: 10/14/19 12:28

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 92.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.39 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 01:59	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		4.82 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 18:28	P1N	TAL SAC

Client Sample ID: SS-19-22

Lab Sample ID: 320-55422-40

Date Collected: 10/14/19 12:35

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-22

Lab Sample ID: 320-55422-40

Date Collected: 10/14/19 12:35

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.24 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 02:28	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		5.01 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 18:58	P1N	TAL SAC

Client Sample ID: SS-19-23

Lab Sample ID: 320-55422-41

Date Collected: 10/14/19 12:00

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-23

Lab Sample ID: 320-55422-41

Date Collected: 10/14/19 12:00

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 93.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 02:38	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		4.86 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 19:08	P1N	TAL SAC

Client Sample ID: SS-19-24

Lab Sample ID: 320-55422-42

Date Collected: 10/14/19 12:49

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-24

Lab Sample ID: 320-55422-42

Date Collected: 10/14/19 12:49

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 82.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.28 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 02:47	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		5.26 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 19:18	P1N	TAL SAC

Client Sample ID: SS-19-25

Lab Sample ID: 320-55422-43

Date Collected: 10/14/19 12:59

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Eurofins TestAmerica, Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-25

Date Collected: 10/14/19 12:59

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-43

Matrix: Solid

Percent Solids: 94.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.31 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 02:57	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		4.99 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 19:28	P1N	TAL SAC

Client Sample ID: SS-19-26

Date Collected: 10/14/19 13:06

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-44

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-26

Date Collected: 10/14/19 13:06

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-44

Matrix: Solid

Percent Solids: 92.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.16 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 03:07	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		5.44 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 19:38	P1N	TAL SAC

Client Sample ID: SS-19-27

Date Collected: 10/14/19 13:18

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-45

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-27

Date Collected: 10/14/19 13:18

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-45

Matrix: Solid

Percent Solids: 95.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.24 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 03:36	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		5.16 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 20:09	P1N	TAL SAC

Client Sample ID: SS-19-28

Date Collected: 10/14/19 13:26

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-46

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Eurofins TestAmerica, Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-28

Lab Sample ID: 320-55422-46

Date Collected: 10/14/19 13:26

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.32 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 03:45	P1N	TAL SAC

Client Sample ID: SW-19-10

Lab Sample ID: 320-55422-47

Date Collected: 10/14/19 13:50

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SW-19-10

Lab Sample ID: 320-55422-47

Date Collected: 10/14/19 13:50

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 70.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.41 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 03:55	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		5.07 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 20:19	P1N	TAL SAC

Client Sample ID: SW-19-11

Lab Sample ID: 320-55422-48

Date Collected: 10/14/19 13:40

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SW-19-11

Lab Sample ID: 320-55422-48

Date Collected: 10/14/19 13:40

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 78.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.46 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 04:05	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		4.85 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 20:28	P1N	TAL SAC

Client Sample ID: Culvert 1

Lab Sample ID: 320-55422-49

Date Collected: 10/14/19 14:40

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: Culvert 1

Date Collected: 10/14/19 14:40

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-49

Matrix: Solid

Percent Solids: 60.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.46 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		5			340266	11/20/19 17:33	S1M	TAL SAC
Total/NA	Prep	SHAKE	RE		4.80 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 22:39	P1N	TAL SAC

Client Sample ID: SS-19-30

Date Collected: 10/14/19 14:50

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-50

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332559	10/21/19 14:30	HRB	TAL SAC

Client Sample ID: SS-19-30

Date Collected: 10/14/19 14:50

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-50

Matrix: Solid

Percent Solids: 53.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.45 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 04:24	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		4.85 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 20:38	P1N	TAL SAC

Client Sample ID: SS-19-29

Date Collected: 10/14/19 14:47

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-51

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332630	10/21/19 16:45	HRB	TAL SAC

Client Sample ID: SS-19-29

Date Collected: 10/14/19 14:47

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-51

Matrix: Solid

Percent Solids: 76.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.37 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 04:33	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		5.11 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 22:49	P1N	TAL SAC

Client Sample ID: Culvert 3

Date Collected: 10/14/19 15:10

Date Received: 10/16/19 10:10

Lab Sample ID: 320-55422-52

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332630	10/21/19 16:45	HRB	TAL SAC

Eurofins TestAmerica, Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: Culvert 3

Lab Sample ID: 320-55422-52

Date Collected: 10/14/19 15:10

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 61.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.18 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			340573	11/21/19 23:37	VPM	TAL SAC
Total/NA	Prep	SHAKE	RE		4.80 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 22:59	P1N	TAL SAC

Client Sample ID: SS-19-31

Lab Sample ID: 320-55422-53

Date Collected: 10/14/19 15:12

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332630	10/21/19 16:45	HRB	TAL SAC

Client Sample ID: SS-19-31

Lab Sample ID: 320-55422-53

Date Collected: 10/14/19 15:12

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 60.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.36 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			340573	11/21/19 23:47	VPM	TAL SAC
Total/NA	Prep	SHAKE	RE		4.81 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	5			341725	11/26/19 22:19	P1N	TAL SAC

Client Sample ID: Culvert 2

Lab Sample ID: 320-55422-54

Date Collected: 10/14/19 14:55

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332630	10/21/19 16:45	HRB	TAL SAC

Client Sample ID: Culvert 2

Lab Sample ID: 320-55422-54

Date Collected: 10/14/19 14:55

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 66.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			340573	11/21/19 23:57	VPM	TAL SAC
Total/NA	Prep	SHAKE	RE		4.92 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 23:19	P1N	TAL SAC

Client Sample ID: SS-19-29

Lab Sample ID: 320-55422-55

Date Collected: 10/14/19 13:38

Matrix: Solid

Date Received: 10/16/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332630	10/21/19 16:45	HRB	TAL SAC

Eurofins TestAmerica, Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Client Sample ID: SS-19-29

Lab Sample ID: 320-55422-55

Date Collected: 10/14/19 13:38

Matrix: Solid

Date Received: 10/16/19 10:10

Percent Solids: 94.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 g	10.00 mL	333289	10/24/19 07:33	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			337140	11/10/19 05:31	P1N	TAL SAC
Total/NA	Prep	SHAKE	RE		5.37 g	10.00 mL	340760	11/22/19 11:47	BHT	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			341725	11/26/19 20:49	P1N	TAL SAC

Laboratory References:

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



Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-20 *
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
D 2216	Percent Moisture	ASTM	TAL SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	TAL SAC

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-55422-1	SW-19-01	Solid	10/09/19 14:17	10/16/19 10:10	
320-55422-2	SW-19-02	Solid	10/09/19 15:03	10/16/19 10:10	
320-55422-3	SW-19-03	Solid	10/09/19 15:46	10/16/19 10:10	
320-55422-4	SW-19-04	Solid	10/09/19 16:50	10/16/19 10:10	
320-55422-5	SW-19-06	Solid	10/10/19 09:58	10/16/19 10:10	
320-55422-6	SW-19-07	Solid	10/10/19 10:40	10/16/19 10:10	
320-55422-7	SW-19-08	Solid	10/10/19 11:54	10/16/19 10:10	
320-55422-8	SW-19-09	Solid	10/10/19 12:54	10/16/19 10:10	
320-55422-9	SB-11-1	Solid	10/12/19 08:25	10/16/19 10:10	
320-55422-10	SB-11-3.5	Solid	10/12/19 08:27	10/16/19 10:10	
320-55422-11	SB-11-12	Solid	10/12/19 08:30	10/16/19 10:10	
320-55422-12	SB-11-19	Solid	10/12/19 08:32	10/16/19 10:10	
320-55422-13	SB-12-0	Solid	10/12/19 10:10	10/16/19 10:10	
320-55422-14	SB-112-0	Solid	10/12/19 10:00	10/16/19 10:10	
320-55422-15	SB-12-1.5	Solid	10/12/19 10:12	10/16/19 10:10	
320-55422-16	SB-12-7	Solid	10/12/19 10:15	10/16/19 10:10	
320-55422-17	SB-12-13	Solid	10/12/19 10:20	10/16/19 10:10	
320-55422-18	SB-12-17	Solid	10/12/19 10:22	10/16/19 10:10	
320-55422-19	SS-19-01	Solid	10/14/19 08:09	10/16/19 10:10	
320-55422-20	SS-19-02	Solid	10/14/19 08:28	10/16/19 10:10	
320-55422-21	SS-19-03	Solid	10/14/19 08:40	10/16/19 10:10	
320-55422-22	SS-19-04	Solid	10/14/19 08:51	10/16/19 10:10	
320-55422-23	SS-19-05	Solid	10/14/19 08:54	10/16/19 10:10	
320-55422-24	SS-19-06	Solid	10/14/19 09:01	10/16/19 10:10	
320-55422-25	SS-19-07	Solid	10/14/19 09:13	10/16/19 10:10	
320-55422-26	SS-19-08	Solid	10/14/19 09:43	10/16/19 10:10	
320-55422-27	SS-19-09	Solid	10/14/19 09:48	10/16/19 10:10	
320-55422-28	SS-19-10	Solid	10/14/19 09:51	10/16/19 10:10	
320-55422-29	SS-19-11	Solid	10/14/19 09:59	10/16/19 10:10	
320-55422-30	SS-19-12	Solid	10/14/19 10:07	10/16/19 10:10	
320-55422-31	SS-19-13	Solid	10/14/19 10:13	10/16/19 10:10	
320-55422-32	SS-19-14	Solid	10/14/19 10:00	10/16/19 10:10	
320-55422-33	SS-19-15	Solid	10/14/19 10:23	10/16/19 10:10	
320-55422-34	SS-19-16	Solid	10/14/19 10:29	10/16/19 10:10	
320-55422-35	SS-19-17	Solid	10/14/19 10:34	10/16/19 10:10	
320-55422-36	SS-19-18	Solid	10/14/19 10:20	10/16/19 10:10	
320-55422-37	SS-19-19	Solid	10/14/19 10:46	10/16/19 10:10	
320-55422-38	SS-19-20	Solid	10/14/19 12:16	10/16/19 10:10	
320-55422-39	SS-19-21	Solid	10/14/19 12:28	10/16/19 10:10	
320-55422-40	SS-19-22	Solid	10/14/19 12:35	10/16/19 10:10	
320-55422-41	SS-19-23	Solid	10/14/19 12:00	10/16/19 10:10	
320-55422-42	SS-19-24	Solid	10/14/19 12:49	10/16/19 10:10	
320-55422-43	SS-19-25	Solid	10/14/19 12:59	10/16/19 10:10	
320-55422-44	SS-19-26	Solid	10/14/19 13:06	10/16/19 10:10	
320-55422-45	SS-19-27	Solid	10/14/19 13:18	10/16/19 10:10	
320-55422-46	SS-19-28	Solid	10/14/19 13:26	10/16/19 10:10	
320-55422-47	SW-19-10	Solid	10/14/19 13:50	10/16/19 10:10	
320-55422-48	SW-19-11	Solid	10/14/19 13:40	10/16/19 10:10	
320-55422-49	Culvert 1	Solid	10/14/19 14:40	10/16/19 10:10	
320-55422-50	SS-19-30	Solid	10/14/19 14:50	10/16/19 10:10	
320-55422-51	SS-19-29	Solid	10/14/19 14:47	10/16/19 10:10	
320-55422-52	Culvert 3	Solid	10/14/19 15:10	10/16/19 10:10	
320-55422-53	SS-19-31	Solid	10/14/19 15:12	10/16/19 10:10	

Eurofins TestAmerica, Sacramento

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Gust SC

Job ID: 320-55422-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-55422-54	Culvert 2	Solid	10/14/19 14:55	10/16/19 10:10	
320-55422-55	SS-19-29	Solid	10/14/19 13:38	10/16/19 10:10	

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

Soils-Project site characterization: ~~test~~



2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

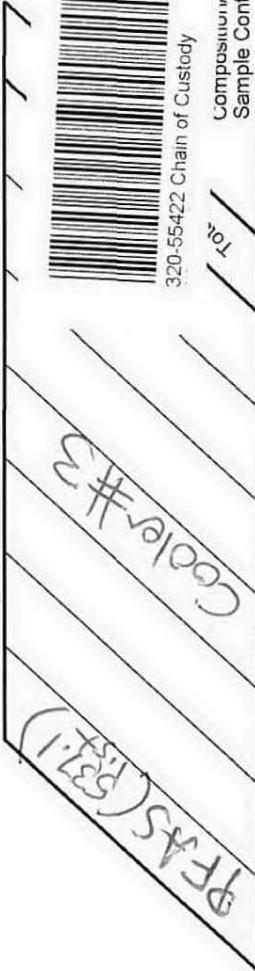
Laboratory Page 1 of 6
Attn: ESOTAS
DAVID ALTEFER

Analytical Methods (include preservative if used)

Turn Around Time:
 Normal Rush
 Please Specify

Quote No: _____

J-Flags: Yes No



320-55422 Chain of Custody

Compositional Class. Sample Containers

Sample Identity	Lab No.	Time	Date Sampled	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
✓ SW-19-01		1417	10/9/19	X	X	1 Sediment
✓ SW-19-02		1503		X	X	1
✓ SW-19-03		1546		X	X	1
✓ SW-19-04		1650		X	X	1 Sediment
✓ SW-19-06		958	10/10/19	X	X	1
✓ SW-19-07		1040		X	X	1
✓ SW-19-08		1154		X	X	1
✓ SW-19-09		1254		X	X	1
✓ SB-11-1		825	10/12/19	X	X	1 Soil
✓ SB-11-3.5		827		X	X	1 Soil

Project Information

Number: 102594-003

Name: GUST SC

Contact: KRF

Ongoing Project? Yes No

Sampler: KRF

Sample Receipt

Total No. of Containers: 54

COC Seals/Intact? Y/N/A

Received Good Cond./Cold

Temp:

Delivery Method:

Notes:

Analysis by 537.1 list

Relinquished By: 1.
 Signature: [Signature]
 Printed Name: Kristen Freiberg
 Date: 10/15/19
 Company: S&W

Relinquished By: 2.
 Signature: _____
 Printed Name: _____
 Date: _____
 Company: _____

Relinquished By: 3.
 Signature: _____
 Printed Name: _____
 Date: _____
 Company: _____

Received By: 1.
 Signature: [Signature]
 Printed Name: Jennifer Sackington
 Date: 16 Oct 19
 Company: ETA D SEC

Received By: 2.
 Signature: _____
 Printed Name: _____
 Date: _____
 Company: _____

Received By: 3.
 Signature: _____
 Printed Name: _____
 Date: _____
 Company: _____

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file



Soils-Project site characterization: ~~11/19/19~~

SHANNON & WILSON, INC.
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
 2355 Hill Road
 Fairbanks, AK 99709
 (907) 479-0600
 www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory _____ Page 2 of 6
 Attn: _____

Turn Around Time:
 Normal Rush
 Please Specify _____

Quote No: _____

J-Flags: Yes No



Sample Identity	Lab No.	Time	Date Sampled	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
✓ SB-11-12		830	10/12/19	1	Soil
✓ SB-11-19		832		1	
✓ SB-12-0		1010		1	
✓ SB-112-0		1000		1	
✓ SB-12-1.5		1012		1	
✓ SB-12-7		1015		1	
✓ SB-12-13		1020		1	
✓ SB-12-17		1022		1	
SS-19-01		809	10/14/19	1	Soil
SS-19-02		828		1	

Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Number: _____	Total No. of Containers: _____	Signature: _____	Signature: _____	Signature: _____
Name: _____	COC Seals/Intact? Y/N/NA _____	Time: _____	Time: _____	Time: _____
Contact: _____	Received Good Cont./Cold _____	Date: _____	Date: _____	Date: _____
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>	Temp: _____	Printed Name: _____	Printed Name: _____	Printed Name: _____
Sampler: _____	Delivery Method: _____	Company: _____	Company: _____	Company: _____
Notes:		Received By: 1.	Received By: 2.	Received By: 3.
		Signature: _____	Signature: _____	Signature: _____
		Time: _____	Time: _____	Time: _____
		Date: _____	Date: _____	Date: _____
		Printed Name: _____	Printed Name: _____	Printed Name: _____
		Company: _____	Company: _____	Company: _____

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file



Soils - Project Site Characterization

SHANNON & WILSON, INC.
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
 2355 Hill Road
 Fairbanks, AK 99709
 (907) 479-0600
 www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Page 3 of 6

Laboratory _____
 Attn: _____

Analytical Methods (include preservative if used)

PFAS	Cooler #3	Cooler #5	Total Number of Containers
------	-----------	-----------	----------------------------

Quote No: _____
 J-Flags: Yes No

Turn Around Time:
 Normal Rush
 Please Specify _____

Remarks/Matrix Composition/Grab? Sample Containers

Sample Identity	Lab No.	Time	Date Sampled	PFAS	Cooler #3	Cooler #5	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
SS-19-03		840	10/14/19	X			1	Soil
SS-19-04		851		X			1	
SS-19-05		854		X	X		1	
SS-19-06		901		X	X		1	
SS-19-07		913		X	X		1	
SS-19-08		943		X			1	
SS-19-09		948		X	X		1	
SS-19-10		951		X	X		1	
SS-19-11		959		X			1	
SS-19-12		1007		X	X		1	

Project Information

Number: _____
 Name: _____
 Contact: _____
 Ongoing Project? Yes No
 Sampler: _____

Sample Receipt

Total No. of Containers: _____
 COC Seals/Intact? Y/N/NA _____
 Received Good Cond./Cold _____
 Temp: _____
 Delivery Method: _____

Notes:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file

Relinquished By: 1. Signature: _____ Printed Name: <u>see page</u> Date: _____ Company: _____	Relinquished By: 2. Signature: _____ Printed Name: _____ Date: _____ Company: _____	Relinquished By: 3. Signature: _____ Printed Name: _____ Date: _____ Company: _____
Received By: 1. Signature: _____ Printed Name: _____ Date: _____ Company: _____	Received By: 2. Signature: _____ Printed Name: _____ Date: _____ Company: _____	Received By: 3. Signature: _____ Printed Name: <u>Shannon & Wilson</u> Date: <u>10/17/19</u> Company: <u>ETA D See</u>



Soils - Project site characterization

CHAIN-OF-CUSTODY RECORD

Quote No: _____
 J-Flags: Yes No

Turn Around Time:
 Normal Rush
 Please Specify _____

Analytical Methods (include preservative if used)

PTAS	Cooler #3	Cooler #5	
------	-----------	-----------	--

Remarks/Matrix Composition/Grab? Sample Containers

Sample Identity	Lab No.	Time	Date Sampled	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
SS-19-13	1013	1007	10/14/19	1	Soil
SS-19-14	1000	1013		1	
SS-19-15	1083	1000		1	
SS-19-16		1039		1	
SS-19-17		1034		1	
SS-19-18		1020		1	
SS-19-19		1046		1	
SS-19-20		1216		1	
SS-19-21		1238		1	
SS-19-22		1235		1	

Project Information

Number: _____
 Name: _____
 Contact: _____
 Ongoing Project? Yes No
 Sampler: _____

Sample Receipt

Total No. of Containers: _____
 COC Seals/Intact? Y/N/NA _____
 Received Good Cond./Cold _____
 Temp: _____
 Delivery Method: _____

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: _____ Printed Name: <u>See Page</u> Company: _____	Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____
Time: _____ Date: _____	Time: _____ Date: _____	Time: _____ Date: _____
Received By: 1.	Received By: 2.	Received By: 3.
Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____
Time: _____ Date: _____	Time: _____ Date: _____	Time: <u>10/10</u> Date: <u>10/10/19</u>

Notes:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file



Soils - project site characterization



2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Page 5 of 6

Laboratory _____
Attn: _____

Analytical Methods (include preservative if used)

DFAS	Coles #15	Coor #5	Total Number of Containers
------	-----------	---------	----------------------------

Quote No: _____
J-Flags: Yes No

Turn Around Time:
 Normal Rush
Please Specify _____

Sample Identity	Lab No.	Time	Date Sampled	DFAS	Coles #15	Coor #5	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
SS-19-23		1200	10/14/19	X			1	Soil
SS-19-24	124	1235		X	X		1	
SS-19-25		1259		X	X		1	
SS-19-26		1306		X	X		1	
SS-19-27		1318		X	X		1	
SS-19-28		1326		X	X		1	
SW-19-10		1350		X	X		1	Sediment
SW-19-11		1340		X	X		1	
Solvent 1		1440		X	X		1	
SS-19-30		1450		X	X		1	

Project Information
Number: _____
Name: _____
Contact: _____
Ongoing Project? Yes No
Sampler: _____

Sample Receipt
Total No. of Containers: _____
COC Seals/Intact? Y/N/NA _____
Received Good Cond./Cold _____
Temp: _____
Delivery Method: _____

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____
Time: _____ Date: _____	Time: _____ Date: _____	Time: _____ Date: _____
Received By: 1.	Received By: 2.	Received By: 3.
Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____
Time: _____ Date: _____	Time: _____ Date: _____	Time: _____ Date: _____

Notes:
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - job file



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-55422-1

Login Number: 55422

List Source: Eurofins TestAmerica, Sacramento

List Number: 1

Creator: Oropeza, Salvador

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
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?	False	
There are no discrepancies between the containers received and the COC.	False	Received extra samples not listed on COC.
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 <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

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

Laboratory Job ID: 320-55444-1
Client Project/Site: Gustavus Site Chara

For:
Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:
11/20/2019 2:55:54 PM

David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



Table of Contents

Cover Page	1
Table of Contents	2
Definitions/Glossary	3
Case Narrative	4
Detection Summary	5
Client Sample Results	7
Isotope Dilution Summary	26
QC Sample Results	28
QC Association Summary	35
Lab Chronicle	37
Certification Summary	43
Method Summary	44
Sample Summary	45
Chain of Custody	46
Receipt Checklists	48

Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Job ID: 320-55444-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative 320-55444-1

Receipt

The samples were received on 10/17/2019 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.3° C.

Receipt Exceptions

The Chain-of-Custody (COC) was incomplete as received and/or improperly completed. The second page of the COC was not relinquished by client. Instead, it had a large note over the space where the client was supposed to relinquish saying "see page 1".

LCMS

Method 537 (modified): Due to a shortage in the marketplace for 13C3-PFBS, the target analyte PFBS and/or Perfluoropentanesulfonic acid (PFPeS) could not be quantitated against 13C3-PFBS (its labeled variant) as listed in the SOP. PFBS and Perfluoropentanesulfonic acid (PFPeS) was quantitated versus 18O2-PFHxS instead.

Method 537 (modified): The "l" qualifier means the transition mass ratio for the indicated analyte(s) was outside of the established ratio limits. The qualitative identification of the analyte(s) has/have some degree of uncertainty. However, analyst judgement was used to positively identify the analyte(s). Drum15 (320-55444-15)

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

General Chemistry

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

Organic Prep

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-334030.

Method 3535: The following samples were observed to contain sediment prior to extraction: Drum01 (320-55444-1), Drum02 (320-55444-2)

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum01

Lab Sample ID: 320-55444-1

No Detections.

Client Sample ID: Drum02

Lab Sample ID: 320-55444-2

No Detections.

Client Sample ID: Drum03

Lab Sample ID: 320-55444-3

No Detections.

Client Sample ID: Drum04

Lab Sample ID: 320-55444-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.039	J	0.24	0.038	ug/Kg	1	*	537 (modified)	Total/NA

Client Sample ID: Drum05

Lab Sample ID: 320-55444-5

No Detections.

Client Sample ID: Drum06

Lab Sample ID: 320-55444-6

No Detections.

Client Sample ID: Drum07

Lab Sample ID: 320-55444-7

No Detections.

Client Sample ID: Drum08

Lab Sample ID: 320-55444-8

No Detections.

Client Sample ID: Drum09

Lab Sample ID: 320-55444-9

No Detections.

Client Sample ID: Drum10

Lab Sample ID: 320-55444-10

No Detections.

Client Sample ID: Drum11

Lab Sample ID: 320-55444-11

No Detections.

Client Sample ID: Drum12

Lab Sample ID: 320-55444-12

No Detections.

Client Sample ID: Drum13

Lab Sample ID: 320-55444-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.24	J	0.52	0.21	ug/Kg	1	*	537 (modified)	Total/NA

Client Sample ID: Drum14

Lab Sample ID: 320-55444-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.15	J	0.20	0.031	ug/Kg	1	*	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.90		0.50	0.20	ug/Kg	1	*	537 (modified)	Total/NA

Client Sample ID: Drum15

Lab Sample ID: 320-55444-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.22	J	0.23	0.048	ug/Kg	1	*	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum15 (Continued)

Lab Sample ID: 320-55444-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.053	J	0.23	0.033	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.12	J	0.23	0.097	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.045	J	0.23	0.025	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.077	J	0.23	0.041	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.043	J I	0.23	0.028	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.41		0.23	0.035	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.2		0.57	0.23	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: Drum16

Lab Sample ID: 320-55444-16

No Detections.

Client Sample ID: EB-19-31

Lab Sample ID: 320-55444-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.28	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: GAC #1

Lab Sample ID: 320-55444-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.27	J B	1.9	0.17	ng/L	1		537 (modified)	Total/NA

Client Sample ID: GAC #2

Lab Sample ID: 320-55444-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.50	J	1.9	0.28	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.32	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.53	J	1.9	0.52	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum01

Lab Sample ID: 320-55444-1

Date Collected: 10/15/19 13:46

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 78.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.24	0.051	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluoroheptanoic acid (PFHpA)	ND		0.24	0.035	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorooctanoic acid (PFOA)	ND		0.24	0.11	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorononanoic acid (PFNA)	ND		0.24	0.044	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorodecanoic acid (PFDA)	ND		0.24	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluoroundecanoic acid (PFUnA)	ND		0.24	0.044	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.082	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.062	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.066	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24	0.038	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.61	0.24	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.48	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.45	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.033	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.13	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.022	ug/Kg	☼	10/28/19 08:45	11/16/19 09:58	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	95		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C4 PFHpA	99		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C4 PFOA	93		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C5 PFNA	87		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C2 PFDA	84		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C2 PFUnA	86		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C2 PFDoA	83		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C2 PFTeDA	82		25 - 150	10/28/19 08:45	11/16/19 09:58	1
18O2 PFHxS	97		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C4 PFOS	80		25 - 150	10/28/19 08:45	11/16/19 09:58	1
d3-NMeFOSAA	72		25 - 150	10/28/19 08:45	11/16/19 09:58	1
d5-NEtFOSAA	73		25 - 150	10/28/19 08:45	11/16/19 09:58	1
13C3 HFPO-DA	91		25 - 150	10/28/19 08:45	11/16/19 09:58	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum02

Lab Sample ID: 320-55444-2

Date Collected: 10/15/19 13:25

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 77.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.24	0.050	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluoroheptanoic acid (PFHpA)	ND		0.24	0.034	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorooctanoic acid (PFOA)	ND		0.24	0.10	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorononanoic acid (PFNA)	ND		0.24	0.043	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorodecanoic acid (PFDA)	ND		0.24	0.026	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluoroundecanoic acid (PFUnA)	ND		0.24	0.043	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.079	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.060	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.064	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.030	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.59	0.24	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.46	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.44	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.032	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.30	0.13	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.026	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.021	ug/Kg	☼	10/28/19 08:45	11/16/19 10:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	102		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C4 PFHpA	103		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C4 PFOA	101		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C5 PFNA	95		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C2 PFDA	95		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C2 PFUnA	92		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C2 PFDoA	90		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C2 PFTeDA	84		25 - 150	10/28/19 08:45	11/16/19 10:28	1
18O2 PFHxS	102		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C4 PFOS	85		25 - 150	10/28/19 08:45	11/16/19 10:28	1
d3-NMeFOSAA	83		25 - 150	10/28/19 08:45	11/16/19 10:28	1
d5-NEtFOSAA	73		25 - 150	10/28/19 08:45	11/16/19 10:28	1
13C3 HFPO-DA	87		25 - 150	10/28/19 08:45	11/16/19 10:28	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum03

Lab Sample ID: 320-55444-3

Date Collected: 10/15/19 13:36

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 77.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.25	0.053	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluoroheptanoic acid (PFHpA)	ND		0.25	0.036	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorooctanoic acid (PFOA)	ND		0.25	0.11	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorononanoic acid (PFNA)	ND		0.25	0.045	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorodecanoic acid (PFDA)	ND		0.25	0.028	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluoroundecanoic acid (PFUnA)	ND		0.25	0.045	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorododecanoic acid (PFDoA)	ND		0.25	0.084	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.064	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25	0.068	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.25	0.039	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.63	0.25	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.49	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.46	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.034	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.31	0.14	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.028	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 10:37	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	102		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C4 PFHpA	104		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C4 PFOA	99		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C5 PFNA	91		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C2 PFDA	86		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C2 PFUnA	86		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C2 PFDoA	82		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C2 PFTeDA	83		25 - 150	10/28/19 08:45	11/16/19 10:37	1
18O2 PFHxS	105		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C4 PFOS	83		25 - 150	10/28/19 08:45	11/16/19 10:37	1
d3-NMeFOSAA	78		25 - 150	10/28/19 08:45	11/16/19 10:37	1
d5-NEtFOSAA	74		25 - 150	10/28/19 08:45	11/16/19 10:37	1
13C3 HFPO-DA	85		25 - 150	10/28/19 08:45	11/16/19 10:37	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum04

Lab Sample ID: 320-55444-4

Date Collected: 10/15/19 13:40

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 78.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.24	0.051	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluoroheptanoic acid (PFHpA)	ND		0.24	0.035	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorooctanoic acid (PFOA)	ND		0.24	0.10	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorononanoic acid (PFNA)	ND		0.24	0.044	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorodecanoic acid (PFDA)	ND		0.24	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluoroundecanoic acid (PFUnA)	ND		0.24	0.044	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.082	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.062	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.066	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.030	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorohexanesulfonic acid (PFHxS)	0.039	J	0.24	0.038	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.61	0.24	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.48	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.45	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.033	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.30	0.13	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.022	ug/Kg	☼	10/28/19 08:45	11/16/19 10:47	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	97		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C4 PFHpA	101		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C4 PFOA	98		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C5 PFNA	94		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C2 PFDA	92		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C2 PFUnA	96		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C2 PFDoA	91		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C2 PFTeDA	82		25 - 150	10/28/19 08:45	11/16/19 10:47	1
18O2 PFHxS	103		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C4 PFOS	84		25 - 150	10/28/19 08:45	11/16/19 10:47	1
d3-NMeFOSAA	91		25 - 150	10/28/19 08:45	11/16/19 10:47	1
d5-NEtFOSAA	93		25 - 150	10/28/19 08:45	11/16/19 10:47	1
13C3 HFPO-DA	86		25 - 150	10/28/19 08:45	11/16/19 10:47	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum05

Lab Sample ID: 320-55444-5

Date Collected: 10/15/19 13:55

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 85.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.045	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.093	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorononanoic acid (PFNA)	ND		0.22	0.039	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorodecanoic acid (PFDA)	ND		0.22	0.024	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluoroundecanoic acid (PFUnA)	ND		0.22	0.039	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.072	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorotridecanoic acid (PFTriA)	ND		0.22	0.055	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.058	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.033	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.54	0.22	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.2	0.42	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.2	0.40	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.029	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.27	0.12	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.024	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.019	ug/Kg	☼	10/28/19 08:45	11/16/19 10:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	101		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C4 PFHpA	104		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C4 PFOA	98		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C5 PFNA	94		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C2 PFDA	90		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C2 PFUnA	87		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C2 PFDoA	85		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C2 PFTeDA	88		25 - 150	10/28/19 08:45	11/16/19 10:57	1
18O2 PFHxS	106		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C4 PFOS	88		25 - 150	10/28/19 08:45	11/16/19 10:57	1
d3-NMeFOSAA	101		25 - 150	10/28/19 08:45	11/16/19 10:57	1
d5-NEtFOSAA	82		25 - 150	10/28/19 08:45	11/16/19 10:57	1
13C3 HFPO-DA	107		25 - 150	10/28/19 08:45	11/16/19 10:57	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum06

Lab Sample ID: 320-55444-6

Date Collected: 10/15/19 14:00

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 76.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.25	0.054	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluoroheptanoic acid (PFHpA)	ND		0.25	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorooctanoic acid (PFOA)	ND		0.25	0.11	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorononanoic acid (PFNA)	ND		0.25	0.046	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorodecanoic acid (PFDA)	ND		0.25	0.028	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluoroundecanoic acid (PFUnA)	ND		0.25	0.046	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorododecanoic acid (PFDoA)	ND		0.25	0.085	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorotridecanoic acid (PFTriA)	ND		0.25	0.065	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25	0.069	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25	0.032	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.25	0.039	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.64	0.25	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.5	0.50	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.5	0.47	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.034	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.32	0.14	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.25	0.028	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 11:07	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	99		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C4 PFHpA	106		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C4 PFOA	98		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C5 PFNA	94		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C2 PFDA	90		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C2 PFUnA	87		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C2 PFDoA	85		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C2 PFTeDA	85		25 - 150	10/28/19 08:45	11/16/19 11:07	1
18O2 PFHxS	106		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C4 PFOS	87		25 - 150	10/28/19 08:45	11/16/19 11:07	1
d3-NMeFOSAA	70		25 - 150	10/28/19 08:45	11/16/19 11:07	1
d5-NEtFOSAA	69		25 - 150	10/28/19 08:45	11/16/19 11:07	1
13C3 HFPO-DA	113		25 - 150	10/28/19 08:45	11/16/19 11:07	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum07

Lab Sample ID: 320-55444-7

Date Collected: 10/15/19 14:14

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 80.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.24	0.049	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluoroheptanoic acid (PFHpA)	ND		0.24	0.034	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorooctanoic acid (PFOA)	ND		0.24	0.10	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorononanoic acid (PFNA)	ND		0.24	0.042	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorodecanoic acid (PFDA)	ND		0.24	0.026	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluoroundecanoic acid (PFUnA)	ND		0.24	0.042	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.079	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorotridecanoic acid (PFTriA)	ND		0.24	0.060	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.064	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.029	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.59	0.24	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.4	0.46	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.4	0.44	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.032	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.29	0.13	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.026	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.021	ug/Kg	☼	10/28/19 08:45	11/16/19 11:36	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C4 PFHpA	92		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C4 PFOA	86		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C5 PFNA	82		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C2 PFDA	76		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C2 PFUnA	77		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C2 PFDoA	75		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C2 PFTeDA	75		25 - 150	10/28/19 08:45	11/16/19 11:36	1
18O2 PFHxS	98		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C4 PFOS	75		25 - 150	10/28/19 08:45	11/16/19 11:36	1
d3-NMeFOSAA	72		25 - 150	10/28/19 08:45	11/16/19 11:36	1
d5-NEtFOSAA	71		25 - 150	10/28/19 08:45	11/16/19 11:36	1
13C3 HFPO-DA	88		25 - 150	10/28/19 08:45	11/16/19 11:36	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum08

Lab Sample ID: 320-55444-8

Date Collected: 10/15/19 14:25

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 85.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.23	0.049	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.034	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorooctanoic acid (PFOA)	ND		0.23	0.099	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorononanoic acid (PFNA)	ND		0.23	0.042	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorodecanoic acid (PFDA)	ND		0.23	0.025	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23	0.042	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.078	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.059	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.062	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.029	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.036	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.58	0.23	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.3	0.45	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.3	0.43	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.29	0.13	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.025	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.021	ug/Kg	☼	10/28/19 08:45	11/16/19 11:46	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	104		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C4 PFHpA	104		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C4 PFOA	101		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C5 PFNA	93		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C2 PFDA	84		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C2 PFUnA	86		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C2 PFDoA	85		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C2 PFTeDA	87		25 - 150	10/28/19 08:45	11/16/19 11:46	1
18O2 PFHxS	105		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C4 PFOS	81		25 - 150	10/28/19 08:45	11/16/19 11:46	1
d3-NMeFOSAA	84		25 - 150	10/28/19 08:45	11/16/19 11:46	1
d5-NEtFOSAA	82		25 - 150	10/28/19 08:45	11/16/19 11:46	1
13C3 HFPO-DA	85		25 - 150	10/28/19 08:45	11/16/19 11:46	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum09

Lab Sample ID: 320-55444-9

Date Collected: 10/15/19 14:30

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 94.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.045	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.091	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.038	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.038	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.071	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.054	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.057	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.033	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.53	0.21	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.41	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.39	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.029	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.27	0.12	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/28/19 08:45	11/16/19 11:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	89		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C4 PFHpA	92		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C4 PFOA	88		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C5 PFNA	80		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C2 PFDA	71		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C2 PFUnA	67		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C2 PFDoA	64		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C2 PFTeDA	67		25 - 150	10/28/19 08:45	11/16/19 11:55	1
18O2 PFHxS	94		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C4 PFOS	68		25 - 150	10/28/19 08:45	11/16/19 11:55	1
d3-NMeFOSAA	59		25 - 150	10/28/19 08:45	11/16/19 11:55	1
d5-NEtFOSAA	61		25 - 150	10/28/19 08:45	11/16/19 11:55	1
13C3 HFPO-DA	78		25 - 150	10/28/19 08:45	11/16/19 11:55	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum10

Lab Sample ID: 320-55444-10

Date Collected: 10/15/19 14:55

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 94.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.041	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.085	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.066	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.050	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.053	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.49	0.20	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.38	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.36	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/28/19 08:45	11/16/19 12:05	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	99		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C4 PFHpA	101		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C4 PFOA	97		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C5 PFNA	87		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C2 PFDA	82		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C2 PFUnA	71		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C2 PFDoA	70		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C2 PFTeDA	65		25 - 150	10/28/19 08:45	11/16/19 12:05	1
18O2 PFHxS	101		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C4 PFOS	74		25 - 150	10/28/19 08:45	11/16/19 12:05	1
d3-NMeFOSAA	70		25 - 150	10/28/19 08:45	11/16/19 12:05	1
d5-NEtFOSAA	70		25 - 150	10/28/19 08:45	11/16/19 12:05	1
13C3 HFPO-DA	85		25 - 150	10/28/19 08:45	11/16/19 12:05	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum11
Date Collected: 10/15/19 15:18
Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-11
Matrix: Solid
Percent Solids: 91.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.043	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.030	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.088	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.069	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.052	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.055	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.032	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.51	0.21	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.40	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.38	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.018	ug/Kg	☼	10/28/19 08:45	11/16/19 12:15	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	103		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C4 PFHpA	106		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C4 PFOA	99		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C5 PFNA	91		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C2 PFDA	86		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C2 PFUnA	83		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C2 PFDoA	87		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C2 PFTeDA	79		25 - 150	10/28/19 08:45	11/16/19 12:15	1
18O2 PFHxS	106		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C4 PFOS	80		25 - 150	10/28/19 08:45	11/16/19 12:15	1
d3-NMeFOSAA	69		25 - 150	10/28/19 08:45	11/16/19 12:15	1
d5-NEtFOSAA	73		25 - 150	10/28/19 08:45	11/16/19 12:15	1
13C3 HFPO-DA	90		25 - 150	10/28/19 08:45	11/16/19 12:15	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum12

Lab Sample ID: 320-55444-12

Date Collected: 10/15/19 15:28

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 94.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.043	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.087	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.068	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.052	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.055	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.51	0.20	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.40	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.38	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/28/19 08:45	11/16/19 12:25	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	105		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C4 PFHpA	108		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C4 PFOA	100		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C5 PFNA	93		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C2 PFDA	83		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C2 PFUnA	84		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C2 PFDoA	84		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C2 PFTeDA	84		25 - 150	10/28/19 08:45	11/16/19 12:25	1
18O2 PFHxS	108		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C4 PFOS	78		25 - 150	10/28/19 08:45	11/16/19 12:25	1
d3-NMeFOSAA	76		25 - 150	10/28/19 08:45	11/16/19 12:25	1
d5-NEtFOSAA	81		25 - 150	10/28/19 08:45	11/16/19 12:25	1
13C3 HFPO-DA	98		25 - 150	10/28/19 08:45	11/16/19 12:25	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum13

Lab Sample ID: 320-55444-13

Date Collected: 10/15/19 15:32

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 92.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.043	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.030	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.089	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.037	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.069	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.053	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.056	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.032	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Perfluorooctanesulfonic acid (PFOS)	0.24	J	0.52	0.21	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.40	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.38	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.11	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/28/19 08:45	11/16/19 12:34	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C4 PFHpA	96		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C4 PFOA	92		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C5 PFNA	89		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C2 PFDA	85		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C2 PFUnA	84		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C2 PFDoA	76		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C2 PFTeDA	77		25 - 150	10/28/19 08:45	11/16/19 12:34	1
18O2 PFHxS	100		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C4 PFOS	77		25 - 150	10/28/19 08:45	11/16/19 12:34	1
d3-NMeFOSAA	87		25 - 150	10/28/19 08:45	11/16/19 12:34	1
d5-NEtFOSAA	82		25 - 150	10/28/19 08:45	11/16/19 12:34	1
13C3 HFPO-DA	76		25 - 150	10/28/19 08:45	11/16/19 12:34	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum14

Lab Sample ID: 320-55444-14

Date Collected: 10/15/19 15:40

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 93.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.087	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.068	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.055	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorohexanesulfonic acid (PFHxS)	0.15	J	0.20	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Perfluorooctanesulfonic acid (PFOS)	0.90		0.50	0.20	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg	☼	10/28/19 08:45	11/16/19 12:44	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	102		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C4 PFHpA	104		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C4 PFOA	98		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C5 PFNA	92		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C2 PFDA	86		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C2 PFUnA	83		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C2 PFDoA	82		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C2 PFTeDA	80		25 - 150	10/28/19 08:45	11/16/19 12:44	1
18O2 PFHxS	99		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C4 PFOS	79		25 - 150	10/28/19 08:45	11/16/19 12:44	1
d3-NMeFOSAA	55		25 - 150	10/28/19 08:45	11/16/19 12:44	1
d5-NEtFOSAA	50		25 - 150	10/28/19 08:45	11/16/19 12:44	1
13C3 HFPO-DA	91		25 - 150	10/28/19 08:45	11/16/19 12:44	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum15

Lab Sample ID: 320-55444-15

Date Collected: 10/15/19 15:45

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 82.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.22	J	0.23	0.048	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluoroheptanoic acid (PFHpA)	0.053	J	0.23	0.033	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorooctanoic acid (PFOA)	0.12	J	0.23	0.097	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorononanoic acid (PFNA)	ND		0.23	0.041	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorodecanoic acid (PFDA)	0.045	J	0.23	0.025	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluoroundecanoic acid (PFUnA)	0.077	J	0.23	0.041	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.076	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.058	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.061	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorobutanesulfonic acid (PFBS)	0.043	J I	0.23	0.028	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorohexanesulfonic acid (PFHxS)	0.41		0.23	0.035	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Perfluorooctanesulfonic acid (PFOS)	2.2		0.57	0.23	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.3	0.44	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.3	0.42	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.031	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.28	0.12	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.025	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.020	ug/Kg	☼	10/28/19 08:45	11/16/19 12:54	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C4 PFHpA	102		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C4 PFOA	98		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C5 PFNA	92		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C2 PFDA	89		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C2 PFUnA	93		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C2 PFDoA	85		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C2 PFTeDA	84		25 - 150	10/28/19 08:45	11/16/19 12:54	1
18O2 PFHxS	104		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C4 PFOS	86		25 - 150	10/28/19 08:45	11/16/19 12:54	1
d3-NMeFOSAA	64		25 - 150	10/28/19 08:45	11/16/19 12:54	1
d5-NEtFOSAA	70		25 - 150	10/28/19 08:45	11/16/19 12:54	1
13C3 HFPO-DA	69		25 - 150	10/28/19 08:45	11/16/19 12:54	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum16

Lab Sample ID: 320-55444-16

Date Collected: 10/15/19 16:46

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 91.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.044	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.030	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.090	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorononanoic acid (PFNA)	ND		0.21	0.038	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluoroundecanoic acid (PFUnA)	ND		0.21	0.038	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.070	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.054	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.057	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.026	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.033	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.53	0.21	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.1	0.41	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.1	0.39	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.028	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.26	0.12	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.023	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.019	ug/Kg	☼	10/28/19 08:45	11/16/19 13:04	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	103		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C4 PFHpA	105		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C4 PFOA	101		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C5 PFNA	90		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C2 PFDA	82		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C2 PFUnA	86		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C2 PFDoA	84		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C2 PFTeDA	80		25 - 150	10/28/19 08:45	11/16/19 13:04	1
18O2 PFHxS	105		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C4 PFOS	82		25 - 150	10/28/19 08:45	11/16/19 13:04	1
d3-NMeFOSAA	76		25 - 150	10/28/19 08:45	11/16/19 13:04	1
d5-NEtFOSAA	79		25 - 150	10/28/19 08:45	11/16/19 13:04	1
13C3 HFPO-DA	84		25 - 150	10/28/19 08:45	11/16/19 13:04	1

Client Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: EB-19-31

Lab Sample ID: 320-55444-17

Date Collected: 10/15/19 17:13

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.54	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.23	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.79	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.51	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorohexanesulfonic acid (PFHxS)	0.28	J B	1.9	0.16	ng/L		10/28/19 06:01	11/02/19 11:38	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.50	ng/L		10/28/19 06:01	11/02/19 11:38	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/28/19 06:01	11/02/19 11:38	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		10/28/19 06:01	11/02/19 11:38	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/28/19 06:01	11/02/19 11:38	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/28/19 06:01	11/02/19 11:38	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/28/19 06:01	11/02/19 11:38	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/28/19 06:01	11/02/19 11:38	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	99		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C4 PFHpA	97		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C4 PFOA	101		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C5 PFNA	102		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C2 PFDA	103		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C2 PFUnA	105		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C2 PFDoA	109		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C2 PFTeDA	101		25 - 150	10/28/19 06:01	11/02/19 11:38	1
18O2 PFHxS	109		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C4 PFOS	101		25 - 150	10/28/19 06:01	11/02/19 11:38	1
d3-NMeFOSAA	98		25 - 150	10/28/19 06:01	11/02/19 11:38	1
d5-NEtFOSAA	109		25 - 150	10/28/19 06:01	11/02/19 11:38	1
13C3 HFPO-DA	96		25 - 150	10/28/19 06:01	11/02/19 11:38	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: GAC #1
Date Collected: 10/15/19 07:30
Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-18
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.56	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.83	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.3	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorohexanesulfonic acid (PFHxS)	0.27	J B	1.9	0.17	ng/L		10/28/19 06:01	11/02/19 11:48	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.53	ng/L		10/28/19 06:01	11/02/19 11:48	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/28/19 06:01	11/02/19 11:48	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/28/19 06:01	11/02/19 11:48	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/28/19 06:01	11/02/19 11:48	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		10/28/19 06:01	11/02/19 11:48	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/28/19 06:01	11/02/19 11:48	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.18	ng/L		10/28/19 06:01	11/02/19 11:48	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	104		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C4 PFHpA	104		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C4 PFOA	100		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C5 PFNA	90		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C2 PFDA	89		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C2 PFUnA	84		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C2 PFDoA	83		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C2 PFTeDA	87		25 - 150	10/28/19 06:01	11/02/19 11:48	1
18O2 PFHxS	105		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C4 PFOS	85		25 - 150	10/28/19 06:01	11/02/19 11:48	1
d3-NMeFOSAA	81		25 - 150	10/28/19 06:01	11/02/19 11:48	1
d5-NEtFOSAA	87		25 - 150	10/28/19 06:01	11/02/19 11:48	1
13C3 HFPO-DA	101		25 - 150	10/28/19 06:01	11/02/19 11:48	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: GAC #2

Lab Sample ID: 320-55444-19

Date Collected: 10/15/19 10:05

Matrix: Water

Date Received: 10/17/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.56	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.82	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorotetradecanoic acid (PFTeA)	0.50	J	1.9	0.28	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorohexanesulfonic acid (PFHxS)	0.32	J B	1.9	0.16	ng/L		10/28/19 06:01	11/02/19 11:58	1
Perfluorooctanesulfonic acid (PFOS)	0.53	J	1.9	0.52	ng/L		10/28/19 06:01	11/02/19 11:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		10/28/19 06:01	11/02/19 11:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		10/28/19 06:01	11/02/19 11:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		10/28/19 06:01	11/02/19 11:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		10/28/19 06:01	11/02/19 11:58	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		10/28/19 06:01	11/02/19 11:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		10/28/19 06:01	11/02/19 11:58	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	65		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C4 PFHpA	59		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C4 PFOA	57		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C5 PFNA	55		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C2 PFDA	55		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C2 PFUnA	54		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C2 PFDoA	56		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C2 PFTeDA	52		25 - 150	10/28/19 06:01	11/02/19 11:58	1
18O2 PFHxS	62		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C4 PFOS	53		25 - 150	10/28/19 06:01	11/02/19 11:58	1
d3-NMeFOSAA	55		25 - 150	10/28/19 06:01	11/02/19 11:58	1
d5-NEtFOSAA	57		25 - 150	10/28/19 06:01	11/02/19 11:58	1
13C3 HFPO-DA	67		25 - 150	10/28/19 06:01	11/02/19 11:58	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)
320-55444-1	Drum01	95	99	93	87	84	86	83	82
320-55444-1 MS	Drum01	95	100	98	94	88	88	84	87
320-55444-1 MSD	Drum01	96	99	94	90	85	84	80	82
320-55444-2	Drum02	102	103	101	95	95	92	90	84
320-55444-3	Drum03	102	104	99	91	86	86	82	83
320-55444-4	Drum04	97	101	98	94	92	96	91	82
320-55444-5	Drum05	101	104	98	94	90	87	85	88
320-55444-6	Drum06	99	106	98	94	90	87	85	85
320-55444-7	Drum07	88	92	86	82	76	77	75	75
320-55444-8	Drum08	104	104	101	93	84	86	85	87
320-55444-9	Drum09	89	92	88	80	71	67	64	67
320-55444-10	Drum10	99	101	97	87	82	71	70	65
320-55444-11	Drum11	103	106	99	91	86	83	87	79
320-55444-12	Drum12	105	108	100	93	83	84	84	84
320-55444-13	Drum13	96	96	92	89	85	84	76	77
320-55444-14	Drum14	102	104	98	92	86	83	82	80
320-55444-15	Drum15	88	102	98	92	89	93	85	84
320-55444-16	Drum16	103	105	101	90	82	86	84	80
LCS 320-334052/2-A	Lab Control Sample	100	102	96	89	83	84	86	86
MB 320-334052/1-A	Method Blank	78	82	74	71	69	67	67	67

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFOS (25-150)	-NMeFOS (25-150)	-NEtFOS (25-150)	HFPODA (25-150)
320-55444-1	Drum01	97	80	72	73	91
320-55444-1 MS	Drum01	104	87	87	76	98
320-55444-1 MSD	Drum01	102	82	90	75	85
320-55444-2	Drum02	102	85	83	73	87
320-55444-3	Drum03	105	83	78	74	85
320-55444-4	Drum04	103	84	91	93	86
320-55444-5	Drum05	106	88	101	82	107
320-55444-6	Drum06	106	87	70	69	113
320-55444-7	Drum07	98	75	72	71	88
320-55444-8	Drum08	105	81	84	82	85
320-55444-9	Drum09	94	68	59	61	78
320-55444-10	Drum10	101	74	70	70	85
320-55444-11	Drum11	106	80	69	73	90
320-55444-12	Drum12	108	78	76	81	98
320-55444-13	Drum13	100	77	87	82	76
320-55444-14	Drum14	99	79	55	50	91
320-55444-15	Drum15	104	86	64	70	69
320-55444-16	Drum16	105	82	76	79	84
LCS 320-334052/2-A	Lab Control Sample	107	85	67	70	89
MB 320-334052/1-A	Method Blank	86	67	56	59	71

Surrogate Legend

- PFHxA = 13C2 PFHxA
- PFHpA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

PFUnA = 13C2 PFUnA
 PFDoA = 13C2 PFDoA
 PFTDA = 13C2 PFTeDA
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3-NMeFOSAA = d3-NMeFOSAA
 d5-NEtFOSAA = d5-NEtFOSAA
 HFPODA = 13C3 HFPO-DA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)
320-55444-17	EB-19-31	99	97	101	102	103	105	109	101
320-55444-18	GAC #1	104	104	100	90	89	84	83	87
320-55444-19	GAC #2	65	59	57	55	55	54	56	52
LCS 320-334030/2-A	Lab Control Sample	102	105	103	105	105	106	104	103
LCS 320-334030/3-A	Lab Control Sample Dup	91	92	92	93	94	94	95	95
MB 320-334030/1-A	Method Blank	102	105	108	106	106	103	103	99

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFOS (25-150)	d3-NMeFOSAA (25-150)	d5-NEtFOSAA (25-150)	HFPODA (25-150)
320-55444-17	EB-19-31	109	101	98	109	96
320-55444-18	GAC #1	105	85	81	87	101
320-55444-19	GAC #2	62	53	55	57	67
LCS 320-334030/2-A	Lab Control Sample	114	106	100	101	104
LCS 320-334030/3-A	Lab Control Sample Dup	101	92	88	93	97
MB 320-334030/1-A	Method Blank	116	104	91	103	107

Surrogate Legend

PFHxA = 13C2 PFHxA
 PFHpA = 13C4 PFHpA
 PFOA = 13C4 PFOA
 PFNA = 13C5 PFNA
 PFDA = 13C2 PFDA
 PFUnA = 13C2 PFUnA
 PFDoA = 13C2 PFDoA
 PFTDA = 13C2 PFTeDA
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3-NMeFOSAA = d3-NMeFOSAA
 d5-NEtFOSAA = d5-NEtFOSAA
 HFPODA = 13C3 HFPO-DA

QC Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-334030/1-A
Matrix: Water
Analysis Batch: 335476

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 334030

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorohexanesulfonic acid (PFHxS)	0.314	J	2.0	0.17	ng/L		10/28/19 06:01	11/02/19 08:55	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		10/28/19 06:01	11/02/19 08:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		10/28/19 06:01	11/02/19 08:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		10/28/19 06:01	11/02/19 08:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/28/19 06:01	11/02/19 08:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		10/28/19 06:01	11/02/19 08:55	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		10/28/19 06:01	11/02/19 08:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		10/28/19 06:01	11/02/19 08:55	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	102		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C4 PFHpA	105		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C4 PFOA	108		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C5 PFNA	106		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C2 PFDA	106		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C2 PFUnA	103		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C2 PFDoA	103		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C2 PFTeDA	99		25 - 150	10/28/19 06:01	11/02/19 08:55	1
18O2 PFHxS	116		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C4 PFOS	104		25 - 150	10/28/19 06:01	11/02/19 08:55	1
d3-NMeFOSAA	91		25 - 150	10/28/19 06:01	11/02/19 08:55	1
d5-NEtFOSAA	103		25 - 150	10/28/19 06:01	11/02/19 08:55	1
13C3 HFPO-DA	107		25 - 150	10/28/19 06:01	11/02/19 08:55	1

Lab Sample ID: LCS 320-334030/2-A
Matrix: Water
Analysis Batch: 335476

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 334030

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	40.0	43.3		ng/L		108	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	41.8		ng/L		104	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	42.0		ng/L		105	70 - 130
Perfluorononanoic acid (PFNA)	40.0	43.0		ng/L		107	75 - 135
Perfluorodecanoic acid (PFDA)	40.0	42.9		ng/L		107	76 - 136

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-334030/2-A
Matrix: Water
Analysis Batch: 335476

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 334030

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroundecanoic acid (PFUnA)	40.0	38.9		ng/L		97	68 - 128
Perfluorododecanoic acid (PFDoA)	40.0	40.8		ng/L		102	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	42.3		ng/L		106	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	40.1		ng/L		100	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	33.8		ng/L		96	67 - 127
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.3		ng/L		92	59 - 119
Perfluorooctanesulfonic acid (PFOS)	37.1	37.4		ng/L		101	70 - 130
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	37.3	37.1		ng/L		100	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	42.8		ng/L		107	51 - 173
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	37.7	29.2		ng/L		78	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	41.9		ng/L		111	79 - 139

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	102		25 - 150
13C4 PFHpA	105		25 - 150
13C4 PFOA	103		25 - 150
13C5 PFNA	105		25 - 150
13C2 PFDA	105		25 - 150
13C2 PFUnA	106		25 - 150
13C2 PFDoA	104		25 - 150
13C2 PFTeDA	103		25 - 150
18O2 PFHxS	114		25 - 150
13C4 PFOS	106		25 - 150
d3-NMeFOSAA	100		25 - 150
d5-NEtFOSAA	101		25 - 150
13C3 HFPO-DA	104		25 - 150

Lab Sample ID: LCSD 320-334030/3-A
Matrix: Water
Analysis Batch: 335476

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 334030

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	41.7		ng/L		104	73 - 133	4	30
Perfluoroheptanoic acid (PFHpA)	40.0	42.2		ng/L		106	72 - 132	1	30
Perfluorooctanoic acid (PFOA)	40.0	41.7		ng/L		104	70 - 130	1	30
Perfluorononanoic acid (PFNA)	40.0	42.9		ng/L		107	75 - 135	0	30
Perfluorodecanoic acid (PFDA)	40.0	41.8		ng/L		105	76 - 136	3	30
Perfluoroundecanoic acid (PFUnA)	40.0	38.9		ng/L		97	68 - 128	0	30
Perfluorododecanoic acid (PFDoA)	40.0	41.9		ng/L		105	71 - 131	3	30

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-334030/3-A
Matrix: Water
Analysis Batch: 335476

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 334030

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorotridecanoic acid (PFTriA)	40.0	44.0		ng/L		110	71 - 131	4	30
Perfluorotetradecanoic acid (PFTeA)	40.0	39.6		ng/L		99	70 - 130	1	30
Perfluorobutanesulfonic acid (PFBS)	35.4	33.0		ng/L		93	67 - 127	2	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.8		ng/L		93	59 - 119	1	30
Perfluorooctanesulfonic acid (PFOS)	37.1	37.9		ng/L		102	70 - 130	1	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.3	38.2		ng/L		102	75 - 135	3	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	39.8		ng/L		100	51 - 173	7	30
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	37.7	30.6		ng/L		81	54 - 114	4	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	40.8		ng/L		108	79 - 139	3	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
13C2 PFHxA	91		25 - 150
13C4 PFHpA	92		25 - 150
13C4 PFOA	92		25 - 150
13C5 PFNA	93		25 - 150
13C2 PFDA	94		25 - 150
13C2 PFUnA	94		25 - 150
13C2 PFDoA	95		25 - 150
13C2 PFTeDA	95		25 - 150
18O2 PFHxS	101		25 - 150
13C4 PFOS	92		25 - 150
d3-NMeFOSAA	88		25 - 150
d5-NEtFOSAA	93		25 - 150
13C3 HFPO-DA	97		25 - 150

Lab Sample ID: MB 320-334052/1-A
Matrix: Solid
Analysis Batch: 339160

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 334052

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.50	0.20	ug/Kg		10/28/19 08:45	11/16/19 09:39	1

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-334052/1-A
Matrix: Solid
Analysis Batch: 339160

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 334052

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
11-Chloroeicosfluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg		10/28/19 08:45	11/16/19 09:39	1
Isotope Dilution	MB	MB	Limits			D	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
13C2 PFHxA	78		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C4 PFHpA	82		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C4 PFOA	74		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C5 PFNA	71		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C2 PFDA	69		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C2 PFUnA	67		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C2 PFDoA	67		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C2 PFTeDA	67		25 - 150				10/28/19 08:45	11/16/19 09:39	1
18O2 PFHxS	86		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C4 PFOS	67		25 - 150				10/28/19 08:45	11/16/19 09:39	1
d3-NMeFOSAA	56		25 - 150				10/28/19 08:45	11/16/19 09:39	1
d5-NEtFOSAA	59		25 - 150				10/28/19 08:45	11/16/19 09:39	1
13C3 HFPO-DA	71		25 - 150				10/28/19 08:45	11/16/19 09:39	1

Lab Sample ID: LCS 320-334052/2-A
Matrix: Solid
Analysis Batch: 339160

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 334052

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	2.00	2.26		ug/Kg		113	71 - 131
Perfluorooctanoic acid (PFOA)	2.00	2.21		ug/Kg		111	72 - 132
Perfluorononanoic acid (PFNA)	2.00	2.36		ug/Kg		118	73 - 133
Perfluorodecanoic acid (PFDA)	2.00	2.26		ug/Kg		113	72 - 132
Perfluoroundecanoic acid (PFUnA)	2.00	2.07		ug/Kg		104	66 - 126
Perfluorododecanoic acid (PFDoA)	2.00	2.19		ug/Kg		110	71 - 131
Perfluorotridecanoic acid (PFTriA)	2.00	2.41		ug/Kg		120	71 - 131
Perfluorotetradecanoic acid (PFTeA)	2.00	2.19		ug/Kg		110	67 - 127
Perfluorobutanesulfonic acid (PFBS)	1.77	1.78		ug/Kg		101	69 - 129
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.74		ug/Kg		95	62 - 122
Perfluorooctanesulfonic acid (PFOS)	1.86	2.51		ug/Kg		135	68 - 141

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-55444-1 MS

Matrix: Solid

Analysis Batch: 339160

Client Sample ID: Drum01

Prep Type: Total/NA

Prep Batch: 334052

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.26	2.21		ug/Kg	☼	98	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.26	2.74		ug/Kg	☼	121	79 - 139
		MS MS							
Isotope Dilution	%Recovery	Qualifier	Limits						
13C2 PFHxA	95		25 - 150						
13C4 PFHpA	100		25 - 150						
13C4 PFOA	98		25 - 150						
13C5 PFNA	94		25 - 150						
13C2 PFDA	88		25 - 150						
13C2 PFUnA	88		25 - 150						
13C2 PFDoA	84		25 - 150						
13C2 PFTeDA	87		25 - 150						
18O2 PFHxS	104		25 - 150						
13C4 PFOS	87		25 - 150						
d3-NMeFOSAA	87		25 - 150						
d5-NEtFOSAA	76		25 - 150						
13C3 HFPO-DA	98		25 - 150						

Lab Sample ID: 320-55444-1 MSD

Matrix: Solid

Analysis Batch: 339160

Client Sample ID: Drum01

Prep Type: Total/NA

Prep Batch: 334052

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	ND		2.35	2.50		ug/Kg	☼	106	71 - 131	6	30
Perfluoroheptanoic acid (PFHpA)	ND		2.35	2.58		ug/Kg	☼	110	71 - 131	4	30
Perfluorooctanoic acid (PFOA)	ND		2.35	2.55		ug/Kg	☼	109	72 - 132	0	30
Perfluorononanoic acid (PFNA)	ND		2.35	2.66		ug/Kg	☼	113	73 - 133	2	30
Perfluorodecanoic acid (PFDA)	ND		2.35	2.67		ug/Kg	☼	114	72 - 132	1	30
Perfluoroundecanoic acid (PFUnA)	ND		2.35	2.36		ug/Kg	☼	101	66 - 126	1	30
Perfluorododecanoic acid (PFDoA)	ND		2.35	2.54		ug/Kg	☼	108	71 - 131	7	30
Perfluorotridecanoic acid (PFTriA)	ND		2.35	2.76		ug/Kg	☼	118	71 - 131	6	30
Perfluorotetradecanoic acid (PFTeA)	ND		2.35	2.42		ug/Kg	☼	103	67 - 127	3	30
Perfluorobutanesulfonic acid (PFBS)	ND		2.07	2.07		ug/Kg	☼	100	69 - 129	4	30
Perfluorohexanesulfonic acid (PFHxS)	ND		2.13	2.04		ug/Kg	☼	96	62 - 122	1	30
Perfluorooctanesulfonic acid (PFOS)	ND		2.18	2.63		ug/Kg	☼	121	68 - 141	2	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.19	2.50		ug/Kg	☼	115	74 - 134	4	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.35	3.13		ug/Kg	☼	134	53 - 158	23	30
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.21	2.12		ug/Kg	☼	96	66 - 136	4	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.21	2.81		ug/Kg	☼	127	79 - 139	3	30

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>MSD MSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C2 PFHxA	96		25 - 150
13C4 PFHpA	99		25 - 150
13C4 PFOA	94		25 - 150
13C5 PFNA	90		25 - 150
13C2 PFDA	85		25 - 150
13C2 PFUnA	84		25 - 150
13C2 PFDoA	80		25 - 150
13C2 PFTeDA	82		25 - 150
18O2 PFHxS	102		25 - 150
13C4 PFOS	82		25 - 150
d3-NMeFOSAA	90		25 - 150
d5-NEtFOSAA	75		25 - 150
13C3 HFPO-DA	85		25 - 150

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

QC Association Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

LCMS

Prep Batch: 334030

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55444-17	EB-19-31	Total/NA	Water	3535	
320-55444-18	GAC #1	Total/NA	Water	3535	
320-55444-19	GAC #2	Total/NA	Water	3535	
MB 320-334030/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-334030/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-334030/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Prep Batch: 334052

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55444-1	Drum01	Total/NA	Solid	SHAKE	
320-55444-2	Drum02	Total/NA	Solid	SHAKE	
320-55444-3	Drum03	Total/NA	Solid	SHAKE	
320-55444-4	Drum04	Total/NA	Solid	SHAKE	
320-55444-5	Drum05	Total/NA	Solid	SHAKE	
320-55444-6	Drum06	Total/NA	Solid	SHAKE	
320-55444-7	Drum07	Total/NA	Solid	SHAKE	
320-55444-8	Drum08	Total/NA	Solid	SHAKE	
320-55444-9	Drum09	Total/NA	Solid	SHAKE	
320-55444-10	Drum10	Total/NA	Solid	SHAKE	
320-55444-11	Drum11	Total/NA	Solid	SHAKE	
320-55444-12	Drum12	Total/NA	Solid	SHAKE	
320-55444-13	Drum13	Total/NA	Solid	SHAKE	
320-55444-14	Drum14	Total/NA	Solid	SHAKE	
320-55444-15	Drum15	Total/NA	Solid	SHAKE	
320-55444-16	Drum16	Total/NA	Solid	SHAKE	
MB 320-334052/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-334052/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-55444-1 MS	Drum01	Total/NA	Solid	SHAKE	
320-55444-1 MSD	Drum01	Total/NA	Solid	SHAKE	

Analysis Batch: 335476

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55444-17	EB-19-31	Total/NA	Water	537 (modified)	334030
320-55444-18	GAC #1	Total/NA	Water	537 (modified)	334030
320-55444-19	GAC #2	Total/NA	Water	537 (modified)	334030
MB 320-334030/1-A	Method Blank	Total/NA	Water	537 (modified)	334030
LCS 320-334030/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	334030
LCSD 320-334030/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	334030

Analysis Batch: 339160

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55444-1	Drum01	Total/NA	Solid	537 (modified)	334052
320-55444-2	Drum02	Total/NA	Solid	537 (modified)	334052
320-55444-3	Drum03	Total/NA	Solid	537 (modified)	334052
320-55444-4	Drum04	Total/NA	Solid	537 (modified)	334052
320-55444-5	Drum05	Total/NA	Solid	537 (modified)	334052
320-55444-6	Drum06	Total/NA	Solid	537 (modified)	334052
320-55444-7	Drum07	Total/NA	Solid	537 (modified)	334052
320-55444-8	Drum08	Total/NA	Solid	537 (modified)	334052
320-55444-9	Drum09	Total/NA	Solid	537 (modified)	334052
320-55444-10	Drum10	Total/NA	Solid	537 (modified)	334052

Eurofins TestAmerica, Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

LCMS (Continued)

Analysis Batch: 339160 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55444-11	Drum11	Total/NA	Solid	537 (modified)	334052
320-55444-12	Drum12	Total/NA	Solid	537 (modified)	334052
320-55444-13	Drum13	Total/NA	Solid	537 (modified)	334052
320-55444-14	Drum14	Total/NA	Solid	537 (modified)	334052
320-55444-15	Drum15	Total/NA	Solid	537 (modified)	334052
320-55444-16	Drum16	Total/NA	Solid	537 (modified)	334052
MB 320-334052/1-A	Method Blank	Total/NA	Solid	537 (modified)	334052
LCS 320-334052/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	334052
320-55444-1 MS	Drum01	Total/NA	Solid	537 (modified)	334052
320-55444-1 MSD	Drum01	Total/NA	Solid	537 (modified)	334052

General Chemistry

Analysis Batch: 332632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55444-1	Drum01	Total/NA	Solid	D 2216	
320-55444-2	Drum02	Total/NA	Solid	D 2216	
320-55444-3	Drum03	Total/NA	Solid	D 2216	
320-55444-4	Drum04	Total/NA	Solid	D 2216	
320-55444-5	Drum05	Total/NA	Solid	D 2216	
320-55444-6	Drum06	Total/NA	Solid	D 2216	
320-55444-7	Drum07	Total/NA	Solid	D 2216	
320-55444-8	Drum08	Total/NA	Solid	D 2216	
320-55444-9	Drum09	Total/NA	Solid	D 2216	
320-55444-10	Drum10	Total/NA	Solid	D 2216	
320-55444-1 DU	Drum01	Total/NA	Solid	D 2216	

Analysis Batch: 332832

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55444-11	Drum11	Total/NA	Solid	D 2216	
320-55444-12	Drum12	Total/NA	Solid	D 2216	
320-55444-13	Drum13	Total/NA	Solid	D 2216	
320-55444-14	Drum14	Total/NA	Solid	D 2216	
320-55444-15	Drum15	Total/NA	Solid	D 2216	
320-55444-16	Drum16	Total/NA	Solid	D 2216	

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum01

Lab Sample ID: 320-55444-1

Date Collected: 10/15/19 13:46

Matrix: Solid

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Client Sample ID: Drum01

Lab Sample ID: 320-55444-1

Date Collected: 10/15/19 13:46

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 78.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.23 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 09:58	S1M	TAL SAC

Client Sample ID: Drum02

Lab Sample ID: 320-55444-2

Date Collected: 10/15/19 13:25

Matrix: Solid

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Client Sample ID: Drum02

Lab Sample ID: 320-55444-2

Date Collected: 10/15/19 13:25

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 77.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.45 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 10:28	S1M	TAL SAC

Client Sample ID: Drum03

Lab Sample ID: 320-55444-3

Date Collected: 10/15/19 13:36

Matrix: Solid

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Client Sample ID: Drum03

Lab Sample ID: 320-55444-3

Date Collected: 10/15/19 13:36

Matrix: Solid

Date Received: 10/17/19 09:10

Percent Solids: 77.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.15 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 10:37	S1M	TAL SAC

Client Sample ID: Drum04

Lab Sample ID: 320-55444-4

Date Collected: 10/15/19 13:40

Matrix: Solid

Date Received: 10/17/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Eurofins TestAmerica, Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum04

Date Collected: 10/15/19 13:40

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-4

Matrix: Solid

Percent Solids: 78.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.25 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 10:47	S1M	TAL SAC

Client Sample ID: Drum05

Date Collected: 10/15/19 13:55

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-5

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Client Sample ID: Drum05

Date Collected: 10/15/19 13:55

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-5

Matrix: Solid

Percent Solids: 85.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.44 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 10:57	S1M	TAL SAC

Client Sample ID: Drum06

Date Collected: 10/15/19 14:00

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-6

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Client Sample ID: Drum06

Date Collected: 10/15/19 14:00

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-6

Matrix: Solid

Percent Solids: 76.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.16 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 11:07	S1M	TAL SAC

Client Sample ID: Drum07

Date Collected: 10/15/19 14:14

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum07

Date Collected: 10/15/19 14:14

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-7

Matrix: Solid

Percent Solids: 80.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.25 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 11:36	S1M	TAL SAC

Client Sample ID: Drum08

Date Collected: 10/15/19 14:25

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Client Sample ID: Drum08

Date Collected: 10/15/19 14:25

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-8

Matrix: Solid

Percent Solids: 85.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.03 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 11:46	S1M	TAL SAC

Client Sample ID: Drum09

Date Collected: 10/15/19 14:30

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-9

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Client Sample ID: Drum09

Date Collected: 10/15/19 14:30

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-9

Matrix: Solid

Percent Solids: 94.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.01 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 11:55	S1M	TAL SAC

Client Sample ID: Drum10

Date Collected: 10/15/19 14:55

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332632	10/21/19 17:32	HRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum10

Date Collected: 10/15/19 14:55

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-10

Matrix: Solid

Percent Solids: 94.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 12:05	S1M	TAL SAC

Client Sample ID: Drum11

Date Collected: 10/15/19 15:18

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-11

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332832	10/22/19 15:20	TCS	TAL SAC

Client Sample ID: Drum11

Date Collected: 10/15/19 15:18

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-11

Matrix: Solid

Percent Solids: 91.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.35 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 12:15	S1M	TAL SAC

Client Sample ID: Drum12

Date Collected: 10/15/19 15:28

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-12

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332832	10/22/19 15:20	TCS	TAL SAC

Client Sample ID: Drum12

Date Collected: 10/15/19 15:28

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-12

Matrix: Solid

Percent Solids: 94.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.24 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 12:25	S1M	TAL SAC

Client Sample ID: Drum13

Date Collected: 10/15/19 15:32

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-13

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332832	10/22/19 15:20	TCS	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum13

Date Collected: 10/15/19 15:32

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-13

Matrix: Solid

Percent Solids: 92.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.25 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 12:34	S1M	TAL SAC

Client Sample ID: Drum14

Date Collected: 10/15/19 15:40

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-14

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332832	10/22/19 15:20	TCS	TAL SAC

Client Sample ID: Drum14

Date Collected: 10/15/19 15:40

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-14

Matrix: Solid

Percent Solids: 93.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.31 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 12:44	S1M	TAL SAC

Client Sample ID: Drum15

Date Collected: 10/15/19 15:45

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-15

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332832	10/22/19 15:20	TCS	TAL SAC

Client Sample ID: Drum15

Date Collected: 10/15/19 15:45

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-15

Matrix: Solid

Percent Solids: 82.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.37 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 12:54	S1M	TAL SAC

Client Sample ID: Drum16

Date Collected: 10/15/19 16:46

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-16

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			332832	10/22/19 15:20	TCS	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Client Sample ID: Drum16

Date Collected: 10/15/19 16:46

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-16

Matrix: Solid

Percent Solids: 91.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.21 g	10.00 mL	334052	10/28/19 08:45	AEC	TAL SAC
Total/NA	Analysis	537 (modified)		1			339160	11/16/19 13:04	S1M	TAL SAC

Client Sample ID: EB-19-31

Date Collected: 10/15/19 17:13

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-17

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			268.5 mL	10 mL	334030	10/28/19 06:01	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			335476	11/02/19 11:38	P1N	TAL SAC

Client Sample ID: GAC #1

Date Collected: 10/15/19 07:30

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-18

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			257.1 mL	10 mL	334030	10/28/19 06:01	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			335476	11/02/19 11:48	P1N	TAL SAC

Client Sample ID: GAC #2

Date Collected: 10/15/19 10:05

Date Received: 10/17/19 09:10

Lab Sample ID: 320-55444-19

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			260.3 mL	10 mL	334030	10/28/19 06:01	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			335476	11/02/19 11:58	P1N	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
 Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-20 *
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
D 2216	Percent Moisture	ASTM	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	TAL SAC

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Site Chara

Job ID: 320-55444-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-55444-1	Drum01	Solid	10/15/19 13:46	10/17/19 09:10	
320-55444-2	Drum02	Solid	10/15/19 13:25	10/17/19 09:10	
320-55444-3	Drum03	Solid	10/15/19 13:36	10/17/19 09:10	
320-55444-4	Drum04	Solid	10/15/19 13:40	10/17/19 09:10	
320-55444-5	Drum05	Solid	10/15/19 13:55	10/17/19 09:10	
320-55444-6	Drum06	Solid	10/15/19 14:00	10/17/19 09:10	
320-55444-7	Drum07	Solid	10/15/19 14:14	10/17/19 09:10	
320-55444-8	Drum08	Solid	10/15/19 14:25	10/17/19 09:10	
320-55444-9	Drum09	Solid	10/15/19 14:30	10/17/19 09:10	
320-55444-10	Drum10	Solid	10/15/19 14:55	10/17/19 09:10	
320-55444-11	Drum11	Solid	10/15/19 15:18	10/17/19 09:10	
320-55444-12	Drum12	Solid	10/15/19 15:28	10/17/19 09:10	
320-55444-13	Drum13	Solid	10/15/19 15:32	10/17/19 09:10	
320-55444-14	Drum14	Solid	10/15/19 15:40	10/17/19 09:10	
320-55444-15	Drum15	Solid	10/15/19 15:45	10/17/19 09:10	
320-55444-16	Drum16	Solid	10/15/19 16:46	10/17/19 09:10	
320-55444-17	EB-19-31	Water	10/15/19 17:13	10/17/19 09:10	
320-55444-18	GAC #1	Water	10/15/19 07:30	10/17/19 09:10	
320-55444-19	GAC #2	Water	10/15/19 10:05	10/17/19 09:10	

West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (07/13)

Regulatory Program: DW NPDES RCRA Other:

Company Name: Shannon & Wilson Client Contact: John F. [Signature] Date: 10/15/2014 COC No.: 1 of 2 COCs

Tell/Fax: 2355 Hill Road City/State/Zip: Fox Lake, IL 60121 Phone: 907-750-0679 Fax:

Project Name: Gustavos Site Char. Project Manager: D. Allacker Lab Contact: PFAS 537.1 list

Address: 2355 Hill Road City/State/Zip: Fox Lake, IL 60121 Phone: 907-750-0679 Fax:

Project Name: Gustavos Site Char. Project Manager: D. Allacker Lab Contact: PFAS 537.1 list

Address: 2355 Hill Road City/State/Zip: Fox Lake, IL 60121 Phone: 907-750-0679 Fax:

Project Name: Gustavos Site Char. Project Manager: D. Allacker Lab Contact: PFAS 537.1 list

Address: 2355 Hill Road City/State/Zip: Fox Lake, IL 60121 Phone: 907-750-0679 Fax:

Project Name: Gustavos Site Char. Project Manager: D. Allacker Lab Contact: PFAS 537.1 list

Address: 2355 Hill Road City/State/Zip: Fox Lake, IL 60121 Phone: 907-750-0679 Fax:

Project Name: Gustavos Site Char. Project Manager: D. Allacker Lab Contact: PFAS 537.1 list

Address: 2355 Hill Road City/State/Zip: Fox Lake, IL 60121 Phone: 907-750-0679 Fax:

Project Name: Gustavos Site Char. Project Manager: D. Allacker Lab Contact: PFAS 537.1 list

Address: 2355 Hill Road City/State/Zip: Fox Lake, IL 60121 Phone: 907-750-0679 Fax:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:
DRUM 01	10/15/14	1344	G	GC Soil	1			
DRUM 02		1325	G		1			
DRUM 03		1336	G		1			
DRUM 04		1340	G		1			
DRUM 05		1355	G		1			
DRUM 06		1400	G		1			
DRUM 07		1414	G		1			
DRUM 08		1425	G		1			
DRUM 09		1430	G		1			
DRUM 10		1455	G		1			
DRUM 11		1518	G		1			
DRUM 12		1528	G		1			



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

Special Instructions/QC Requirements & Comments: PFAS 537.1 list

Custody Seal No.: Yes No

Relinquished by: [Signature] Date/Time: 10/15/14 10:14

Relinquished by: [Signature] Date/Time: 10/15/14 9:10

Relinquished by: [Signature] Date/Time: 10/15/14 9:10

Relinquished by: [Signature] Date/Time: 10/15/14 9:10

Relinquished by: [Signature] Date/Time: 10/15/14 9:10

Relinquished by: [Signature] Date/Time: 10/15/14 9:10



Company Name: Address: City/State/Zip: Phone: Fax: Project Name: Site: P O #		Client Contact Tel/Fax: Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Regulatory Program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> Other:		Project Manager: Site Contact: Lab Contact:		Date: Carrier:		COC No.: 2 of 2 COCS Sampler: For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.:					
Sample Identification Drum 13 Drum 14 Drum 15 Drum 16 FB-19-31 GAC #1 GAC #2		Sample Date 10/15/15 1540 1545 1646 1713 730 1005		Sample Type (C=Comp, G=Grab) GCSon G G G G G G		Matrix W W W W W W W		# of Cont. 1 1 1 1 2 2 2		Filtered Sample (Y / N) Y Y Y Y Y Y Y		Perform MS / MSD (Y / N) Y Y Y Y Y Y Y		Sample Specific Notes:	
Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3, 5=NaOH, 6= Other Possible Hazard Identification: Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Polson B <input type="checkbox"/> Unknown <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months															
Special Instructions/QC Requirements & Comments: see paper															
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____ Cor'd: _____		Therm ID No.: _____		Date/Time:		Company:					
Relinquished by:		Company:		Received by:		Company:		Date/Time:		Company:					
Relinquished by:		Company:		Received by:		Company:		Date/Time:		Company:					
Relinquished by:		Company:		Received by:		Company:		Date/Time:		Company:					



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-55444-1

Login Number: 55444

List Source: Eurofins TestAmerica, Sacramento

List Number: 1

Creator: Thompson, Sarah W

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	102599-008
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.	False	COC not relinquished.
Is the Field Sampler's name present on COC?	False	
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 <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix D

QA/QC Summary and DEC LDRCs

CONTENTS

- QA/QC Summary
- DEC Laboratory Data Review Checklists

D.1 OVERVIEW

Quality Assurance/Quality Control (QA/QC) procedures assist in producing data of acceptable quality and reliability. We reviewed the analytical results provided by TestAmerica for laboratory QC samples and conducted our own QA assessment for this project. We reviewed chain-of custody (COC) records and laboratory sample-receipt forms to check that we followed proper custody procedures, met sample holding times, and kept samples properly chilled (between 0°C and 6°C) until analysis. Our QA review procedures allow us to document accuracy and precision of the analytical data and to check that analyses were sufficiently sensitive to detect analytes below regulatory standards.

We reviewed groundwater and soil data reported by TestAmerica under work orders (WO) J55420, J55422 and J55444. The laboratory reports include the case narrative and sample-receipt forms (Appendix C). Our complete review of the laboratory reports is included as an LDRC for each WO (Appendix D). A summary of our QA analysis are presented below.

Sample results for the project met data quality objectives (DQOs) presented in exhibit D-1, below. No datum was rejected for this project sample set; therefore, this project met 100 percent completeness. Precision and accuracy are addressed in Sections D.4 and D.5 below. Where data did not meet DQOs, flags have been added to the datum.

Exhibit D-1: Quality Assurance Objectives for Analytical Samples

Analyte	Method	Matrix	Precision	Accuracy	Completeness
PFOS & PFOA	EPA 537M	Water	±30%	(analyte dependent)	85%
		Soil	±50%	(analyte dependent)	85%

D.2 SAMPLE HANDLING

Immediately after collection, the sample bottles/jars for each PFAS sample were placed in Ziploc bags and stored in a designated sample cooler. The cooler is maintained between 0 °C and 6 °C with ice substitute separated from the sample bottles/jars by a liner bag. Shannon & Wilson maintained custody of the samples until submitting them to the laboratory for analysis. For shipping we packaged analytical samples and chain-of-custody (COC) forms in a hard-plastic cooler with an adequate quantity of packing material to prevent bottle breakage. We applied custody seals to the cooler, which were observed to be intact upon receipt by the laboratory.

We shipped sample coolers to TestAmerica in West Sacramento, California for analysis of PFAS using Alaska Air Cargo priority overnight service, also known as Goldstreak. Samples

were shipped from Goldstreak in Juneau, Alaska. Samples were submitted promptly to the analytical laboratory after the sampling effort. This allowed enough time for the laboratory to analyze the samples within holding-time requirements of the analytical method.

Our QA/QC methods for sample handling were within QA/QC guidelines, with the following exceptions:

- One cooler associated with WO 55420 was measured at 6.2 °C upon arrival at the laboratory. Due to the high chemical and biological stability of PFAS, it is unlikely the integrity of the project samples was adversely affected by the slightly high cooler temperature. In an e-mail dated August 3, 2015, one of the DEC project managers noted he spoke with their chemist who "agrees the high temperature probably would not affect the PFC results." PFAS are also known as PFCs.
- Two samples were submitted with the same sample name of *SS-19-29*; however, each sample had a unique collection time. Only one was listed on the COC. The laboratory contacted Shannon & Wilson to verify they were two distinct samples. The laboratory then logged them in as two separate samples. The lab identified these samples as 320-55422-55 (*SS-19-29* with a sample time of 13:38) and 320-55422-51 (*SS-19-29* with a sample time of 14:47). Laboratory sample 320-55422-51 has been denoted as intended, as project sample *SS-19-32*.

D.3 ANALYTICAL SENSITIVITY

We compared soil- and groundwater-sample LOQs to the DEC regulatory levels as described in Section 3. For soil and groundwater data, LOQs were less than DEC-established clean up levels (CULs), where applicable.

D.4 ACCURACY

The laboratory assessed accuracy of its analytical procedures by analyzing laboratory control samples (LCS) and LCS duplicate samples (LCSD). LCS/LCSD analysis allows the laboratory to evaluate their ability to recover analytes added to clean aqueous matrices. LCS/LCSD samples were reported for water samples. Laboratory accuracy was also measured for each sample by assessing the recovery of analyte surrogates added to individual project samples. PFAS analysis is accomplished using isotope dilution, similar to surrogates and measuring the transition mass ratios.

Finally, the accuracy of laboratory methods in the sample matrix (soil or groundwater) was measured using a matrix spike (MS) and a matrix spike duplicate (MSD), the addition of a known concentration of analyte to a field sample.

Accuracy for the QA/QC samples were within laboratory limits and/or did not result in qualification of the project samples, with the following exceptions:

- LCS recovery for PFOS in preparatory batch 33289 (WO 55422) exceeded laboratory QC criteria. Associated PFOS results are considered biased high, flagged with a “JH*” on the analytical tables. Affected samples include *Culvert 1*, *Culvert 2*, *Culvert 3*, *SS-19-30*, *SS-19-31*, and *SS-19-32*.
- The laboratory noted their “I” qualifier means the mass transition ratio for the indicated analyte was outside of the established ratio limits. We have qualified these samples as “J-flagged” on the associated analytical tables. The flagged data includes samples *Drum15*, *SB-12-0*, *SB-112-0*, and *SS-19-19* (PFBS), *SW-19-02* (PFNA), *SW-19-05*, *MW-3-40*, and *MW-3-140* (PFOS), *MW-3-140* (PFHxA), *SW-19-02* and *SW-19-04* (PFHxS), *Culvert 1* (PFTrDA), *SB-112-0* (PFUnA), and *SB-19-12* (PFTeA).
- Sample *SW-19-06* was J-flagged for PFOS due to concentration exceeding the instrument calibration.

We submitted equipment blanks with our soil samples to be analyzed for the same list of analytes by the same methods as the project samples, to determine if cross contamination among samples may have occurred during sampling. Additionally, the laboratory runs a method blank with each sample batch to detect analyte carryover during analysis.

Analytes were not detected in the blank samples and/or did not result in qualification of the project samples, with the following exceptions:

- PFHxS was detected in equipment blank samples *EB-19-04*. Samples associated with this equipment blank are the sediment samples *SW-19-01*, *SW-19-02*, *SW-19-03*, and *SW-19-04*. The PFHxS results associated with these sample are considered biased high, flagged with a “JH” on the analytical tables (Table 5).
- PFHxS was detected in method blank samples associated with this project. Results within 5 times the method blank concentration are considered not detected, flagged with a “UB” for reporting purposes. Results within 10 times the method blank concentration are considered biased high, flagged with a “JH” for reporting purposes. Project sample results affected by the PFHxS method blank contamination are: *MW-7-20*, *TWP-04*, *MW-8-20*, *TWP-06*, *SW-19-01* (surface water), *EB-19-31*, *GAC #1*, and *GAC #2*.
- PFOS was detected in method blank samples associated with this project. Results within 5 times the method blank concentration are considered not detected, flagged with a “UB” at the LOQ or detected concentration, whichever is greater. The following samples were flagged “UB” due to PFOS method blank contamination: *SS-19-21*, *SS-19-22*, *SS-19-23*, *SS-19-24*, *SS-19-25*, *SS-19-26*, *SS-19-27*, *SS-19-28*, *SS-19-29*, *SW-19-10* and *SW-19-11*.
- HFPO-DA was detected a method blank associated with project sample *SW-19-03*. The project sample was flagged “UB” in the associated analytical table (Table 5).

D.5 PRECISION

We submitted field duplicate samples with each WO to evaluate precision and reproducibility of our sampling techniques. We calculated the relative percent difference (RPD) between the sample and its duplicate for each field-duplicate pair. We can only evaluate RPDs if the results of the analysis for both the sample and its duplicate pair are greater than the LOQs for a given analyte.

RPD is calculated between the duplicate results for a given analyte using the following equation presented in Exhibit D-5.

Exhibit D-2: RPD Calculation

Equation	Variable and Definition	
$RPD = \frac{ R_1 - R_2 }{(R_1 + R_2)/2} \times 100\%$	RPD	Relative Percent Difference
	R1	Primary Result
	R2	Duplicate Result

We also evaluated laboratory analytical precision using RPD calculations. The LCS/LCSDs provide information regarding the reproducibility of laboratory procedures and are therefore a measure of the laboratory's analytical precision. MS/MSDs provide information regarding the reproducibility of laboratory procedures in the sample matrix (soil or groundwater) and therefore measure analytical precision in the field samples.

RPDs were within limits for QC samples with the following exception:

- RPDs were above 50% (soil data quality objective) for field duplicate pair *SB-12-0/SB-112-0* for the following analytes: PFDA, PFHpA, PFHxS, PFHxA, PFNA, and PFOS. These analytes are flagged "J" in the analytical table.

D.6 DATA QUALITY SUMMARY

By working in accordance with our proposed scope of services, we consider the samples we collected to be representative of site conditions at the locations and times they were obtained. The quality of the analytical data for this project does not appear to have been compromised, and those results affected by QC anomalies were qualified with appropriate flags. For more detail on individual analyte flags, see the attached LDRCs.

Laboratory Data Review Checklist

Completed By:

Brittany Blood

Title:

Environmental Professional I

Date:

November 21, 2019

CS Report Name:

Gustavus Site Characterization

Report Date:

November 18, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

J55420-1

ADEC File Number:

1507.38.017

Hazard Identification Number:

26904

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and
- perform
- all of the submitted sample analyses?

 Yes No

Comments:

The ADEC certified the TestAmerica/Eurofins Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

 Yes No

Comments:

Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

- a. CoC information completed, signed, and dated (including released/received by)?

 Yes No

Comments:

- b. Correct Analyses requested?

 Yes No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

 Yes No

Comments:

The laboratory indicated that the temperature of one cooler was at 6.2° C upon receipt (cooler #6).

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

 Yes No

Comments:

Analysis of PFAS compounds does not require chemical preservation.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

 Yes No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes No

Comments:

Other than the temperature discrepancy noted above, the samples were noted as arriving in good condition, properly preserved, and on ice.

- e. Data quality or usability affected?

Comments:

The data quality and/or usability were not affected. Due to the high chemical and biological stability of PFAS, it is unlikely the integrity of the project samples was adversely affected by the slightly-high cooler temperature. Analysis of PFAS does not require a preservative. In an e-mail dated August 3, 2015, one of the ADEC project managers noted that he had spoken with their chemist, who "agrees the high temperature probably would not affect the PFC results." PFAS are also known as PFCs.

4. Case Narrative

- a. Present and understandable?

Yes No

Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes No

Comments:

Method 537 (modified): Due to a shortage in the marketplace for 13C3-PFBS, the target analyte PFBS and/or Perfluoropentanesulfonic acid (PFPeS) could not be quantitated against 13C3-PFBS (its labeled variant) as listed in the SOP. PFBS and Perfluoropentanesulfonic acid (PFPeS) was quantitated versus 18O2-PFHxS instead.

Method 537 (modified): The “I” qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgement was used to positively identify the analyte. SW-19-02 (320-55420-2).

Method 537 (modified): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following samples exceeded the instrument calibration range: SW-19-06 (320-55420-7). These analytes have been qualified; however, the peaks did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

Method 537 (modified): The “I” qualifier means the transition mass ratio for the indicated analytes were outside of the established ratio limits. The qualitative identification of the analytes have some degree of uncertainty. However, analyst judgment was used to positively identify the analytes. SW-19-05 (320-55420-6), MW-3-40 (320-55420-21), MW-3-140 (320-55420-23) and (CCVL 320-333895/2)

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MSD) associated with preparation batch 320-332996.

Method 3535: The following samples were observed to be a yellow color prior to extraction: MW-9-30 (320-55420-26), MW-7-20 (320-55420-27), TWP-05 (320-55420-28), TWP-04 (320-55420-29), TWP-08 (320-55420-30), TWP-07 (320-55420-32), TWP-107 (320-55420-33), TWP-06 (320-55420-34) and MW-12-10 (320-55420-37) in preparation batch 320-332996.

Method 3535: The following samples were observed to contain sediment prior to extraction: MW-8-20 (320-55420-31), MW-11-15 (320-55420-35), MW-11-115 (320-55420-36), SW-19-10 (320-55420-38) and SW-19-11 (320-55420-39) in preparation batch 320-332996.

Method 3535: The following samples: MW-9-30 (320-55420-26), MW-7-20 (320-55420-27), TWP-05 (320-55420-28), MW-8-20 (320-55420-31) and MW-12-10 (320-55420-37) in preparation batch 320-332996 had non-settleable particulate matter, which plugged the solid-phase extraction column.

Method 3535: The following samples were observed to be turbid prior to extraction: MW-9-30 (320-55420-26), MW-7-20 (320-55420-27), TWP-05 (320-55420-28), TWP-04 (320-55420-29), TWP-08 (320-55420-30), MW-8-20 (320-55420-31), TWP-07 (320-55420-32), TWP-107 (320-55420-33), MW-11-15 (320-55420-35), MW-11-115 (320-55420-36) and MW-12-10 (320-55420-37) in preparation batch 320-332996.

Method 3535: The following sample was observed to be a yellow color after it was brought up to final volume: TWP-04 (320-55420-29) in preparation batch 320-332996.

Method 3535: The following sample was observed to be turbid after it was brought up to final volume: MW-8-20 (320-55420-31) in preparation batch 320-332996.

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-333266.

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-333385.

Method 3535: The following samples: SW-19-05 (320-55420-6), SW-19-07 (320-55420-8), MW-4-20 (320-55420-12), MW-1-40 (320-55420-14), TWP-02 (320-55420-19), TWP-03 (320-55420-20), MW-3-40 (320-55420-21), MW-3-15 (320-55420-22), MW-3-140 (320-55420-23) and MW-6-20 (320-55420-24) in preparation batch 320-333385 were observed to be a yellow color prior to extraction.

Method 3535: The following samples: MW-4-20 (320-55420-12), MW-1-15 (320-55420-13), MW-1-40 (320-55420-14), MW-2-30 (320-55420-15), MW-2-20 (320-55420-16), MW-5-20 (320-55420-17), TWP-02 (320-55420-19), TWP-03 (320-55420-20), MW-3-40 (320-55420-21), MW-3-15 (320-55420-22), MW-3-140 (320-55420-23) and MW-6-20 (320-55420-24) in preparation batch 320-333385 were observed to contain sediment prior to extraction.

Method 3535: The following samples: MW-1-15 (320-55420-13), MW-1-40 (320-55420-14), MW-2-30 (320-55420-15), MW-2-20 (320-55420-16), MW-3-40 (320-55420-21), MW-3-15 (320-55420-22), MW-3-140 (320-55420-23) and MW-6-20 (320-55420-24) in preparation batch 320-333385 had non-settleable particulate matter, which plugged the solid-phase extraction column.

Method 3535: The following samples: MW-4-20 (320-55420-12) and MW-1-40 (320-55420-14) in preparation batch 320-333385 were observed to a turbid yellow color after they were brought up to final volume.

Method 3535: The following sample: MW-1-15 (320-55420-13) in preparation batch 320-333385 was observed to turbid after it was brought up to final volume.

Method 3535: The following sample: TWP-03 (320-55420-20) in preparation batch 320-333385 was observed to a yellow color after it was brought up to final volume.

Method 3535: The following samples: MW-10-20 (320-55420-25) in preparation batch 320-333422 had non-settleable particulate matter, which plugged the solid-phase extraction column.

c. Were all corrective actions documented?

Yes No

Comments:

Yes, please see above regarding the use of an alternative IDA for PFBS.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality. We contacted the laboratory regarding the note about non-settleable particulate matter clogging the solid-phase extraction column. They noted not all of the 250 mL sample could be passed through the column; however, the use of the IDA method where isotopes are spiked prior to extraction compensates for this discrepancy where IDA recoveries are within. They IDA recoveries were within for the samples noted with this issue above.

Please see section 7 regarding our assessment.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes No

Comments:

b. All applicable holding times met?

Yes No

Comments:

The laboratory indicates that the samples were analyzed within holding time.

c. All soils reported on a dry weight basis?

Yes No

Comments:

N/A; no soil samples were submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes No

Comments:

e. Data quality or usability affected?

Yes No

Comments:

Data quality and/or usability is not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes No

Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes No

Comments:

The results for the method blanks were less than the limit of quantitation for PFAS. However, the perfluorohexansulfonic acid (PFHxS) was detected in the following method blanks above the detection limits.

The PFHxS result for method blanks associated with preparatory batches 332996, 333266, and 333422 was detected at an estimated concentration below the LOQ (RL) at 0.245J ng/L, 0.268J ng/L, and 0.337J ng/L.

Project samples associated with preparatory batches are listed on pages 65-67 of the laboratory report.

iii. If above LOQ, what samples are affected?

Comments:

Project sample concentrations within 5 times the associated method blank concentration is considered, not detected, flagged "UB" at the reporting limit or detected concentration, whichever is greater. Project sample concentrations greater than 5 times but less than 10 times the associated method blank concentration is considered estimated, biased high, flagged with a "JH" to denote the bias.

Samples *MW-7-20*, *TWP-04*, *MW-8-20*, *TWP-06* and *SW-19-01* are considered affected.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No

Comments:

Samples *TWP-04*, *MW-8-20*, *TWP-06* and *SW-19-01* are flagged 'UB' at the LOQ (RL). Samples flagged with a 'UB' flag are considered not detected due to sample-contamination identified in the blank. Sample *MW-7-20* was flagged 'JH' due to sample-contamination identified in the blank sample.

v. Data quality or usability affected?

Comments:

Yes; please see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes No

Comments:

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes No

Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes No

Comments:

- iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No

Comments:

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No

Comments:

Not applicable, no samples required data flags for MS/MSD or LSC/LCSD failures.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

- c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

Yes No

Comments:

The analytical method uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method. As noted in the case narrative, ¹³C₃-PFBS is not available due to a marketplace shortage, IDA 18O₂-PFHxS was used to quantitate PFBS and PFPeS instead.

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes No

Comments:

Isotope Dilution Analyte (IDA) recovery values were within the method or laboratory limits.

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes No

Comments:

There were no data flags required; see above.

- iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes No

Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes No

Comments:

N/A; a trip blank is not required.

- iii. All results less than LOQ?

Yes No

Comments:

N/A; a trip blank is not required.

- iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

 Yes No

Comments:

Field duplicate pairs *SW-19-10* and *SW-19-11*, *MW-11-115* and *MW-11-15*, *MW-3-40* and *MW-3-140*, and *TWP-07* and *TWP-107* were submitted with this work order.

ii. Submitted blind to lab?

 Yes No

Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration R_2 = Field Duplicate Concentration
 Yes No

Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

RPDs were within the specified DQOs, where calculable. Data quality or usability is not affected.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

 Yes No Not Applicable

Two equipment blanks were submitted with this work order that are associated with soil samples reported in another work order (WO J55422). The EB results will be discussed in the soil-data LDRC.

Water samples were not collected with reusable equipment; therefore, equipment blanks are not required.

i. All results less than LOQ?

 Yes No

Comments:

N/A, see above.

ii. If above LOQ, what samples are affected?

Comments:

N/A, see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes No

Comments:

The following samples were noted with an "I" qualifier by the laboratory to denote transition mass ratio for the indicated analyte was outside of established ratio limits. We consider these results to be estimated and have flagged the analyte with a "J" due to the laboratory noting there is some degree of uncertainty.

- *SW-19-02* for PFNA
- *SW-19-05* for PFOS
- *MW-3-40* for PFOS
- *MW-3-140* for PFHxA and PFOS

Additionally, *SW-19-06* PFOS was also qualified "J" as the sample exceeded instrument calibration range.

Laboratory Data Review Checklist

Completed By:

Brittany Blood

Title:

Environmental Professional I

Date:

November 20, 2019

CS Report Name:

Gustavus Site Characterization

Report Date:

November 20, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

Eurofins TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-55444-1

ADEC File Number:

1507.38.017

Hazard Identification Number:

26904

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and
- perform
- all of the submitted sample analyses?

 Yes No

Comments:

The ADEC certified the TestAmerica/Eurofins Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

 Yes No

Comments:

Analyses were performed by Eurofins TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

- a. CoC information completed, signed, and dated (including released/received by)?

 Yes No

Comments:

The first page of the COC was signed and relinquished properly, however the second page was not properly relinquished but noted to see page 1 of the COC. There is no effect on data quality as the second page of the COC was a continuation of the first page of the COC.

- b. Correct Analyses requested?

 Yes No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

 Yes No

Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

 Yes No

Comments:

Analysis of PFAS compounds does not require chemical preservation.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

 Yes No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes No

Comments:

There were no discrepancies noted in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

The data quality and/or usability were not affected; see above.

4. Case Narrative

- a. Present and understandable?

Yes No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

Yes No

Comments:

Method 537 (modified): Due to a shortage in the marketplace for 13C3-PFBS, the target analyte PFBS and/or Perfluoropentanesulfonic acid (PFPeS) could not be quantitated against 13C3-PFBS (its labeled variant) as listed in the SOP. PFBS and Perfluoropentanesulfonic acid (PFPeS) was quantitated versus 18O2-PFHxS instead.

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analyte(s) was outside of the established ratio limits. The qualitative identification of the analyte(s) has/have some degree of uncertainty. However, analyst judgement was used to positively identify the analyte(s). Consequently, the PFBS result for sample *Drum15* was qualified J as an estimated quantity.

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-334030.

Method 3535: The following samples were observed to contain sediment prior to extraction: Drum01 (320-55444-1), Drum02 (320-55444-2)

- c. Were all corrective actions documented?

Yes No

Comments:

See above.

- d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

 Yes No

Comments:

b. All applicable holding times met?

 Yes No

Comments:

The laboratory indicates that the samples are within holding time.

c. All soils reported on a dry weight basis?

 Yes No

Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

 Yes No

Comments:

e. Data quality or usability affected?

 Yes No

Comments:

Data quality and/or usability is not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

 Yes No

Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

 Yes No

Comments:

No analytes were detected in method blank samples at concentrations exceeding the LOQ; however, perfluorohexanesulfonic acid (PFHxS) was detected at a concentration below the LOQ for the method blank sample included in preparatory batch 334030. PFHxs was detected within five times the concentration detected in the method blank sample in project samples *EB-19-31*, *GAC #1*, and *GAC #2*. The PFHxS results for these samples are considered estimated with a high bias due to potential laboratory cross-contamination. These results have been flagged UB for reporting purposes. Project sample *EB-19-31* is used as a field QC sample and is not presented in the reporting tables.

iii. If above LOQ, what samples are affected?

Comments:

Not applicable, see above.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No

Comments:

See above.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes No

Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes No

Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes No

Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No

Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No

Comments:

Not applicable, no samples required data flags for MS/MSD or LSC/LSCD failures.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

Yes No

Comments:

The analytical method 537 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes No

Comments:

Isotope Dilution Analyte (IDA) values were within the method or laboratory limits.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes No

Comments:

There were no data flags required; see above.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?

(If not, enter explanation below.)

Yes No

Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes No

Comments:

N/A; a trip blank is not required.

- iii. All results less than LOQ?

Yes No

Comments:

N/A; a trip blank is not required.

- iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

- v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

- i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes No

Comments:

No field duplicate was submitted.

- ii. Submitted blind to lab?

Yes No

Comments:

No field duplicate was submitted.

- iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
 R_2 = Field Duplicate Concentration

Yes No

Comments:

N/A, see above.

- iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

N/A, see above.

- f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

Yes No Not Applicable

An equipment blank sample (*EB-19-31*) was included with this work order, however, this equipment blank sample applies to soil samples included in work order J55422. No samples contained in this work order were collected using reusable equipment.

- i. All results less than LOQ?

Yes No

Comments:

Please see the LDRC for WO J55422 for additional details.

- ii. If above LOQ, what samples are affected?

Comments:

Not applicable, see above.

- iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Defined and appropriate?

Yes No

Comments:

Appendix E

Updated Conceptual Site Model

CONTENTS

- Updated Conceptual Site Model

Appendix C - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name:

File Number:

Completed by:

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources (*check potential sources at the site*)

- | | |
|--|--|
| <input type="checkbox"/> USTs | <input type="checkbox"/> Vehicles |
| <input type="checkbox"/> ASTs | <input type="checkbox"/> Landfills |
| <input type="checkbox"/> Dispensers/fuel loading racks | <input type="checkbox"/> Transformers |
| <input type="checkbox"/> Drums | <input checked="" type="checkbox"/> Other: <input type="text" value="Fire-training activities"/> |

Release Mechanisms (*check potential release mechanisms at the site*)

- | | |
|---------------------------------|--|
| <input type="checkbox"/> Spills | <input checked="" type="checkbox"/> Direct discharge |
| <input type="checkbox"/> Leaks | <input type="checkbox"/> Burning |
| | <input type="checkbox"/> Other: <input type="text"/> |

Impacted Media (*check potentially-impacted media at the site*)

- | | |
|---|--|
| <input checked="" type="checkbox"/> Surface soil (0-2 feet bgs*) | <input checked="" type="checkbox"/> Groundwater |
| <input checked="" type="checkbox"/> Subsurface soil (>2 feet bgs) | <input checked="" type="checkbox"/> Surface water |
| <input type="checkbox"/> Air | <input checked="" type="checkbox"/> Biota |
| <input checked="" type="checkbox"/> Sediment | <input type="checkbox"/> Other: <input type="text"/> |

Receptors (*check receptors that could be affected by contamination at the site*)

- | | |
|---|---|
| <input checked="" type="checkbox"/> Residents (adult or child) | <input checked="" type="checkbox"/> Site visitor |
| <input checked="" type="checkbox"/> Commercial or industrial worker | <input checked="" type="checkbox"/> Trespasser |
| <input checked="" type="checkbox"/> Construction worker | <input checked="" type="checkbox"/> Recreational user |
| <input checked="" type="checkbox"/> Subsistence harvester (i.e. gathers wild foods) | <input checked="" type="checkbox"/> Farmer |
| <input checked="" type="checkbox"/> Subsistence consumer (i.e. eats wild foods) | <input type="checkbox"/> Other: <input type="text"/> |

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.)

If the box is checked, label this pathway complete:

Complete

Comments:

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)?

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

We note PFOS and PFOA are present on the Appendix B guidance document; however, according to the Alaska Department of Health and Social Services, PFOS and PFOA are not appreciably absorbed through the skin. We therefore consider dermal exposure to these compounds to be insignificant.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future?

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350.

If both boxes are checked, label this pathway complete:

Complete

Comments:

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future?

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities).

If both boxes are checked, label this pathway complete:

Complete

Comments:

This pathway is considered complete due surface-water influence on drinking-water wells in the affected area.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods?

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)?

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.)

If all of the boxes are checked, label this pathway complete:

Complete

Comments:

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)

Are the contaminants in soil volatile (see Appendix D in the guidance document)?

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminated soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures)

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)?

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

3. Additional Exposure Pathways: *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed:

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed:

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM₁₀). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed:



Comments:

Several surface soil samples were above current cleanup levels.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed:



Comments:

Several surface, subsurface and sediment analytical samples were above current cleanup levels.

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Gustavus Airport Terminal

Completed By: Craig Beebe; Shannon & Wilson, Inc.

Date Completed: 4/11/19; updated January 10, 2020

Instructions: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.

(1) Media	(2) Transport Mechanisms
<input checked="" type="checkbox"/> Surface Soil (0-2 ft bgs)	<input checked="" type="checkbox"/> Direct release to surface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to subsurface <i>check soil</i> <input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Runoff or erosion <i>check surface water</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Subsurface Soil (2-15 ft bgs)	<input checked="" type="checkbox"/> Direct release to subsurface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Ground-water	<input checked="" type="checkbox"/> Direct release to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Flow to surface water body <i>check surface water</i> <input checked="" type="checkbox"/> Flow to sediment <i>check sediment</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Surface Water	<input checked="" type="checkbox"/> Direct release to surface water <i>check surface water</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Sedimentation <i>check sediment</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Sediment	<input checked="" type="checkbox"/> Direct release to sediment <i>check sediment</i> <input checked="" type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____

(3) Exposure Media	(4) Exposure Pathway/Route	(5) Current & Future Receptors						
		Residents (adults or children)	Commercial or Industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
<input checked="" type="checkbox"/> soil	<input checked="" type="checkbox"/> Incidental Soil Ingestion <input type="checkbox"/> Dermal Absorption of Contaminants from Soil <input checked="" type="checkbox"/> Inhalation of Fugitive Dust	C/F	C/F	C/F	C/F		F	
<input checked="" type="checkbox"/> groundwater	<input checked="" type="checkbox"/> Ingestion of Groundwater <input type="checkbox"/> Dermal Absorption of Contaminants in Groundwater <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water	C/F	C/F	C/F	C/F	C/F		
<input type="checkbox"/> air	<input type="checkbox"/> Inhalation of Outdoor Air <input type="checkbox"/> Inhalation of Indoor Air <input type="checkbox"/> Inhalation of Fugitive Dust							
<input checked="" type="checkbox"/> surface water	<input type="checkbox"/> Ingestion of Surface Water <input type="checkbox"/> Dermal Absorption of Contaminants in Surface Water <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water							
<input checked="" type="checkbox"/> sediment	<input checked="" type="checkbox"/> Direct Contact with Sediment	C/F	C/F	C/F	C/F	C/F	C/F	
<input checked="" type="checkbox"/> biota	<input checked="" type="checkbox"/> Ingestion of Wild or Farmed Foods	C/F	C/F	C/F	C/F		F	

Appendix F

Ecoscoping Form

CONTENTS

- Ecoscoping Form

Ecoscoping Form

Site Name: Gustavus Airport

Completed by: Craig Beebe

Date: 4/1/2020

Instructions: Follow the italicized instructions in each section below. “Off-ramps,” where the evaluation ends before completing all of the sections, can be taken when indicated by the instructions. Comment boxes should be used to help support your answers.

1. Direct Visual Impacts and Acute Toxicity

Are direct impacts that may result from the site contaminants evident, or is acute toxicity from high contaminant concentrations suspected? *Check the appropriate box.*

- Yes – *Describe observations below and evaluate all of the remaining sections without taking any off-ramps.*
- No – *Go to next section.*

Comments:

2. Terrestrial and Aquatic Exposure Routes

Check each terrestrial and aquatic route that could occur at the site.

Terrestrial Exposure Routes

- Exposure to water-borne contaminants as a result of wading or swimming in contaminated waters or ingesting contaminated water.
- Contaminant uptake in terrestrial plants whose roots are in contact with contaminated surface water.
- Contaminant migration via saturated or unsaturated groundwater zones and discharge at upland “seep” locations (not associated with a wetland or waterbody).
- Contaminant uptake by terrestrial plants whose roots are in contact with soil moisture or groundwater present within the root zone (generally no more than 4 feet below ground surface).
- Particulates deposited on plants directly or from rain splash.
- Incidental ingestion and/or exposure while animals grub for food, burrow (up to 2 feet for small animals or 6 feet for large animals), or groom.

- Inhalation of fugitive dust or vapors disturbed by foraging or burrowing activities.
- Bioaccumulatives (other than PAHs, which bioaccumulate more readily in aquatic environments) taken up by soil invertebrates, which are in turn eaten by higher food chain organisms (see the *Policy Guidance on Developing Conceptual Site Models*).
- Other site-specific exposure pathways.

Aquatic Exposure Routes

- Contaminated surface runoff migration to water bodies through swales, drainage ditches, or overland flow.
- Aquatic receptors exposed through osmotic exchange, respiration, or ventilation of surface waters.
- Contaminant migration via saturated or unsaturated groundwater zones and discharge at “seep” locations along banks or directly to surface water.
- Deposition into sediments from upwelling of contaminated groundwater.
- Aquatic receptors may be exposed directly to contaminated sediments through foraging or burrowing, or indirectly exposed due to osmotic exchange, respiration, or ventilation of sediment pore water.
- Aquatic plants rooted in contaminated sediments.
- Bioaccumulatives (see the *Policy Guidance on Developing Conceptual Site Models*) taken up by sediment invertebrates, which are in turn eaten by higher food chain organisms.
- Other site-specific exposure pathways.

If any of the above boxes are checked, go on to the next section. If none are checked, end the evaluation and check the box below.

OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Potentially complete pathways include deposition of fugitive dust from onsite onto nearby vegetation, incidental ingestion by ground dwelling species, and uptake by plants. Groundwater seeps exist in effected wetland. PFAS are known to bioaccumulate in plants and animals. Volatilization of PFAS requires a high temperature making this pathway less likely.

Aquatic exposure routes are prevalent through drainage ditches and streams leaving the site and a pond near the site. Aquatic plants are found throughout effected drainage ditches and within nearby pond. In anadromous streams osmotic exchange or respiration is likely an receptor.

3. Habitat

*Check all that may apply. See *Ecoscoping Guidance for additional help.**

- Habitat that could be affected by the contamination supports valued species (i.e., species that are regulated, used for subsistence, have ceremonial importance, have commercial value, or provide recreational opportunity).
- Critical habitat or anadromous stream in an area that could be affected by the contamination.
- Habitat that is important to the region that could be affected by the contamination.

- Contamination is in a park, preserve, or wildlife refuge.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Moose used for subsistence, graze vegetation in the affected area. Various water fowl also use affected water bodies. There are several listed ADF&G anadromous fish streams within or near the site.

4. Contaminant Quantity

Check all that may apply. See Ecoscoping Guidance for additional help.

- Endangered or threatened species are present.
- The aquatic environment is or could be affected.
- Non-petroleum contaminants may be present, or the total area of petroleum-contaminated surface soil exceeds one-half acre.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

5. Toxicity Determination

Check all that apply.

- Bioaccumulative chemicals are present (see *Policy Guidance on Developing Conceptual Site Models*).
- Contaminants exceed benchmark levels (see the Ecological Benchmark Tool in RAIS, available at: http://rais.ornl.gov/tools/eco_search.php).

If either box is checked, complete a detailed Ecological Conceptual Site Model (see DEC's Policy Guidance on Developing Conceptual Site Models) and submit it with the form to your DEC project manager.

If neither box is checked, check the box below and submit this form to your DEC project manager.

OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Ecological benchmarks for PFAS have not been established.

Important Information

About Your Geotechnical/Environmental Report

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally. Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent

such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process. To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland