

**NAPA AUTO PARTS  
2018/2019 ON-SITE  
GROUNDWATER MONITORING REPORT**

**1937 VAN HORN ROAD  
FAIRBANKS, ALASKA**

**MAY 15, 2019**



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## ACRONYMS AND ABBREVIATIONS

AFFF	Aqueous Film Forming Foam
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
Alyeska	Alyeska Pipeline Service Company
AMSL	Above Mean Sea Level
Bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, xylenes
COCs	Contaminants of concern
CSM	Conceptual Site Model
cy	Cubic yards
12DBE	1,2-Dibromoethane
DL	Detection Limit
DO	Dissolved Oxygen
DPT	Direct Push Technology
DQOs	Data quality objectives
DRO	Diesel Range Organics
EPA	Environmental Protection Agency
FIAPFD	Fairbanks International Airport Police and Fire Department
FFD	Fairbanks Fire Department
FWFD	Fort Wainwright Fire Department
FNSB	Fairbanks North Star Borough
FSG	2017 ADEC Field Sampling Guidance
GPC	Genuine Parts Company
GRO	Gasoline Range Organics
GVEA	Golden Valley Electric Association
IDW	Investigation-Derived Waste
LCS/LCSD	Laboratory Control Sample/Duplicate
LDRC	Laboratory Data Review Checklist
LHA	Lifetime Health Advisory
LOQ	Limit of Quantitation
mg/kg	Milligrams per kilogram
mg/L	Milligrams per Liter
mv	Millivolts
MS/MSD	Matrix Spike Sample/Duplicate
MW	Monitoring well
NPFD	North Pole Fire Department
OD	Outer Diameter
OIT	Organic Incineration Technology, Inc.
ORP	Oxidation/reduction potential
%	Percent
PAHs	Polynuclear Aromatic Hydrocarbons
PCE	Tetrachloroethylene
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutane Sulfonate
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PID	Photoionization Detector





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ACRONYMS AND ABBREVIATIONS (Continued)

+/-	Plus/Minus
ppm	parts per million
PVC	Polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
SA	Site assessment
SGS	SGS North America Inc.
SAVFD	Steese Area Volunteer Fire Department
TBM	Temporary bench mark
123TCP	1,2,3-Trichloropropane
TOC	Top of Casing
TSP	Temporary sampling point
µg/L	Micrograms per Liter
UFD	University Fire Department
VOCs	Volatile Organic Compounds
WP	Work Plan



## **1.0 EXECUTIVE SUMMARY**

This report describes the October 2018 and February 2019 per- and polyfluoroalkyl substances (PFAS) groundwater sampling at the NAPA Van Horn Facility (the Site). This Report also describes the October 2018 annual groundwater sampling of non-PFAS compounds.

**NORTECH** performed the field activities in accordance with the *NAPA 2018 Long Term Groundwater Monitoring Plan Revision 2 (WP)* (August 6, 2018 WP) and January 14, 2019 Scope of Work (SOW) for PFAS sampling.

The August 2018 WP was written to address comments by the Alaska Department of Environmental Conservation (ADEC) in a letter dated May 21, 2018. ADEC approved the August 2018 WP in a letter dated August 31, 2018. The January 2019 SOW was written after results of the October 2018 groundwater sampling was submitted to ADEC on January 6, 2019. The PFAS results of the offsite well sampled as part of the October 2018 sampling event has been submitted in a separate report as are the results of the Spring 2019 PFAS offsite sampling completed from neighborhood water wells.

As approved by ADEC, the October 2018 field work included sampling for volatile organic compounds (VOCs) in monitoring wells (MW) MW1R and MW2, and diesel range organics (DRO) and VOCs in MW3 and MW4. All four wells were also tested for PFAS compounds. DRO was not detected in monitoring wells MW3 and MW4. VOCs, including 1,2-dibromoethane (12DBE) and 1,2,3-trichloropropane (123TCP) were not detected in any of the four monitoring wells.

In October 2018, the sum of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) concentrations were reported above the ADEC Action Level of 0.070 microgram per Liter ( $\mu\text{g/L}$ ) in all four monitoring wells. Concentrations were as much as 370 times the ADEC Action Level. PFOS had the highest concentrations in each monitoring well. Concentrations were highest in monitoring well MW2 located at the northwest corner of the NAPA building. MW1R had the next highest concentrations. The sum of the two PFAS compounds were significantly lower in MW3 and MW4, but still exceeded the ADEC Action Level.

In February 2019, the ADEC Action Level was exceeded in the four on-Site monitoring wells, confirming the October 2018 results. Concentrations were again highest in MW1R and MW2, up to 614 times the LHA. The results of the groundwater monitoring confirm PFAS compounds were the fire-fighting foam used to suppress the 2011 facility fire. The level of PFOS/PFOA at the Site is greater than two orders of magnitude above the LHA in MW2.

**NORTECH** recommends submitting this report to ADEC as documentation of completing onsite groundwater monitoring in accordance with the August 2018 ADEC letter and January 2019 SOW. Based on the laboratory results, it is requested ADEC consider No Further Action required for additional petroleum and VOC groundwater monitoring in the four monitoring wells.

The PFAS laboratory results of the on-Site monitoring wells confirms the presence of PFAS at the western perimeter of the property boundary. Additional site characterization and testing is recommended to determine the level and extent of PFOS/PFOA contamination in the soil, and shallow and deep groundwater tables at the Site perimeter and immediately downgradient to the north and west. It is anticipated a PFAS Work Plan will be required to detail the proposed method and procedures of installing soil borings, temporary sampling points (TSPs), and permanent groundwater MWs needed to complete the site characterization.



## 2.0 BACKGROUND AND FIRE-FIGHTING EFFORT RESEARCH

This report describes the October 2018 and February 2019 groundwater sampling conducted at the NAPA facility at 1937 Van Horn Road in Fairbanks, Alaska (the Site). Figures 1, 2, and 3 in Appendix 1 show the location, vicinity, and Site map of the monitoring wells. Genuine Parts Company (GPC) owns the building and leases the Site. On May 26, 2011, a fire consumed the NAPA Auto Parts store and warehouse, located at 1937 Van Horn Road in Fairbanks. Water and aqueous film forming foam (AFFF) product sprayed on the building during firefighting efforts acted as a transport mechanism to carry hazardous materials across the paved parking lot to adjacent properties. Hazardous materials included oil, grease, lubricants, glycols, solvents, paint, and batteries.

The NAPA store on Van Horn Road is in the University Fire Department (UFD) district. UFD made the initial response to the fire and was assisted by four other departments: Fairbanks Fire Department (FFD), Fort Wainwright Fire Department (FWFD), Steese Area Volunteer Fire Department (SAVFD), and North Pole Fire Department (NPFD). Following the initial firefighting response, UFD personnel used absorbent pads to mop up observed run-off contamination from onsite materials. The initial environmental response included the removal of standing water, sheen and floating product from around the NAPA building using a vacuum truck, absorbent pads, and booms. The top foot of soil was removed during June 2011 excavation prior to an environmental site characterization performed by **NORTECH** in the fall of 2011.

In July 2015, ADEC had contacted **NORTECH** to clarify the use and volume of AFFF used to combat the NAPA fire in 2011. **NORTECH** contacted UFD Fire Chief Doug Schrage to determine if and how much AFFF were used during fire suppression efforts. Chief Schrage said a single apparatus was requested from Fairbanks International Airport Police and Fire Department (FIAPFD). Then-Deputy Fire Chief Dan Grimes stated that the Airport trucks have a 400-gallon capacity for AFFF and approximately 100 gallons may have been used on the NAPA fire. At the time of this fire in 2011, FIAPFD used an AFFF product manufactured by Ansul called Ansulite 3% Freeze Protected AFFF (Ansulite 3%).

**NORTECH** requested information from Ansul on December 19, 2017 to confirm specifications for Ansulite 3%. The product is a proprietary blend of PFCs and the formulation contains average concentrations of PFOA/PFOS compounds estimated to be 1 part per million (ppm). The primary PFCs found in this product are known to biodegrade to PFOA under the right conditions in the presence of oxygen.

### 2.1 Previous Investigations

ADEC has multiple reports on file documenting investigations at this Site due to a release of petroleum and other products during a fire and associated firefighting activities on May 26, 2011. The most comprehensive is the January 22, 2013 *Site Characterization and Corrective Action Report* (2013 Report) containing background information regarding past and present conditions at the Site, as well as methodology for completed work.

Results from the 2011 site characterization indicated diesel range organics (DRO) and tetrachloroethene (PCE) contamination remained in place in soil beneath the southern portion of the building, with the highest concentrations at the original building corners. An addition was added to the south side of the building in the summer 2013.



From April 2013 through October 2014, additional groundwater monitoring was completed as described in the *2013 & 2014 Groundwater Monitoring Report* dated May 1, 2015 (2015 Groundwater Report). The 2013/2014 monitoring was also summarized in the June 5, 2017 WP. The results of the 2013/2014 groundwater monitoring showed an overall decreasing trend in shallow groundwater contamination from 2011 through 2014.

Concentrations of DRO, glycols, benzene, and other volatile organic compounds (VOCs) detected in 2011 in MW1 and MW2 had significantly decreased in these wells, meeting the cleanup levels for the contaminants of concern (COCs). The 2014 water table elevation measurements indicated the hydraulic gradient is generally to the northwest, consistent with the documented regional hydraulic gradient. In October 2014, MW1 was decommissioned and replaced.

The results of the two-year onsite and laboratory geochemical testing indicated anaerobic biological degradation of contamination was occurring. Iron reduction and methanogenesis appeared to be the primary biological degradation pathways. The geochemical data demonstrated the potential for biological degradation and reduction of contaminant mass in the groundwater over time. Additional geochemical testing was not considered necessary unless PCE concentrations rise in MW4 or PCE appears to be migrating to other wells.

ADEC issued a determination on July 15, 2015 stating contaminants had been satisfactorily removed from affected soils which may have been impacted due to the 2011 fire at the NAPA store. Long term groundwater monitoring was to be continued. In the fall 2017 groundwater monitoring and well survey was conducted at the NAPA facility, as documented in the *Long-Term Groundwater Monitoring 2017 Interim Report* (2017 Report), dated May 1, 2018.

The 2017 groundwater elevation survey by Design Alaska, Inc. of Fairbanks confirmed groundwater flow is generally northwest. This was consistent with documented regional flow and the 2014 elevation survey gradient. The 2017 report noted PCE has never been detected in MW1 and in MW2, PCE has not been detected since 2011. DRO, glycols, benzene, and other VOCs detected previously have significantly decreased and/or become undetectable. **NORTECH** recommended no additional sampling of MW1R [Replacement] and MW2 for DRO and the full list of VOCs, since the two wells meet the trend analysis requirements for the two parameters using the Mann-Kendall Test.

The 2017 Report also noted PCE has never been detected in MW3 and in MW4, the 2017 PCE concentration was the lowest detected concentration since monitoring began. Only one other VOC has ever been detected in either well (MW3) and was detected below the limit of quantitation (LOQ) and well below the cleanup level. The 2017 Report added the three sampling events over the four-year period demonstrate contamination has not migrated from beneath the building foundation to shallow groundwater and PCE does not appear to be migrating from MW4 to other wells. **NORTECH** recommended the second-round groundwater monitoring scheduled for the fall 2018 be limited to sampling monitoring wells MW3 and MW4 only.

The May 2018 ADEC letter was in response to 2017 Report. ADEC noted the consideration of no further sampling of MW1R and MW2 would depend on the results of the 2018 groundwater sampling tests, and additional VOC testing using a method with lower detection limits to confirm the absence of 12DBE and 123TCP. The 2017 sample results for 12DBE and 123TCP were non-detect under the Environmental Protection Agency (EPA) Method SW8260C. The lab LOQ of 12DBE was equal to and the detection limit (DL) was less than ADEC groundwater cleanup



level. This confirmed the analyte was not present above groundwater cleanup level in the 2017 samples. The LOQ and DL of 123TCP in samples were greater than ADEC groundwater cleanup level and could not be eliminated as a contaminant of concern. **NORTECH** reviewed soil and groundwater test data from the previous Site investigations and could not confirm the two analytes were not present in soil and groundwater below ADEC cleanup levels.

## 2.2 Planning and ADEC Coordination

The 2018 Groundwater WP was completed and revised to address comments in the May 21, 2018 ADEC letter requesting sampling for 123TCP and 12DBE, and PFAS compounds found in fire-fighting foam. ADEC approved the WP in their August 31, 2018 letter. **NORTECH** sampled the on-Site monitoring wells for DRO, VOCs, and PFAS on October 9, 2018. On January 6, 2019, the laboratory analytical results were forwarded to ADEC. In a January 8, 2019 email to GPC and **NORTECH**, ADEC indicated an immediate response would be required to address potential off-Site migration of PFAS. This was followed by a conference call between GPC, **NORTECH**, and ADEC on January 10, 2019.

The on-Site PFAS sampling SOW described below is the result of the conference call. The Winter/Spring 2019 off-Site private water well search and sampling investigation around NAPA is being documented in the *NAPA Auto Parts Off-Site Private Water Well Search & Sampling Report* submitted separately.

## 3.0 SCOPE OF WORK AND METHODOLOGY

### 3.1 Approved Onsite Scope of Work

The SOW for onsite groundwater monitoring was described the August 2018 WP, ADEC's August 2018 approval letter, and January 10, 2019 Conference Call Summary electronic mail. ADEC specified the on-Site monitoring wells be tested for PFAS by EPA 537 and 12DBE and 123TCP by EPA Method 8011 or similar. MW3 and MW4 was also to be tested for DRO by AK 102 and VOCs by EPA Method 8260. The on-Site portion of the January 14, 2019 SOW specified the four monitoring wells be resampled for PFAS using the same protocol as in October 2018 to confirm the October PFAS results.

### 3.2 Methodology

The October 2018 monitoring well sampling was performed in accordance with the August 2018 WP. The February 2019 monitoring well sampling was performed in accordance with the January 14, 2019 emailed SOW and WP attachments with standard operating procedures. The October 2018 and February 2019 monitoring well sampling was completed by qualified environmental professionals as defined by 18 Alaska Administrative Code (AAC) 75, 18 AAC 78, and the ADEC August 2017 Field Sampling Guidance (2017 FSG). Sampling methods were in general accordance with the 2017 FSG, and as further defined in the August 2018 WP. This included sampling location, quantity and methods, field duplicate, and other quality assurance/quality control (QA/QC) samples.

#### 3.2.1 Groundwater Monitoring

**NORTECH's** standard methodology section Laboratory Sampling Plan provided in Attachment 3 of the 2018 WP detailed sampling methodologies for the fieldwork. Depth to groundwater and total depth of the four wells (MW1R, MW2, MW3, and MW4) were measured using an electronic oil/water interface level indicator probe. All water quality parameters except turbidity were





obtained using a YSI meter within a flow-through cell. Water clarity was evaluated by visual observation before the water entered the flow-through cell and was recorded as clear or turbid. Field parameters measured during purging were obtained using a calibrated YSI™ ProDSS water quality meter. Water quality parameters were recorded in a field notebook.

Water quality parameters were considered stable when three successive readings, taken 3 to 5 minutes apart, were within:

- $\pm 3\%$  for temperature (maximum of  $\pm 0.2$  °C)
- $\pm 0.1$  for pH
- $\pm 3\%$  for conductivity
- $\pm 10$  millivolts (mv) for oxidation/reduction potential (ORP)
- $\pm 10\%$  for dissolved oxygen (DO)

The five parameters above and visual clarity were monitored and recorded as presented in the field notes in Appendix 3. The four wells were purged and sampled using the Proactive™ Supernova 70 Engineered Plastic Pump with Low Flow Sampling Controller, decontaminated between wells to avoid cross-contamination. To prevent potential VOC loss, a submersible pump was utilized to ensure air bubbles were not entrained with the water during purging and sampling efforts.

After purging, water samples were collected directly from the pump discharge tubing into laboratory-supplied sample bottles as outlined in Appendix E of the 2017 FSG. New disposable gloves were worn to collect samples. Gloves were changed between samples. Sample containers were filled quickly, and immediately preserved as necessary. For semi-volatile samples, headspace in the sample container was minimized by filling the container until a positive meniscus was present. Teflon-lined screw caps provided by the laboratory were used to seal the containers.

### 3.2.2 PFAS Sampling

In addition to sampling for DRO and VOCs in the monitoring wells, each of the on-Site monitoring wells was sampled for PFAS using **NORTECH's** July 2018 PFCs Groundwater Sampling Plan as submitted as an attachment in the 2019 WP and 2019 SOW. Equipment and field blanks were collected using PFAS-free water provided by SGS North America (SGS) an ADEC-approved laboratory in Anchorage, Alaska laboratory contracted for analysis. Samples were submitted to the Fairbanks sample-receiving office of SGS; the PFAS samples were transferred to their Anchorage laboratory, then to their laboratory in Florida which performs the PFAS analysis.

### 3.2.3 Quality Assurance/Quality Control

QA/QC objectives were as described in the 2017 FSG. Field QA/QC procedures included adherence to the WP, handling samples under chain-of-custody procedures, submitting samples within specified holding times, and collecting field duplicate samples. Equipment blank samples were collected and submitted for analysis with each of the monitoring well sampling events, as a non-dedicated submersible pump was used for sampling the monitoring wells.

PFAS field blank samples were collected and submitted with each of the monitoring well PFAS sampling events. Laboratory QA/QC procedures include analysis of method blanks; laboratory



control samples (LCS) and LCS duplicates (LCSD); and matrix spike samples (MS) and MS duplicates (MSD).

### 3.3 EPA Lifetime Health Advisory & Deviations from Work Plans

In 2016, the EPA established a lifetime health advisory (LHA) of 0.070 µg/L for the combined concentrations PFOS and PFOA in drinking water to assist state and local officials and drinking water system operators in evaluating risks from these contaminants. These LHAs were created so appropriate action can be taken to protect residents.

On August 20, 2018, ADEC issued a Technical Memorandum titled “*Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water.*” establishing PFAS Action Levels for groundwater and surface water used as drinking water. A 0.07 µg/L Action Level was set for the sum of five PFAS chemicals with a second action level of 2.0 µg/L for perfluorobutane sulfonate (PFBS).

The ADEC August 31, 2018 WP approval letter further specified a minimum of six PFAS compounds should be tested for, reported, and compared to the action levels described in the memo. The testing and reporting for the six compounds were also stated in the January 2019 SOW. **NORTECH** completed the October 2018 and February 2019 groundwater sampling in accordance with the August 2018 ADEC letter (and January 2019 SOW), testing for the six PFAS compounds.

In February 2019, the EPA published a PFAS Action Plan with a national drinking water regulatory determination for PFOA and PFOS only. On April 9, 2019, ADEC issued a Technical Memorandum stating ADEC will use the EPA LHA for PFOS plus PFOA above 0.07 µg/L as the Action Level. Any new testing for PFAS will be for PFOS and PFOA only.

**NORTECH** contacted ADEC in April 2019 following the release of the 2019 Technical Memorandum requesting additional time to revise the report to reflect the updated PFAS reporting levels to reporting on the concentrations of PFOS and PFOA only. ADEC responded with no objection.

A second deviation from the WP was the use in a decontaminated steel tape measure instead of a product-detection probe in February 2019 to measure the depth to groundwater. The result is the groundwater gradient was not calculated due to the potential for an imprecise water level measurement.



#### 4.0 FIELD ACTIVITIES AND OBSERVATIONS

**NORTECH** conducted groundwater monitoring at the NAPA facility on October 9, 2018 and again on February 13, 2019 for PFAS. Groundwater monitoring consisted of purging and sampling monitoring wells MW1R, MW2, MW3, and MW4. Field notes are presented in Appendix 3 and photo pages are presented in Appendix 4.

##### 4.1 October 9, 2018 Monitoring Well Sampling

The two stickup wells, MW1R and MW2, and the two flush-mounted wells, MW3 and MW4, were inspected to confirm they were not damaged and were not frost-jacked. There is no outer steel protective casing around MW2, but the polyvinyl chloride (PVC) soil riser was in good condition and the threaded cap was present. There is no lid attached to the outer steel casing of MW1R. Flush mount wells MW3 and MW4 were not frost-jacked. Excess hydrated bentonite was removed from around the interior monument of MW4.

Free product was not detected in any of the four monitoring wells using a product-detection probe. Between 25 and 40 gallons of water were purged from the wells for a total of 155 gallons of purge water, disposed at NRC, Alaska. No odors and/or sheen on the water were exhibited in any of the wells. Field duplicate sample MW-44 was collected from MW4. Equipment blank sample EB-Napa VH was collected in the field following sampling of MW3. A field blank was prepared in the parking lot of the Site.

The off-Site private well at 2081 Van Horn Road, at the business to the west of NAPA (Alaska Dreams, Inc.), was also sampled (HR-1) on October 9, 2018. Methodology, observations, and results are presented in the *Off-Site Private Well Search and Sampling Report* to be submitted separately.

##### 4.2 February 2019 Monitoring Well Resampling

The four monitoring wells were inspected and found to be in good condition. Free product was not detected in any well. The depth to groundwater was measured using a decontaminated steel tape measure instead of a product-detection probe or a water-level meter to minimize PFAS cross contamination. Groundwater gradient was not calculated due to the potential for an imprecise water level measurement.

Between seven and 13 gallons of water were purged from each well for a total of 40 gallons of purge water, containerized on Site. No odors and/or sheen on the water were exhibited in any of the wells. Field duplicate sample MW-33 was collected from MW3. Equipment blank sample EB-1 was collected after sampling MW3. Field blank sample Field Blank-1 was prepared in the parking lot of the Site.

##### 4.3 Investigation-Derived Waste (IDW) Management

Approximately 155 gallons of groundwater generated during well purging and equipment decontamination water were containerized and temporarily stored on Site. The containerized water was transported to NRC for disposal on October 16, 2018. Purge water from the February 2019 sampling event was drummed and stored on Site and is pending disposal. Used disposable sampling supplies from the 2018 sampling event were double bagged and disposed with other non-hazardous waste in a trash receptacle.





## 5.0 ANALYTICAL RESULTS AND QUALITY CONTROL

### 5.1 October 2018 Monitoring Well Sampling

The tables in Appendix 2 summarize the October 2018 and February 2019 PFAS concentrations for the four monitoring wells on Site. The laboratory report and Laboratory Data Review Checklist (LDRC) are presented in Appendix 5.

Table 1, Appendix 2 presents the monitoring wells results for petroleum analyses. VOCs including 12DBE and 123TCP were not detected in any of the four monitoring wells. DRO was not detected in MW3 and MW4.

Both regulated PFAS compounds PFOS and PFOA were detected in all four monitoring wells (Table 2). The highest concentrations of the sum of PFOS and PFOA were reported in MW2 and MW1R at 25.9 µg/L and 24.3 µg/L, respectively. The sum of PFOS/PFOA reported in MW3 was 0.42 µg/L, and 0.91 µg/L in MW4. The sum of the PFOS/PFOA in all four wells were greater than the ADEC Action Level/LHA of 0.07 µg/L.

### 5.2 February 2019 Monitoring Well Resampling

February 2019 PFAS concentrations in the monitoring wells are summarized in Table 2. Both regulated PFAS were detected above the ADEC Action level/LHA in three of four monitoring wells. MW3 PFOS and PFOA individual concentrations were below the LHA but the sum of both was greater than the LHA. The highest PFOS concentrations were reported in MW2 and MW1R at 42.2 µg/L and 16.9 µg/L, respectively. The highest concentration of PFOA was reported in MW2 at 0.0853 µg/L.

### 5.3 Quality Assurance/Quality Control

Part of the data quality objectives (DQOs) for this project were to produce data of adequate quality as outlined in the 2017 FSG for comparison to the 18 AAC 75.345 groundwater cleanup levels. The primary tool used to assess data quality was the ADEC LDRC. LDRCs were completed for the laboratory work orders and are included in Appendix 5 with the laboratory reports. The SGS laboratory report case narrative was reviewed against the ADEC LDRC for potential laboratory QC issues.

Field duplicate pairs serve as a QC check on the repeatability of field sampling techniques and of laboratory error. Precision, expressed as the relative percent difference (RPD) between field duplicate sample results, is an indication of consistency in sampling, sample handling, preservation, and laboratory analysis. The RPD was calculated according to ADEC's FSG (the difference between the field duplicate results expressed as a percentage of the average of those results).

October 2018 RPDs for the field duplicate pair collected from MW4 did not have petroleum hydrocarbons or VOC results above the laboratory LOQ or detection limit (DL) for any analyte, so RPDs were not calculated. October 2018 RPDs for PFAS compounds collected from the field duplicate pair MW4 had five exceed the RPD of plus or minus (+/-) 30%; RPDs were as high as 61%. February 2019 RPDs from MW3 met the DQO.

The DQO exceedances for the October 2018 PFAS results are not significant because results for both samples either exceeded the ADEC Action Level/LHA or did not exceed the Action Level/LHA. RPD calculated results for PFAS compounds are presented in Table 2.



Another QC check was to compare the LOQs and DLs with ADEC cleanup levels for non-PFAS compounds and the ADEC Action Level/ EPA LHA for PFOS and PFOA. The laboratory LOQ for 123TCP was greater than the ADEC cleanup level but less than the DL, confirming 123TCP was not present in the samples. For the PFAS analysis, as noted in the LDRCs, laboratory DLs did not exceed the EPA LHA.

VOCs, including 12DBE and 123TCP, were not detected above their LOQs in the trip blank sample. VOCs were not detected in the equipment blank sample, with the following exception. Toluene was reported in the equipment blank sample at 3.02 µg/L. Toluene has not been detected in MW1 or MW2 recently, so its presence in the equipment blank suggests incomplete decontamination of the sample pump. PFAS were not detected in the equipment blank or field blank samples.

The data quality review for these sampling events indicate there were no significant data quality issues associated with the laboratory results. The data quality is adequate, and results can be used to characterize contaminant concentrations, including PFAS of groundwater at the Site. The data quality issues associated with this report and the issues discussed above are also reviewed in the ADEC LDRCs.



## 6.0 ANALYSIS AND DISCUSSION

**NORTECH** completed the October 2018 and February 2019 groundwater monitoring at the NAPA facility, 1937 Van Horn Road in Fairbanks, Alaska. Groundwater sampling including testing the four on-Site shallow monitoring wells for VOCs and PFAS compounds. Two of the four wells were also tested for DRO.

### 6.1 Non-PFAS Groundwater Monitoring

During the October 2018 monitoring event, DRO and VOCs were not detected in the two monitoring wells MW3 and MW4. VOCs were not detected above LOQs in the four monitoring wells, including 12DBE. 123TCP was not detected in any of the four wells above the detection. The non-detect results for 12DBE and 123TCP in the four monitoring wells confirm those contaminants have not impacted the shallow groundwater table and they should be eliminated as contaminants of concern.

Table 3 in Appendix 2 presents the Historical Groundwater Results Summary for the four monitoring wells. The table shows a progressive downward trend in petroleum hydrocarbon and VOC concentrations resulting in no detected levels at this time. Based on the historical trend and current non-detect results, it is recommended ADEC consider a No Further Action required for additional petroleum fractions and VOC groundwater monitoring in the four monitoring wells.

### 6.2 On-Site Monitoring Wells

In October 2018, the sum of PFOS and PFOA concentrations were reported above the ADEC Action Level/EPA LHA of 0.070 µg/L in all four monitoring wells. Concentrations were as much as 370 times the LHA. PFOS had the highest concentrations in each monitoring well. Concentrations were highest in monitoring well MW2 located at the northwest corner of the NAPA building. MW1R had the next highest concentrations. Both wells are located in the western ditch at the west side property boundary. The sum of PFOS and PFOA was significantly lower in MW3 and MW4, but still exceeded the LHA.

In February 2019, the EPA LHA was exceeded in all four monitoring wells on the Site, confirming the 2018 results. Concentrations were again highest for PFOS and PFOA in MW2 (614 times the LHA) and MW1R, respectively.

The PFAS laboratory results of the on-Site monitoring wells confirms the presence of PFAS at the western perimeter of the property boundary. Additional site characterization and testing is necessary to determine the level and extent of PFOS/PFOA contamination in the soil, and shallow and deep groundwater tables at the Site perimeter and immediately downgradient to the north and west. This includes installing monitoring wells screened at shallow, interim, and deep intervals on and near the NAPA Site to determine the vertical and horizontal extent of the PFAS contamination. Continued annual monitoring of permanent wells will be required to determine PFAS concentration variations over time.



## 7.0 CONCLUSIONS, AND RECOMMENDATIONS

**NORTECH** completed the October 2018 and February 2019 groundwater monitoring at the NAPA facility, 1937 Van Horn Road in Fairbanks, Alaska. Based on the historical research, field observations, laboratory results, and Site conditions, **NORTECH** has the following conclusions and recommendations:

### *Petroleum Hydrocarbon and VOC Contaminants of Concern*

- VOCs were not detected in the four monitoring wells, including 12DBE and 123TCP
  - 12DBE and 123TCP have not impacted the shallow groundwater table
  - They should be eliminated as contaminants of concern
- DRO was not detected in MW3 or MW4
- Historical groundwater results show a progressive downward trend in petroleum hydrocarbon and VOC concentrations
- A No Further Action for additional petroleum fractions and VOC groundwater monitoring in the four monitoring wells should be considered

### *PFAS Contaminants of Concern*

- Use of AFFF on the 2011 NAPA fire has affected on-site monitoring wells
  - PFOS/PFOA concentrations were above the Action Level/LHA in all four wells
  - MW2 and MW1R at the western perimeter boundary had the highest concentrations, up to 614 times the LHA
  - Installation of temporary sampling points (TSPs) and permanent monitoring wells screened at three intervals on and near the NAPA Site is recommended
  - Long term monitoring of the permanent wells will be required

**NORTECH** recommends submitting this Report to ADEC as documentation of the 2018 PFAS monitoring well sampling and 2019 monitoring well resampling at the Site. We also recommend preparing and submitting a Work Plan to ADEC detailing the proposed method and procedures of installing soil borings, TSPs, and permanent groundwater MWs needed to complete the PFAS site characterization.



## 8.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

**Julie Keener, PE**, is a Senior Environmental Professional for **NORTECH** and the Task Manager for this project phase. Ms. Keener completed graduate courses in Environmental Quality Engineering in addition to her Civil Engineering Bachelor of Science degree while studying at the University of Alaska Fairbanks. Ms. Keener is registered as both an Environmental and Civil Engineer in Alaska. She has nearly 30 years of experience with site characterization, remediation and long-term monitoring, feasibility studies, and remedial investigation.

Julie has authored and reviewed Spill Prevention Control and Countermeasure (SPCC) Plans, prepared work plans, field sampling plans, quality assurance and quality control plans, waste management plans, and health & safety plans. She has managed logistics of remote projects, developed corrective action plans, cost estimates, and conceptual site models, overseen underground storage tank (UST) closures.

**Susan L. Vogt, CPESC, CISEC**, is a Senior Professional for **NORTECH** and overall Project Manager for this Site. Ms. Vogt has nearly 30 years of experience in environmental science and compliance programs, with considerable recent specialization in storm water pollution prevention plans (SWPPP) and other storm water related work, including a Preliminary Drainage Plan (PDP) for the City of Tanana, SWPPPs for Great Northwest, Inc. and other contractors in the Fairbanks area, including within the City of Fairbanks, the Fairbanks North Star Borough, Ft. Wainwright, and Eielson Air Force Base. She has developed SWPPPs and/or completed SWPPP inspections on more than 60 construction and industrial sites; has extensive experience with underground storage tanks (UST Closure License #574) release investigations, site assessments, and contaminated property management.

Primary Author Signature

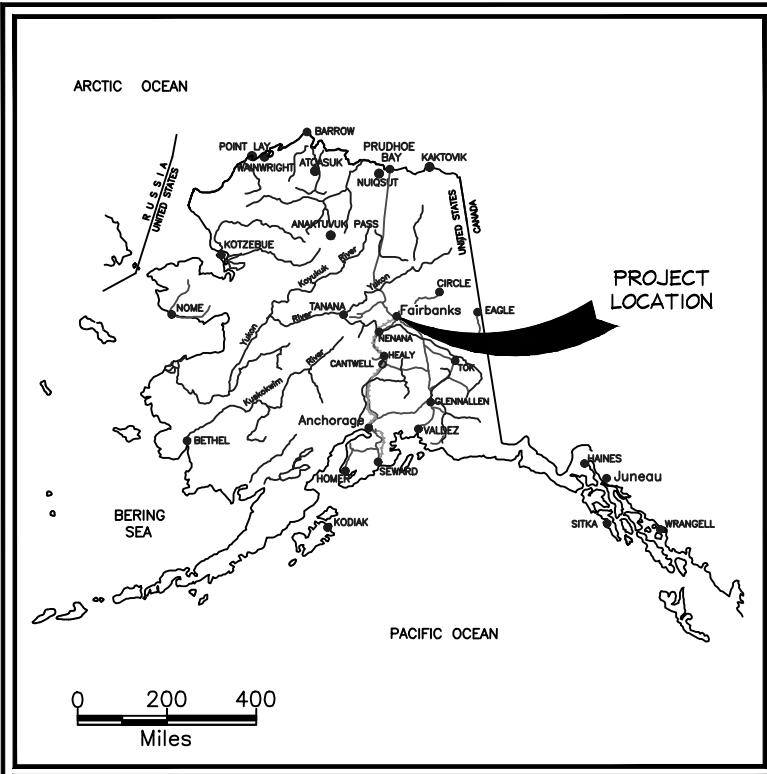
**Julie Keener, PE**  
Senior Professional

Reviewer

**Susan Vogt, CPESC, CISEC**  
Senior Professional

# Appendix 1





ENVIRONMENT, ENERGY, HEALTH & SAFETY CONSULTANTS  
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 3105 Lakeshore Dr., Anchorage, AK. 99517 907-222-2445  
 5438 Shaune Dr., Juneau, Alaska 99801 907-586-6813

Location Map  
 NAPA 2018/2019 Groundwater Monitoring  
 Van Horn Road, Fairbanks, Alaska

DATE: 05/10/2019	SCALE: 1" = 1 MILE
DESIGN: JAK	PROJECT: 17-1001
DRAWN: KAO	DWG: 17-1001g(01)

FIGURE  
 1



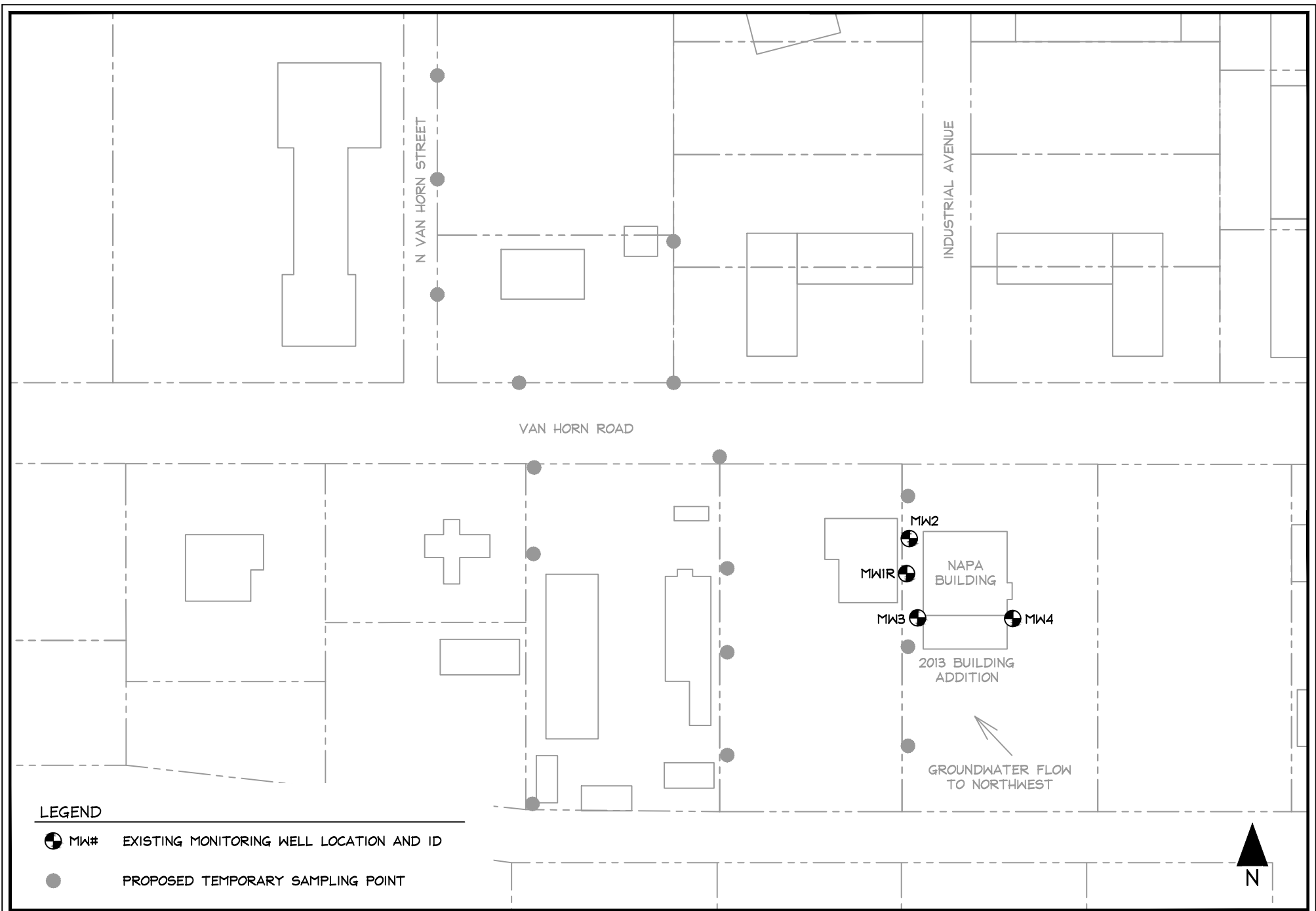
ENVIRONMENT, ENERGY, HEALTH & SAFETY CONSULTANTS  
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 3105 Lakeshore Dr., Anchorage, AK. 99517 907-222-2445  
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Vicinity Map  
 NAPA 2018/2019 Groundwater Monitoring  
 Van Horn Road, Fairbanks, Alaska

DATE: 05/10/2019	SCALE: 1" = 200'
DESIGN: JAK	PROJECT: 17-1001
DRAWN: KAO	DWG: 171001g(02)


FIGURE  
 2





**LEGEND**

- MW# EXISTING MONITORING WELL LOCATION AND ID
- PROPOSED TEMPORARY SAMPLING POINT


**ENVIRONMENT, ENERGY, HEALTH & SAFETY CONSULTANTS**  
 2400 College Road, Fairbanks, AK. 99709, 907-452-5688  
 3105 Lakeshore Dr., Anchorage, AK. 99517 907-222-2445  
 5438 Shaune Dr., Juneau, Alaska 99801 907-586-6813

Site Map  
 NAPA 2018/2019 Groundwater Monitoring  
 Van Horn Road, Fairbanks, Alaska

DATE: 05/10/2019	SCALE: 1" = 150'
DESIGN: JAK	PROJECT: 17-1001
DRAWN: KAO	DWG: 171001g(03)

**FIGURE**  
3

# Appendix 2

**Table 1**  
**October 2018 Groundwater Results Summary**  
**Detected Analytes and Analytes of Interest**

Sample ID		MW-1R	MW-2	MW-3	MW-4	MW-44	EB-Napa VH
Analyte	ADEC Cleanup Level	West Ditch	West Ditch	SW Corner	SE Corner	Dup of MW-4	Equipment Blank
<b>Petroleum Fractions (mg/L)</b>							
DRO	1.5	NA	NA	0.566 U	0.588 U	0.600 U	0.556 U
<b>VOCs (µg/L)</b>							
1,2-Dibromoethane	0.075	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
1,2,3-Trichloropropane	0.0075	<u>0.00250 U</u>	<u>0.00250 U</u>	<u>0.00250 U</u>	<u>0.00250 U</u>	<u>0.00250 U</u>	<u>0.00250 U</u>
Toluene	1100	NA	NA	1.00 U	1.00 U	1.00 U	3.02

**Notes:**

- U Analyte not detected at the listed limit of quantitation (LOQ)
- U LOQ is greater than the ADEC Cleanup Level; the reported Detection Limit (DL) is less than the Cleanup Level
- NA Analysis not performed
- Shade Analyte detected below the ADEC Cleanup Level
- mg/L milligrams per liter
- µg/L micrograms per liter

**Table 2  
On-Site Monitoring Well Results Summary - Per- and Polyfluoroalkyl Substances (PFAS) by EPA 537**

Monitoring Well	EPA Lifetime Health Advisory	MW1R	MW1R	MW2	MW2	MW3	MW3	MW3 (Dup)	MW3 RPD	MW4	MW4 (Dup)	MW4 RPD	MW4
		10/9/2018	2/13/2019	10/9/2018	2/13/2019	10/9/2018	2/13/2019	2/13/2019		10/9/2018	10/9/2018		2/13/2019
<b>PFAS (µg/L)</b>													
Perfluorobutanoic acid	NE	0.0661 J	0.143	0.305	0.467	0.522	0.342	0.349	-2.03	0.0624	0.0595	4.8	0.0544
Perfluoropentanoic acid	NE	0.153	0.194	0.532	0.566	0.537	0.464	0.402	14.32	0.0899	0.100	14.6	0.0882
Perfluorohexanoic acid	NE	0.249	0.340	1.89	1.88	1.54	1.22	1.06	14.04	0.158	0.172	23.2	0.114
Perfluoroheptanoic acid	NE	0.0793	0.0668	0.365	0.396	0.174	0.200	0.204	-1.96	0.0294	0.0308	-14.9	0.0286
<b>Perfluorooctanoic acid (PFOA)</b>	<b>**</b>	<b>0.461</b>	<b>0.222</b>	<b>1.05</b>	<b>0.853</b>	<b>0.0635</b>	<b>0.0588</b>	<b>0.0632</b>	<b>-7.21</b>	<b>0.091</b>	<b>0.134</b>	<b>7.7</b>	<b>0.0885</b>
Perfluorononanoic acid	NE	0.123	0.0132	0.0283	0.0261 J	0.0137	0.00319 J	0.00321 J	NA	0.00675 J	0.00902	-28.8	0.00313 J
Perfluorodecanoic acid	NE	0.077 U	0.0038 U	0.080 U	0.021 U	0.0077 U	0.0038 U	0.0040 U	NA	0.008 U	0.0077 U	NA	0.0038 U
Perfluoroundecanoic acid	NE	0.0456 J	0.0038 U	0.080 U	0.021 U	0.00943	0.0038 U	0.0040 U	NA	0.008 U	0.0077 U	NA	0.0038 U
Perfluorododecanoic acid	NE	0.077 U	0.0038 U	0.080 U	0.021 U	0.0077 U	0.0038 U	0.0040 U	NA	0.008 U	0.0077 U	NA	0.0038 U
Perfluorotridecanoic acid	NE	0.077 U	0.0038 U	0.080 U	0.021 U	0.0114	0.0038 U	0.0040 U	NA	0.008 U	0.0077 U	NA	0.0038 U
Perfluorotetradecanoic acid	NE	0.077 U	0.0038 U	0.080 U	0.021 U	0.0077 U	0.0038 U	0.0040 U	NA	0.008 U	0.0077 U	NA	0.0038 U
Perfluorobutanesulfonic acid	NE	0.479	1.38	3.04	5.02	4.81	3.51	3.10	11.68	0.512	0.648	-23.45	0.523
Perfluoropentanesulfonic acid	NE	0.336	0.599	3.97	3.89	3.74	3.05	2.62	-56.26	0.248	0.277	-11.05	0.171
Perfluorohexanesulfonic acid	NE	5.59	4.13	23.5	19.0	5.59	6.00	5.74	30.04	1.14	2.15	-61.4	0.887
Perfluoroheptanesulfonic acid	NE	2.27	0.83	2.19	2.15	0.0539	0.0152	0.0161	92.90	0.0821	0.117	-35.06	0.119
<b>Perfluorooctanesulfonic acid (PFOS)</b>	<b>**</b>	<b>23.8</b>	<b>16.9</b>	<b>24.8</b>	<b>42.2</b>	<b>0.355</b>	<b>0.0552</b>	<b>0.0580</b>	<b>33.91</b>	<b>0.431</b>	<b>0.772</b>	<b>-56.69</b>	<b>0.705</b>
Perfluorononanesulfonic acid	NE	0.077 U	0.019 U	0.080 U	0.210 U	0.0077 U	0.0038 U	0.0040 U	NA	0.0080 U	0.0077 U	NA	0.0038 U
Perfluorodecanesulfonic acid	NE	0.077 U	0.019 U	0.080 U	0.210 U	0.0077 U	0.0038 U	0.0040 U	NA	0.0080 U	0.0077 U	NA	0.0038 U
PFOSA	NE	0.077 U	0.0038 U	0.080 U	0.0210 U	0.0077 U	0.0038 U	0.0040 U	NA	0.0080 U	0.0077 U	NA	0.0038 U
MeFOSAA	NE	0.190 U	0.015 U	0.200 U	0.0830 U	0.019 U	0.015 U	0.016 U	NA	0.020 U	0.019 U	NA	0.015 U
EtFOSAA	NE	0.190 U	0.015 U	0.200 U	0.0830 U	0.019 U	0.015 U	0.016 U	NA	0.020 U	0.019 U	NA	0.015 U
4:2 Fluorotelomer sulfonate	NE	0.190 U	0.015 U	0.200 U	0.0830 U	0.019 U	0.015 U	0.016 U	NA	0.020 U	0.019 U	NA	0.015 U
6:2 Fluorotelomer sulfonate	NE	0.355	0.202	0.531	0.257	0.0292	0.015 U	0.016 U	NA	0.112	0.167	-39.43	0.0952
8:2 Fluorotelomer sulfonate	NE	0.190 U	0.015 U	0.200 U	0.0830 U	0.019 U	0.015 U	0.016 U	NA	0.020 U	0.019 U	NA	0.015 U
Sum of PFOS and PFOA †	0.070	24.3	17.1	25.9	43.1	0.42	0.11	0.12	--	0.52	0.91	--	0.79

**Notes:**

- µg/L micrograms per liter
- U Analyte not detected above the listed reporting limit (RL)
- J Concentration is estimated between the detection limit and the level of quantitation
- Shade Analyte concentration detected below the EPA Lifetime Health Advisory (LHA), if applicable
- Bold** Analyte concentration exceeds the EPA Lifetime Health Advisory
- NE No EPA Lifetime Health Advisory is established for this analyte
- \*\* Sum of PFOS and PFOA is compared to EPA Lifetime Health Advisory.
- † Sum calculated in accordance with ADEC March 2019 Technical Memorandum "Treatment of Non-Detects and Blank Detections in Per- and Polyfluoroalkyl Substances (PFAS) Analysis"
- PFAS per- and poly-fluoroalkyl substances
- PFOSA Perfluorooctanesulfonamide
- MeFOSAA 2-(N-Methyl-perfluorooctane sulfanamido) acetic acid
- EtFOSAA N-Ethylperfluorooctane-1-sulfonamide
- Perfluorooctanesulfonic acid was detected in the 2018 equipment blank at 0.00230 J µg/L
- The following were detected in the 2018 field blank: Perfluorononanoic acid 0.00234 J µg/L and Perfluorooctanesulfonic acid 0.00440 J µg/L
- No detections were reported in the 2019 QC samples
- RPD; NA Relative Percent Difference; Not Applicable

Table 3

## Historical Groundwater Results Summary

## Monitoring Well MW1 - Detected Analytes and Analytes of Interest

Sample ID		MW01 <sup>D1</sup>	MW31 <sup>D1</sup>	MW1B	MW1 <sup>D2</sup>	MW11	MW1	MW1	MW1R	MW1R5	MW-1R
Well Location Relative to Building	ADEC Cleanup Level	West Ditch	West Ditch Dup	West Ditch	West Ditch	West Ditch Dup	West Ditch	West Ditch	West Ditch	West Ditch Dup	West Ditch
Date Sample Collected		6/13/11	6/13/11	9/29/11	4/1/13	7/23/13	11/19/13	10/1/14	9/27/17	9/27/17	10/9/18
Work Order		1118395	1118395	1118928	1137643	1138129	1138737	1148566	1178439	1178439	1189850
Analyte	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Petroleum Fractions</b>											
GRO	2.2	0.100 U	0.100 U	1.18	0.100 U	0.100 U	0.100 U	0.100 U	NA	NA	NA
DRO	1.5	0.800 U	0.800 U	13.6	1.33	1.28	0.612 U	0.600 U	0.588 U	0.588 U	NA
RRO	1.1	0.500 U	0.500 U	0.644	0.543 U	0.500 U	0.510 U	0.500 U	NA	NA	NA
<b>VOCs<sup>1</sup></b>											
1,2,4-Trimethylbenzene	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
1,3,5-Trimethylbenzene	0.12	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
2 Butanone	5.6	0.0957	0.125	0.762	0.010 U	0.010 U	0.01 U	0.01 U	0.01 U	0.01 U	NA
2-Hexanone	0.038	0.01 U	0.01 U	0.0128	0.010 U	0.010 U	0.01 U	0.01 U	0.01 U	0.01 U	NA
4-Isopropyltoluene	NE	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
4-Methyl-2-pentanone	6.3	0.0326	0.0343	1.90	0.0238	0.010 U	0.01 U	0.01 U	0.01 U	0.01 U	NA
Benzene	0.0046	0.0004 U	0.00158	0.0536	0.00124	0.00346	0.00171	0.0006	0.0004 U	0.0004 U	NA
Chloroform	0.0022	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Ethylbenzene	0.015	0.001 U	0.001 U	0.02	0.001 U	0.00149	0.00396	0.001 U	0.001 U	0.001 U	NA
Isopropylbenzene	0.45	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Chloromethane	0.19	0.005 U	0.001 U	0.0137	0.00175	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Naphthalene	0.0017	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01 U	0.001 U	0.001 U	NA
n-Butylbenzene	1.0	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
n-Propylbenzene	0.66	0.001 U	0.001 U	0.00617	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
sec-Butylbenzene	2.0	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
trans-1,2-Dichloroethene	0.36	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Styrene	1.2	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Tetrachloroethene	0.041	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Toluene	1.1	0.001 U	0.00135	0.121	0.001 U	0.00139	0.00107	0.001 U	0.001 U	0.001 U	NA
o-Xylene	NE	0.001 U	0.001 U	0.0213	0.001 U	0.00127	0.00322	0.001 U	0.001 U	0.001 U	NA
p & m-Xylene	NE	0.002 U	0.002 U	0.0512	0.002 U	0.00232	0.0074	0.002 U	0.002 U	0.002 U	NA
Xylenes (total)	0.19	0.003 U	0.003 U	0.0726	0.003 U	0.00359	0.01062	0.003 U	0.003 U	0.003 U	NA
<b>Glycols</b>											
Ethylene Glycol	40	30 <sup>2</sup>	2 U	2 U	2 U	2 U	10 U	10 U	NA	NA	NA
Propylene Glycol	730	23 <sup>2</sup>	2 U	2 U	2 U	2 U	10 U	10 U	NA	NA	NA

**Table 3**  
**Historical Groundwater Results Summary**  
**Monitoring Well MW2 - Detected Analytes and Analytes of Interest**

Sample ID		MW02	MW2B	MW2	MW2	MW2	MW2	MW22	MW2	MW-2
Well Location Relative to Building	ADEC Cleanup Level	West Ditch	West Ditch Dup	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch Dup	West Ditch	West Ditch
Date Sample Collected		6/13/11	9/29/11	4/1/13	7/23/13	11/19/13	10/1/14	10/1/14	9/27/17	10/9/18
Work Order		1118395	1118928	1137643	1138129	1138737	1148566	1148566	1178439	189850
Analyte	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Petroleum Fractions</b>										
GRO	2.2	0.100 U	0.704	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	NA	NA
DRO	1.5	0.800 U	15.1	2.28	0.723	0.622 U	0.600 U	0.600 U	0.588 U	NA
RRO	1.1	0.500 U	0.714	0.500 U	0.500 U	0.518 U	0.500 U	0.500 U	NA	NA
<b>VOCs<sup>1</sup></b>										
1,2,4-Trimethylbenzene	0.015	0.001 U	0.001 U	0.001 U	0.001	0.001 U	0.001 U	0.001 U	0.001 U	NA
1,3,5-Trimethylbenzene	0.12	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
2-Butanone	5.6	0.100	0.21	0.01 U	0.0100 U	0.01 U	0.01 U	0.01 U	0.01 U	NA
2-Hexanone	0.038	0.01 U	0.01 U	0.01 U	0.0100 U	0.01 U	0.01 U	0.01 U	0.01 U	NA
4-Isopropyltoluene	NE	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
4-Methyl-2-pentanone	6.3	0.0313	0.151	0.0262	0.0100 U	0.01 U	0.01 U	0.01 U	0.01 U	NA
Benzene	0.0046	0.00134	0.0271	0.00224	0.00168	0.00219	0.00061	0.00071	0.00012 J	NA
Chloroform	0.0022	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Ethylbenzene	0.015	0.001 U	0.0237	0.001 U	0.00439	0.001 U	0.0022	0.00236	0.001 U	NA
Isopropylbenzene	0.45	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Chloromethane	0.19	0.001 U	0.0172	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Naphthalene	0.0017	0.002 U	0.00342	0.002 U	0.002 U	0.002 U	0.01 U	0.01 U	0.001 U	NA
n-Butylbenzene	1.0	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
n-Propylbenzene	0.66	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
sec-Butylbenzene	2.0	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
trans-1,2-Dichloroethene	0.36	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Styrene	1.2	0.001 U	0.0046	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Tetrachloroethene	0.041	0.001 U	0.00151	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Toluene	1.1	0.00122	0.121	0.00209	0.00162	0.001 U	0.001 U	0.001 U	0.001 U	NA
o-Xylene	NE	0.001 U	0.0274	0.00455	0.00451	0.001 U	0.001 U	0.001 U	0.001 U	NA
p & m-Xylene	NE	0.002 U	0.069	0.00780	0.00859	0.002 U	0.00239	0.00255	0.00068 J	NA
Xylenes (total)	0.19	0.003 U	0.0964	0.0124	0.0131	0.003 U	0.00301	0.00316	0.003 U	NA
<b>Glycols</b>										
Ethylene Glycol	40	2 U	2 U	2 U	2 U	2 U	10 U	10 U	NA	NA
Propylene Glycol	730	2 U	2 U	2 U	2 U	2 U	10 U	10 U	NA	NA

Table 3

## Historical Groundwater Results Summary

## Monitoring Wells MW3 and MW4 - Detected Analytes and Analytes of Interest

Sample ID		MW3	MW3	MW3	MW-3	MW4	MW40	MW4	MW4	MW-4	MW-44
Well Location Relative to Building	ADEC Cleanup Level	SW Corner	SW Corner	SW Corner	SW Corner	SE Corner	SE Corner Dup	SE Corner	SE Corner	SE Corner	SE Corner Dup
Date Sample Collected		11/19/13	10/1/14	9/27/17	10/9/18	11/19/13	11/19/13	10/1/14	9/27/17	10/9/18	10/9/18
Work Order		1138737	1148566	1178439	1189850	1138737	1138737	1148566	1178439	1189850	1189850
Analyte	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Petroleum Fractions</b>											
GRO	2.2	0.100 U	0.100 U	NA	NA	0.100 U	0.100 U	0.100 U	NA	NA	NA
DRO	1.5	0.600 U	0.600 U	0.588 U	0.566 U	0.600 U	0.600 U	0.600 U	0.577 U	0.588 U	0.600 U
RRO	1.1	0.500 U	0.500 U	NA	NA	0.500 U	0.500 U	0.500 U	NA	NA	NA
<b>VOCs<sup>1</sup></b>											
1,2,4-Trimethylbenzene	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3,5-Trimethylbenzene	0.12	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2-Butanone	5.6	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Hexanone	0.038	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Isopropyltoluene	NE	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	6.3	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzene	0.0046	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U
Chloroform	0.0022	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.45	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.19	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Naphthalene	0.0017	0.002 U	0.002 U	0.001 U	0.001 U	0.002 U	0.01 U	0.01 U	0.001 U	0.001 U	0.001 U
n-Butylbenzene	1.0	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
n-Propylbenzene	0.66	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
sec-Butylbenzene	2.0	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.36	0.001 U	0.001 U	0.00039 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Styrene	1.2	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.041	0.001 U	0.001 U	0.001 U	0.001 U	0.0028	0.00292	0.0111	0.00129	0.001 U	0.001 U
Toluene	1.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
o-Xylene	NE	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
p & m-Xylene	NE	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Xylenes (total)	0.19	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
<b>Glycols</b>											
Ethylene Glycol	40	10 U	10 U	NA	NA	10 U	10 U	10 U	NA	NA	NA
Propylene Glycol	730	10 U	10 U	NA	NA	10 U	10 U	10 U	NA	NA	NA

**Table 3**  
**Historical Groundwater Results Summary**

**Notes:**

U Analyte not detected at the listed limit of quantitation (LOQ)

NE Cleanup Level not established

**Shade** Analyte detected below the ADEC Cleanup Level

**Bold** Analyte detected exceeding the ADEC Cleanup Level

<sup>1</sup> Refer to Table 1 for October 2018 for 1,2-dibromoethane and 1,2,3-trichloropropane results

<sup>2</sup> On June 30, 2011, MW1 was sampled for glycols with Ethylene Glycol at 170 mg/L and Propylene Glycol at 140 mg/L

NE ADEC groundwater cleanup level not established

mg/L milligrams per liter

NA Analysis not performed



# Appendix 3



# Field Activity Log

Weather: Clear, 25°F, calm <sup>to 35°F</sup>

Date 10/8/18

Staff William Watts  
Scott Hummel

Project ID 17-1001

Safety Topics: Slips, trips, falls Length: 15 min. Page      of     

0900 - <sup>TRR</sup> ~~mobile~~ - <sup>SGS</sup> ~~plu HDPE tubing; frozen PFC-approved gel;~~  
~~250 gallon tote~~

1130 - Arrive site - Set up at Alaska Dreams, Inc site to sample HW for Decan - experiment w PFC-free water pump lab.

1330 - Start pumping HW.

1500 - HW appears to have been pumped dry. Approx. 35 gallons of purge water removed. Wait 30 mins for well to recharge.

1530 - Well dry - could not collect sample. Will allow well to recharge overnight. <sup>Dark brown</sup> sludge bottom of well.

1610 - Departed site

1635 - Return to office / demob

1645 - Done

*William L. Watts*



# Field Activity Log

Weather: Mostly Sunny, 10s-30s Date 10/9/18  
 Staff SWH  
 Project ID 17-1001  
 Safety Topics: GW - POL & PFCs Length: 5 mins Page 1 of 1

0830 pack truck and calibrate YSI Pro Plus DSS  
 0945 arrive at HW-1 to assess well's recharge from being purged dry and having insufficient recharge from 10/8/18 attempted sampling. Bailer used to sample fully recharged well after well was left undisturbed overnight.  
 1020 communicate with owner/managers of Napa and adjacent property regarding gw sampling MW-2, MW-1R, MW-3. Discussed w/ Katie @ Napa (AM shop manager) regarding disposal of 2017 GW Purge water after drum is thawed inside shop.  
 1046 begin Napa GW sampling. initial purge collected prior to parameters. v. turbid water in wells prior to sampling. no complications during sampling.  
 1600 depart site for SGS drop-off of samples. Approx. 155 gallons PW collected for samples. drum will be moved inside to thaw prior to disposal.  
 1625 samples turned in. Truck unpacked at office.  
 1700 off field aspect.

10/16/18 1100 - 55-gallon drum and 5-gallon bucket disposed of @ Napa on Van Horn. PW was transferred to a 250 gallon tote and disposed of @ NRC Alaska.





### Groundwater Sample Form

Project: NAPA

Site Location: Van Horn Facility

Project #: 17-1001

Well Number: MW1

<b>Water Column</b>	Pre-Purge	Post-Purge: (only need to be collected if field staff have sufficient belief these measurements have changed)	
Total Depth of Well (ft):	<u>~35</u>	<u>~36</u>	Water Level Measurement Date: <u>10/9/18</u>
Depth to Product from TOC (ft):	<u>NA</u>	<u>N/A</u>	Water Level Measurement Time: <u>1015</u>
Depth to Water from TOC (ft):	<u>~10</u>	<u>10.30</u>	WL Instrument & S/N: <u>Int Probe 1033</u>
Column of Water in Well (ft):	<u>~25</u>	<u>~26</u>	Depth Pump Deployed At (ft): <u>Bailed</u> Tubing Used (ft): <u>— (100' dev.)</u>

<b>Purge Information</b>	<u>6" Private well</u>	Well Diameter (in)	Volume (gal/ft)	TOM-GS (ft): <u>Flush</u>	TOC-TOM (ft): <u>None</u>
Gallons/foot of Well Casing:	<u>1.47</u>	1 3/4 "	0.13	Purge Method: <u>sub pump w/ controller</u>	
Column of Water in Well (ft):	<u>X 25'</u>	2 "	0.17	Est. Flow Rate (gal/min): <u>~1</u>	Development Tot. Vol (gal): <u>35</u>
Vol. of Water in Well (gal):	<u>= 35</u>	4 "	0.66	Purge Water Disposal: <u>NRC Alaska - drop off</u>	

Field Parameters      Purge Start Time: 10/8/18 1300      Purge End time: 10/8/18 1530      Total Volume Removed (gal): ~35

1330

Time (24-hr)	Temperature [±0.5 °C]	Dissolved O <sub>2</sub> [± 10% mg/L]	Conductivity [± 3% µS/cm]	pH [± 0.1 pH units]	ORP [± 10 mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
<p><i>Purged well dry during development. Allowed slow recharge overnight. 1 WV purged.</i></p>									

Water Quality Meter & S/N: N/A - slow recharge      Purge Notes: bailed after well recharged

<b>Sample Information</b>	Sample Criteria (circle one):    Stable parameters    or    > 3 Well Vol. Purged
Sample Date: <u>10/9/18</u>	Sample ID: <u>MW-1</u> Time: <u>10:05</u>
Sampler(s): <u>SWT</u>	Field Dup ID: <u>N/A</u> Time: <u>—</u>
Sample Method: <u>bailed</u>	Equip Blank ID: <u>N/A</u> Time: <u>—</u>

Laboratory Analyses:  DRO/RRO (AK102/103);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  VOC EPA 8260;  PFOA/PFOs

Well Condition Notes: Well cap NOT secure, Dirt/debris subject to

Casing Notes: falling into well.

Monument Notes: monument flush to ground surface

Notes & Comments: Previous sampling well was ND for PUL.

*6" diam. well 1.47 gal/ft  
1 in<sup>3</sup> = 0.004329 us gal.*





# Groundwater Sample Form

Project: Napa GW Investigation  
 Project #: 17-1001

Site Location: Napa - Van Horn  
 Well Number: mw-1R

**Water Column** Pre-Purge Post-Purge: (only need to be collected if field staff have sufficient belief these measurements have changed)

Total Depth of Well (ft): ~20.5 20.48 Water Level Measurement Date: 10/9/18

Depth to Product from TOC (ft): N/A N/A Water Level Measurement Time: 12:10

Depth to Water from TOC (ft): ~10. 10.26 WL Instrument & S/N: Int Probe 1033

Column of Water in Well (ft): ~10 10.22 Depth Pump Deployed At (ft): ~12 Tubing Used (ft): 25

**Purge Information**

	Well Diameter (in)	Volume (gal/ft)
Gallons/foot of Well Casing: <u>0.17</u>	1 3/4"	0.08
Column of Water in Well (ft): X <u>~10</u>	<u>2"</u>	<u>0.17</u>
Vol. of Water in Well (gal): = <u>1.74</u>	4"	0.66

TOM-GS (ft): 3.28 TOC-TOM (ft): 0.39

Purge Method: Sub pump w/ controller

Est. Flow Rate (gal/min): ~1 Development Tot. Vol (gal): 14

Purge Water Disposal: NRC Alaska Dump-off

Field Parameters Purge Start Time: 1231 Purge End time: 1247 Total Volume Removed (gal): ~30

Time (24-hr)	Temperature [±0.5 °C]	Dissolved O <sub>2</sub> [± 0.1 mg/L]	Conductivity [± 3% µS/cm]	pH [± 0.1 pH units]	ORP [±10 mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
1234	9.0	0.24	165.8	6.31	-22.8	clear	N	~	
1237	9.0	0.19	166.1	6.32	-17.9	"	↓	↓	
1240	9.0	0.17	165.9	6.34	-13.4	"	↓	↓	
1243	9.0	0.17	164.8	6.35	-9.9	"	↓	↓	
1246	9.0	0.17	166.3	6.35	-4.8	"	↓	↓	
1248	Sample time					"	N	N	
—————									
—————									
—————									
—————									
—————									
—————									

Water Quality Meter & S/N: VSI pro DSS 17E101936 Purge Notes: turbid to clear

**Sample Information** Sample Criteria (circle one): Stable parameters or > 3 Well Vol. Purged

Sample Date: 10/9/18 Sample ID: mw-1R Time: 1248

Sampler(s): SWH Field Dup ID: N/A Time: -

Sample Method: sub pump w/ controller Equip Blank ID: N/A Time: -

Laboratory Analyses:  DRO/RRO (AK102/103);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  <sup>SEMS</sup> VOC EPA 8260;  PPOA/PPOS 537

**Well Condition Notes:**

Casing Notes: good

Monument Notes: good

Notes & Comments: very orange & turbid <sup>(pH)</sup> initial purge cleared after approx. 10 mins.





## Groundwater Sample Form

Project: Napa GW investigation

Site Location: Napa - Van Horn

Project #: 17-1001

Well Number: MW-2

<b>Water Column</b>	Pre-Purge	Post-Purge: <i>(only need to be collected if field staff have sufficient belief these measurements have changed)</i>	
Total Depth of Well (ft):	<u>~ 20.91</u>	<u>20.93</u>	Water Level Measurement Date: <u>10/9/18</u>
Depth to Product from TOC (ft):	<u>-</u>	<u>-</u>	Water Level Measurement Time: <u>12:11</u>
Depth to Water from TOC (ft):	<u>~ 11.5</u>	<u>10.59</u>	WL Instrument & S/N: <u>Int Probe. 1033</u>
Column of Water in Well (ft):	<u>~ 9.5</u>	<u>10.34</u>	Depth Pump Deployed At (ft): <u>~ 20</u> Tubing Used (ft): <u>25 + 15 purge</u>

**Purge Information**

Gallons/foot of Well Casing: <u>0.08</u>	Well Diameter (in)	Volume (gal/ft)	TOM-GS (ft): <u>3.45</u> TOC-TOM (ft): <u>-</u>
Column of Water in Well (ft): <u>X 9.5</u>	<u>1 3/4"</u>	<u>0.08</u>	Purge Method: <u>sub pump w/ controller</u>
Vol. of Water in Well (gal): <u>= 0.76</u>	<u>2"</u>	<u>0.17</u>	Est. Flow Rate (gal/min): <u>~ 1</u> Development Tot. Vol (gal): <u>15</u>
	<u>4"</u>	<u>0.66</u>	Purge Water Disposal: <u>NRC Alaska Drop-off</u>

Field Parameters Purge Start Time: 1131 Purge End time: 1147 Total Volume Removed (gal): ~ 30

Time (24-hr)	Temperature [±0.5 °C]	Dissolved O <sub>2</sub> [± 0.1 mg/L]	Conductivity [± 3% µS/cm]	pH [± 0.1 pH units]	ORP [± 10 mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
1134	9.6	0.41	417.2	6.50	-7.5	sl. turbid			
1137	9.0	0.26	415.5	6.52	-27.7	clear			
1140	9.0	0.21	414.2	6.53	-37.4	clear			
1143	9.0	0.18	410.2	6.54	-43.8	clear			
1146	9.0	0.16	409.6	6.55	-49.2	clear			
1148	Sample time					clear	N	N	

Water Quality Meter & S/N: YSI proDSS IFE101936 Purge Notes: sub-pump w/ controller

**Sample Information**

Sample Date: <u>10/9/18</u>	Sample Criteria (circle one): Stable parameters or <u>&gt; 3 Well Vol. Purged</u>	Sample ID: <u>MW-2</u> Time: <u>1148</u>
Sampler(s): <u>SWH</u>	Field Dup ID: <u>N/A</u> Time: <u>-</u>	Equip Blank ID: <u>N/A</u> Time: <u>-</u>
Sample Method: <u>sub-pump w/ controller</u>		

Laboratory Analyses:  DRO/RRO (AK102/103);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  VOC EPA 8260;  PFOA/PFOS 537

**Well Condition Notes:**

Casing Notes: good - narrow diameter ~1 3/4"

Monument Notes: no monument

Notes & Comments: sampled for VOC 8260 SIM 1,2-dibromoethane & 1,2,3-trichloropropane





## Groundwater Sample Form

Project: Napa GW Investigation  
 Project #: 17-1001

Site Location: Napa - Van Horn  
 Well Number: MW-3

**Water Column**      Pre-Purge      Post-Purge: *(only need to be collected if field staff have sufficient belief these measurements have changed)*

Total Depth of Well (ft): ~17      17.02      Water Level Measurement Date: 10/9/18

Depth to Product from TOC (ft): N/A      -      Water Level Measurement Time: 1351

Depth to Water from TOC (ft): ~9      8.73      WL Instrument & S/N: Int Probe 1033

Column of Water in Well (ft): ~8      8.29      Depth Pump Deployed At (ft): ~10      Tubing Used (ft): 25

**Purge Information**

	Well Diameter (in)	Volume (gal/ft)
Gallons/foot of Well Casing: <u>0.17</u>	1 3/4"	0.08
Column of Water in Well (ft): <u>X 8.29</u>	2"	0.17
Vol. of Water in Well (gal): <u>= 1.41</u>	4"	0.66

TOM-GS (ft): flush      TOC-TOM (ft): 0.61

Purge Method: sub pump w/ controller

Est. Flow Rate (gal/min): ~1      Development Tot. Vol (gal): 10

Purge Water Disposal: NRC Alaska Drop off

Field Parameters      Purge Start Time: 1322      Purge End Time: 1340      Total Volume Removed (gal): 25

Time (24-hr)	Temperature [±0.5 °C]	Dissolved O <sub>2</sub> [± 0.1 mg/L]	Conductivity [± 3% µS/cm]	pH [± 0.1 pH units]	ORP [± 10 mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
1325	8.1	0.09	407.1	6.66	-36.6	clear	N	N	
1328	8.1	0.07	407.1	6.67	-42.4	"			
1331	8.1	0.06	406.9	6.67	-48.3	"			
1334	8.1	0.05	406.1	6.67	-53.8	"			
1337	8.1	0.05	406.0	6.67	-56.1	"			
1341	Sample time					"			
(circled)									

Water Quality Meter & S/N: YSI prodSS 17E101939      Purge Notes: turbid to clear

**Sample Information**

Sample Date: 10/9/18      Sample Criteria (circle one): Stable parameters or > 3 Well Vol. Purged

Sampler(s): SWT      Sample ID: MW-3      Time: 1341

Sample Method: Sub. pump w/ controller      Field Dup ID: N/A      Time: -

Equip Blank ID: ER-NAPA MTA (w)      Time: 1441404

Laboratory Analyses:  DRO/RRO (AK102/100);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  VOC EPA 8260;  PFOA/PFOS 537

**Well Condition Notes:**

Casing Notes: good

Monument Notes: good

Notes & Comments:

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# Groundwater Sample Form

Project: Napa GW investigation  
 Project #: 17-1001

Site Location: Napa - Van Horn  
 Well Number: MW-4

**Water Column**      Pre-Purge      Post-Purge: *(only need to be collected if field staff have sufficient belief these measurements have changed)*

Total Depth of Well (ft):    ~17.7    18.01      Water Level Measurement Date:    10/9/18

Depth to Product from TOC (ft):    -    -      Water Level Measurement Time:    1432

Depth to Water from TOC (ft):    ~8.5    8.59      WL Instrument & S/N:    Int probe 1023

Column of Water in Well (ft):    ~9    9.42      Depth Pump Deployed At (ft):    ~15    Tubing Used (ft):    30

**Purge Information**

	Well Diameter (in)	Volume (gal/ft)
Gallons/foot of Well Casing: <u>0.17</u>	1 3/4"	0.08
Column of Water in Well (ft):    X <u>9.42</u>	<u>2"</u>	<u>0.17</u>
Vol. of Water in Well (gal):    = <u>1.60</u>	4"	0.66

TOM-GS (ft):    Flush      TOC-TOM (ft):    0.48

Purge Method:    sub pump w/ controller

Est. Flow Rate (gal/min):    M      Development Tot. Vol (gal):    15

Purge Water Disposal:    NRC Alaska - Drop-off

**Field Parameters**      Purge Start Time:    1458      Purge End time:    1514      Total Volume Removed (gal):    ~40

Time (24-hr)	Temperature [±0.5 °C]	Dissolved O <sub>2</sub> [± 0.1 mg/L]	Conductivity [± 3% µS/cm]	pH [± 0.1 pH units]	ORP [±10 mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
1501	5.1	0.09	332.6	6.63	-41.1	sl. turbid	N	N	
1504	5.2	0.07	331.6	6.63	-43.6	clear	↓	↓	
1507	5.2	0.06	331.9	6.63	-45.8	"	↓	↓	
1510	5.2	0.06	331.9	6.63	-47.5	"	↓	↓	
1513	5.2	0.04	332.1	6.62	-49.1	"	↓	↓	
1515	sample time					clear	↓	↓	
(PW)									

Water Quality Meter & S/N: YSI probes 175101939      Purge Notes: turbid black to clear

**Sample Information**

Sample Date: 10/9/18      Sample ID: MW-4      Time: 1515

Sampler(s): SWT      Field Dup ID: MW-44      Time: 1525

Sample Method: Sub. pump w/ controller      Equip Blank ID: N/A      Time: -

Laboratory Analyses:  DRO/RRO (AK102/103);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  VOC EPA 8260;  PFCs (PFPA/PFOS) <sup>Sims</sup> 537

Well Condition Notes: good

Casing Notes: good.

Monument Notes: removed more bentonite to give casing cap some clearance.

Notes & Comments:

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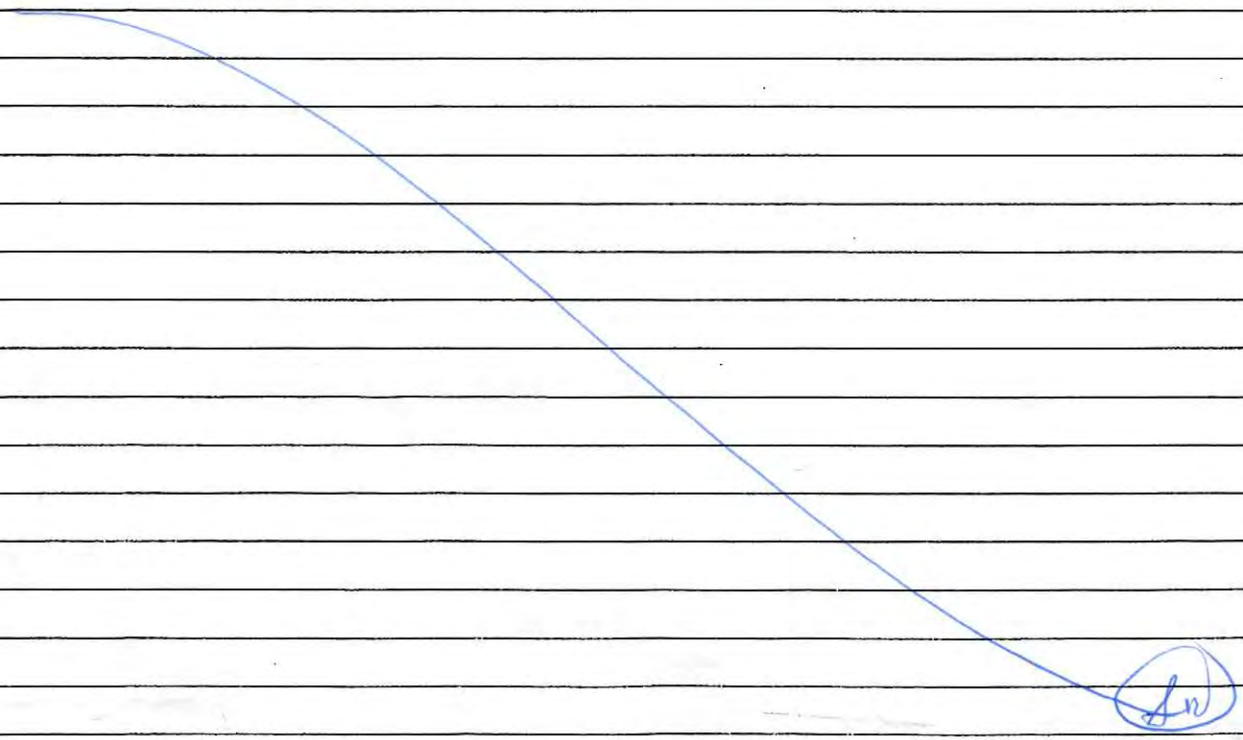




# Field Activity Log

Weather: overcast, windy, ~10s Date: 2-13-19  
 Staff: SWH, WLW  
 Project ID: 17-1001  
 Safety Topics: PFC - ultra sensitive analysis Length: 0.1 Page: 1 of 1

0830 pack truck, calibrate VSI (passed)  
 1000 depart for site (Napa - Van Horn)  
 1030 arrive, site walk-around. get instructions for PW holding and updated Katie w/ PFC - Res Search/sampling documents.  
 1100 begin at upgradient well MW-4  
 QC sampling @ MW-3  
 pump had frozen plug <sup>after CB sampling</sup> - thawed in truck before continuing sampling. Sampled MW-2R and MW-1R w/ no complications.  
 1530 clean-up. Drum left by MW-4 on pallet for Napa to move if desired. Drum was labelled. Approx 40 gallons.  
 1600 drive to SGS - office closed for winter hours. Return to office for unpacking truck.  
 1700 off project - no complications during sampling.  
 dropped off samples @ SGS following day. (SWH)







# Groundwater Sample Form

Project: Napa GW PFC  
Project #: 17-1001

Site Location: Napa Van Horn, Fbx, Ake  
Well Number: mw-1R

**Water Column**      Pre-Purge      Post-Purge: (only need to be collected if field staff have sufficient belief these measurements have changed)

Total Depth of Well (ft): 21      Water Level Measurement Date: 2/13/19

Depth to Product from TOC (ft): -      Water Level Measurement Time: 13:51

Depth to Water from TOC (ft): 13.2      WL Instrument & S/N: steel tape measure

Column of Water in Well (ft): 6.8      Depth Pump Deployed At (ft): 20      Tubing Used (ft): 30

**Purge Information**

	Well Diameter (in)	Volume (gal/ft)
Gallons/foot of Well Casing: <u>0.17</u>	1 3/4"	0.13
Column of Water in Well (ft): <u>X 6.8</u>	<u>2"</u>	<u>0.17</u>
Vol. of Water in Well (gal): <u>= 1.16</u>	4"	0.66

TOM-GS (ft): 3.28      TOC-TOM (ft): 0.39

Purge Method: sub pump w/ controller

Est. Flow Rate (gal/min): 0.5      Development Tot. Vol (gal): 4.5

Purge Water Disposal: Containerize and hold onsite.

Field Parameters      Purge Start Time: 1411      Purge End time: 1433      Total Volume Removed (gal): 13

Time (24-hr)	Temperature [±0.5 °C]	Dissolved O <sub>2</sub> [± 10% mg/L]	Conductivity [± 3% µS/cm]	pH [± 0.1 pH units]	ORP [± 10 mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
1421	4.8	0.19	243.7	6.89	-46.6	sl. turbid	N	N	6
1424	4.8	0.12	245.9	6.88	-47.5	clear	N	N	9.5
1427	4.8	0.09	243.7	6.85	-45.5	"	N	N	11
1430	4.9	0.09	244.5	6.83	-44.0	"	N	N	11.75
1433	4.8	0.09	245.1	6.80	-42.6	"	N	N	13
1434	Sample time					clear	N	N	-

Water Quality Meter & S/N: YSI ProDSS 17E101936      Purge Notes: vis turbid - orange initially - cleared up.

**Sample Information**

Sample Date: 2/13/19      Sample Criteria (circle one): Stable parameters or > 3 Well Vol. Purged

Sampler(s): SWH, WLW      Sample ID: MW-1R      Time: 1434

Sample Method: sub pump w/ controller      Field Dup ID: N/A      Time: -

Equip Blank ID: N/A      Time: -

Laboratory Analyses:  DRO/RRO (AK102/103);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  VOC EPA 8260;  PFCs EPA 537

**Well Condition Notes:**

Casing Notes: good

Monument Notes: good - no monument lid

Notes & Comments: Field blank collected from SGS Provided "PFC-free DI water."  
Field Blank id: Field Blank-1 2/13/19 @ 1400





# Groundwater Sample Form

Project: Napa GW - PFCs

Site Location: Napa Van Horn

Project #: 17-1001

Well Number: MW-2

### Water Column

Pre-Purge

Post-Purge: (only need to be collected if field staff have sufficient belief these measurements have changed)

Total Depth of Well (ft): 21

Water Level Measurement Date: 2/13/19

Depth to Product from TOC (ft): -

Water Level Measurement Time: 1510

Depth to Water from TOC (ft): 13.4

WL Instrument & S/N: steel tape measure

Column of Water in Well (ft): 7.6

Depth Pump Deployed At (ft): 219 Tubing Used (ft): 90

### Purge Information

Well Diameter (in) Volume (gal/ft)

Gallons/foot of Well Casing: 0.13

1 3/4" 0.13

TOM-GS (ft): - TOC-TOM (ft): 3.46

Column of Water in Well (ft): X 7.6

2" 0.17

Purge Method: sub pump w/ controller

Vol. of Water in Well (gal): = 0.988

4" 0.66

Est. Flow Rate (gal/min): 0.5 Development Tot. Vol (gal): 2

Purge Water Disposal: Containerized onsite until results.

### Field Parameters

Purge Start Time: 1508

Purge End time: 1525

Total Volume Removed (gal): 10

Time (24-hr)	Temperature [ $\pm 0.5$ °C]	Dissolved O <sub>2</sub> [ $\pm 10\%$ mg/L]	Conductivity [ $\pm 3\%$ $\mu$ S/cm]	pH [ $\pm 0.1$ pH units]	ORP [ $\pm 10$ mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
1513	4.9	0.13	3635	6.61	-21.5	clear	N	N	2
1516	5.0	0.09	360.4	6.64	-27.3	"	N	N	3.5
1519	5.0	0.08	358.8	6.66	-31.0	"	N	N	5
1522	5.0	0.07	356.3	6.68	-36.9	"	N	N	7.5
1525	5.0	0.07	354.0	6.68	-39.9	"	N	N	10
1526	sample time					clear	N	N	-

Water Quality Meter & S/N: YSI ProDSS 17E101936

Purge Notes: sl. turbid to clear

### Sample Information

Sample Criteria (circle one): Stable parameters or > 3 Well Vol. Purged

Sample Date: 2/13/19

Sample ID: MW-2 Time: 1526

Sampler(s): SWH, WLW

Field Dup ID: N/A Time: -

Sample Method: Sub pump w/ controller

Equip Blank ID: N/A Time: -

Laboratory Analyses:  DRO/RRO (AK102/103);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  VOC EPA 8260;  PFC EPA 537

### Well Condition Notes:

Casing Notes: good

Monument Notes: No monument - just exposed 1 3/4" PVC casing.

Notes & Comments: DTW was measured using a steel tape measure.





### Groundwater Sample Form

Project: Napa GW PFC - onsite  
 Project #: 17-1001

Site Location: Napa Van Horn, Fbx, Hk  
 Well Number: MW-3

**Water Column**      Pre-Purge      Post-Purge: (only need to be collected if field staff have sufficient belief these measurements have changed)

Total Depth of Well (ft): ~17      Water Level Measurement Date: 2/13/19  
 Depth to Product from TOC (ft): -      Water Level Measurement Time: 1235  
 Depth to Water from TOC (ft): 11.3      WL Instrument & S/N: steel tape measure  
 Column of Water in Well (ft): 5.7      Depth Pump Deployed At (ft): ~15      Tubing Used (ft): 25

**Purge Information**

Well Diameter (in)	Volume (gal/ft)
1 3/4"	0.13
2"	0.17
4"	0.66

Gallons/foot of Well Casing: 0.17      TOM-GS (ft): flush      TOC-TOM (ft): 0.64  
 Column of Water in Well (ft): X 5.7      Purge Method: sub pump w/ controller  
 Vol. of Water in Well (gal): = 0.969      Est. Flow Rate (gal/min): ~0.5      Development Tot. Vol (gal): 1.5  
 Purge Water Disposal: Hold onsite in drum for results.

**Field Parameters**      Purge Start Time: 1248      Purge End time: 1303      Total Volume Removed (gal): 7

Time (24-hr)	Temperature [±0.5 °C]	Dissolved O <sub>2</sub> [± 10% mg/L]	Conductivity [± 3% µS/cm]	pH [± 0.1 pH units]	ORP [± 10 mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
1251	4.4	0.19	349.6	6.65	-46.8	clear	N	N	2
1254	4.3	0.16	349.8	6.67	-50.4	"	N	N	3.5
1257	4.5	0.11	352.7	6.68	-53.1	"	N	N	4
1300	4.7	0.10	355.2	6.68	-55.2	"	N	N	5
1303	4.7	0.09	354.7	6.69	-56.0	"	N	N	6.5
1304	Sample time					clear	N	N	
1306	Dup Sample time					clear	N	N	

Water Quality Meter & S/N: YSI ProDSS S/N: 17E14936      Purge Notes: sl. turbid to clear

**Sample Information**

Sample Date: 2/13/19      Sample Criteria (circle one): Stable parameters or > 3 Well Vol. Purged  
 Sampler(s): SWH, WLW      Sample ID: MW-3      Time: 1304  
 Sample Method: sub pump w/ controller      Field Dup ID: MW-33      Time: 1306  
 Equip Blank ID: EB-1      Time: 1340

Laboratory Analyses:  DRO/RRO (AK102/103);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  VOC EPA 8260;  PFC EPA 537

**Well Condition Notes:**

Casing Notes: good  
 Monument Notes: good  
 Notes & Comments: DTW measured using steel tape measure





### Groundwater Sample Form

Project: 217-1001

Site Location: Napa Van Horn Rd, Fbx, Ak

Project #: Napa GW sampling - PFC

Well Number: MW-4

**Water Column**      Pre-Purge      Post-Purge: (only need to be collected if field staff have sufficient belief these measurements have changed)

Total Depth of Well (ft): 11.20      Water Level Measurement Date: 2/13/19

Depth to Product from TOC (ft): -      Water Level Measurement Time: 1120

Depth to Water from TOC (ft): 11.20      WL Instrument & S/N: steel tape measure

Column of Water in Well (ft): ~3.580      Depth Pump Deployed At (ft): ~15      Tubing Used (ft): 25

**Purge Information**

	Well Diameter (in)	Volume (gal/ft)
Gallons/foot of Well Casing: <u>0.17</u>	1 3/4 "	0.13
Column of Water in Well (ft): <u>X 3.580</u>	<u>2"</u>	<u>0.17</u>
Vol. of Water in Well (gal): <u>0.986</u>	4"	0.66

TOM-GS (ft): flush      TOC-TOM (ft): 0.50

Purge Method: sub. pump w/ controller

Est. Flow Rate (gal/min): ~0.5      Development Tot. Vol (gal): ~2

Purge Water Disposal: hold for testing onsite.

**Field Parameters**      Purge Start Time: 1141      Purge End time: 1156      Total Volume Removed (gal): 9

Time (24-hr)	Temperature [±0.5 °C]	Dissolved O <sub>2</sub> [± 10% mg/L]	Conductivity [± 3% µS/cm]	pH [± 0.1 pH units]	ORP [± 10 mV]	Visual Clarity (observed)	Odor (Y/N)	Sheen (Y/N)	Removed Vol (gal)
1144	3.4	0.49	319.1	6.69	-41.0	clear/sl. turb.	N	N	3
1147	3.5	0.37	318.9	6.66	-42.4	"	N	N	~4.5
1150	3.4	0.28	318.2	6.63	-43.3	"	N	N	6.
1153	3.5	0.25	318.9	6.62	-43.1	"	N	N	7.5
1156	3.5	0.20	329.7	6.62	-43.4	"	N	N	9
1157	Sample time					clear	N	N	-

Water Quality Meter & S/N: YSE ProDSS 17E101936      Purge Notes: sl. turbid to clear

**Sample Information**

Sample Date: 2/13/19      Sample Criteria (circle one): Stable parameters or 3 Well Vol. Purged

Sampler(s): SWH, WLW      Sample ID: MW-4      Time: 1157

Sample Method: sub pump w/ controller      Field Dup ID: N/A      Time: -

Equip Blank ID: N/A      Time: -

Laboratory Analyses:  DRO/RRO (AK102/103);  GRO/BTEX (AK101 / EPA 8021B);  PAH (EPA 8270D SIM);  VOC EPA 8260;  PFC EPA 537

**Well Condition Notes:**

Casing Notes: good

Monument Notes: good

Notes & Comments: DTW measured using steel tape measure

# Appendix 4



**Photo 1:** October 9, 2018. Looking north along the west side ditch during sampling of MW3 adjacent to the vapor extraction system (VES) housing and stack. MW1 and MW2 (white stickup) are located (red arrows) in the ditch at the property boundary.



**Photo 2:** February 13, 2019. Looking northwest at the NAPA Auto Parts Store. MW4 is located adjacent to the east side VES housing stack shown rising to above the roof line. This well is situated at the corner of the rebuilt NAPA store before an addition was added in 2013.





**Photo 3:** February 13, 2019. Looking south along the west side boundary ditch at MW2 (white stickup) and MW1. MW2 followed by MW1 had higher sums of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) concentrations than MW3 or MW4.



**Photo 4:** February 13, 2019. Looking north during sampling of MW4 located adjacent to the east side VES housing.



# Appendix 5

## Laboratory Report of Analysis

To: Nortech  
2450 College Road  
Fairbanks, AK 99709  
(907)452-5688

Report Number: **1189850**

Client Project: **2018 GW Napa Van Horn**

Dear Scott Hummel,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Jennifer at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.



Alaska Division Technical Director

Stephen Ede

2018.11.07

11:34:00 -09'00'

Jennifer Dawkins  
Project Manager  
Jennifer.Dawkins@sgs.com

Date

### Case Narrative

SGS Client: **Nortech**  
SGS Project: **1189850**  
Project Name/Site: **2018 GW Napa Van Horn**  
Project Contact: **Scott Hummel**

Refer to sample receipt form for information on sample condition.

**HR-1 (1189850001) PS**

PFCs by 537M were analyzed by SGS of Orlando, FL.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 11/07/2018 9:29:26AM

## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

**Note:** Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
HR-1	1189850001	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)
MW-2	1189850002	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)
MW-1R	1189850003	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)
MW-3	1189850004	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)
EB-Napa VH	1189850005	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)
MW-4	1189850006	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)
MW-44	1189850007	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)
TB-Napa VH	1189850008	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)
Field Blank	1189850009	10/09/2018	10/10/2018	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
AK102	DRO Low Volume (W)
SW8260C-SIM	SW8260-SIM (W)
SW8260C	Volatile Organic Compounds (W) FULL

## Detectable Results Summary

Client Sample ID: **EB-Napa VH**

Lab Sample ID: 1189850005

**Volatile GC/MS**

Parameter

Toluene

Result

3.02

Units

ug/L



### Results of MW-2

Client Sample ID: **MW-2**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850002  
Lab Project ID: 1189850

Collection Date: 10/09/18 11:48  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile-SIM

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,3-Trichloropropane	0.0100 U	0.0100	0.00250	ug/L	1		10/21/18 09:50
1,2-Dibromoethane	0.00500 U	0.00500	0.00125	ug/L	1		10/21/18 09:50
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	99.4	85-114		%	1		10/21/18 09:50
Toluene-d8 (surr)	98.9	89-112		%	1		10/21/18 09:50

### Batch Information

Analytical Batch: VMS18479  
Analytical Method: SW8260C-SIM  
Analyst: NRB  
Analytical Date/Time: 10/21/18 09:50  
Container ID: 1189850002-C

Prep Batch: VXX33396  
Prep Method: SW5030B  
Prep Date/Time: 10/21/18 00:30  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

Print Date: 11/07/2018 9:29:31AM



Results of MW-1R

Client Sample ID: MW-1R
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850003
Lab Project ID: 1189850

Collection Date: 10/09/18 12:48
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile-SIM

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include 1,2,3-Trichloropropane and 1,2-Dibromoethane.

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include 4-Bromofluorobenzene (surr) and Toluene-d8 (surr).

Batch Information

Analytical Batch: VMS18479
Analytical Method: SW8260C-SIM
Analyst: NRB
Analytical Date/Time: 10/21/18 10:06
Container ID: 1189850003-C

Prep Batch: VXX33396
Prep Method: SW5030B
Prep Date/Time: 10/21/18 00:30
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 11/07/2018 9:29:31AM



## Results of MW-3

Client Sample ID: **MW-3**  
 Client Project ID: **2018 GW Napa Van Horn**  
 Lab Sample ID: 1189850004  
 Lab Project ID: 1189850

Collection Date: 10/09/18 13:41  
 Received Date: 10/10/18 16:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.566 U	0.566	0.170	mg/L	1		10/15/18 13:57
<b>Surrogates</b>							
5a Androstane (surr)	88.1	50-150		%	1		10/15/18 13:57

## Batch Information

Analytical Batch: XFC14708  
 Analytical Method: AK102  
 Analyst: CMS  
 Analytical Date/Time: 10/15/18 13:57  
 Container ID: 1189850004-I

Prep Batch: XXX40721  
 Prep Method: SW3520C  
 Prep Date/Time: 10/13/18 08:13  
 Prep Initial Wt./Vol.: 265 mL  
 Prep Extract Vol: 1 mL



Results of MW-3

Client Sample ID: MW-3
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850004
Lab Project ID: 1189850

Collection Date: 10/09/18 13:41
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Print Date: 11/07/2018 9:29:31AM



Results of MW-3

Client Sample ID: MW-3
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850004
Lab Project ID: 1189850

Collection Date: 10/09/18 13:41
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Print Date: 11/07/2018 9:29:31AM

## Results of MW-3

Client Sample ID: **MW-3**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850004  
Lab Project ID: 1189850

Collection Date: 10/09/18 13:41  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS18444  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 10/12/18 16:42  
Container ID: 1189850004-C

Prep Batch: VXX33339  
Prep Method: SW5030B  
Prep Date/Time: 10/12/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



### Results of MW-3

Client Sample ID: **MW-3**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850004  
Lab Project ID: 1189850

Collection Date: 10/09/18 13:41  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile-SIM

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,3-Trichloropropane	0.0100 U	0.0100	0.00250	ug/L	1		10/21/18 10:21
1,2-Dibromoethane	0.00500 U	0.00500	0.00125	ug/L	1		10/21/18 10:21

### Surrogates

4-Bromofluorobenzene (surr)	101	85-114		%	1		10/21/18 10:21
Toluene-d8 (surr)	99.4	89-112		%	1		10/21/18 10:21

### Batch Information

Analytical Batch: VMS18479  
Analytical Method: SW8260C-SIM  
Analyst: NRB  
Analytical Date/Time: 10/21/18 10:21  
Container ID: 1189850004-F

Prep Batch: VXX33396  
Prep Method: SW5030B  
Prep Date/Time: 10/21/18 00:30  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

Print Date: 11/07/2018 9:29:31AM

## Results of EB-Napa VH

Client Sample ID: **EB-Napa VH**  
 Client Project ID: **2018 GW Napa Van Horn**  
 Lab Sample ID: 1189850005  
 Lab Project ID: 1189850

Collection Date: 10/09/18 14:04  
 Received Date: 10/10/18 16:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.556 U	0.556	0.167	mg/L	1		10/15/18 14:07
<b>Surrogates</b>							
5a Androstane (surr)	99.4	50-150		%	1		10/15/18 14:07

## Batch Information

Analytical Batch: XFC14708  
 Analytical Method: AK102  
 Analyst: CMS  
 Analytical Date/Time: 10/15/18 14:07  
 Container ID: 1189850005-I

Prep Batch: XXX40721  
 Prep Method: SW3520C  
 Prep Date/Time: 10/13/18 08:13  
 Prep Initial Wt./Vol.: 270 mL  
 Prep Extract Vol: 1 mL



Results of EB-Napa VH

Client Sample ID: EB-Napa VH
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850005
Lab Project ID: 1189850

Collection Date: 10/09/18 14:04
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

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Results of EB-Napa VH

Client Sample ID: EB-Napa VH
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850005
Lab Project ID: 1189850

Collection Date: 10/09/18 14:04
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

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## Results of EB-Napa VH

Client Sample ID: **EB-Napa VH**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850005  
Lab Project ID: 1189850

Collection Date: 10/09/18 14:04  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS18444  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 10/12/18 16:59  
Container ID: 1189850005-C

Prep Batch: VXX33339  
Prep Method: SW5030B  
Prep Date/Time: 10/12/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

## Results of EB-Napa VH

Client Sample ID: **EB-Napa VH**  
 Client Project ID: **2018 GW Napa Van Horn**  
 Lab Sample ID: 1189850005  
 Lab Project ID: 1189850

Collection Date: 10/09/18 14:04  
 Received Date: 10/10/18 16:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Volatile-SIM

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,3-Trichloropropane	0.0100 U	0.0100	0.00250	ug/L	1		10/21/18 10:37
1,2-Dibromoethane	0.00500 U	0.00500	0.00125	ug/L	1		10/21/18 10:37
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	101	85-114		%	1		10/21/18 10:37
Toluene-d8 (surr)	99.9	89-112		%	1		10/21/18 10:37

## Batch Information

Analytical Batch: VMS18479  
 Analytical Method: SW8260C-SIM  
 Analyst: NRB  
 Analytical Date/Time: 10/21/18 10:37  
 Container ID: 1189850005-F

Prep Batch: VXX33396  
 Prep Method: SW5030B  
 Prep Date/Time: 10/21/18 00:30  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL

## Results of MW-4

Client Sample ID: **MW-4**  
 Client Project ID: **2018 GW Napa Van Horn**  
 Lab Sample ID: 1189850006  
 Lab Project ID: 1189850

Collection Date: 10/09/18 15:15  
 Received Date: 10/10/18 16:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.588 U	0.588	0.176	mg/L	1		10/15/18 14:18
<b>Surrogates</b>							
5a Androstane (surr)	95.6	50-150		%	1		10/15/18 14:18

## Batch Information

Analytical Batch: XFC14708  
 Analytical Method: AK102  
 Analyst: CMS  
 Analytical Date/Time: 10/15/18 14:18  
 Container ID: 1189850006-I

Prep Batch: XXX40721  
 Prep Method: SW3520C  
 Prep Date/Time: 10/13/18 08:13  
 Prep Initial Wt./Vol.: 255 mL  
 Prep Extract Vol: 1 mL



### Results of MW-4

Client Sample ID: **MW-4**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850006  
Lab Project ID: 1189850

Collection Date: 10/09/18 15:15  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,1,1,2-Tetrachloroethane	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
1,1,1-Trichloroethane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,1,2,2-Tetrachloroethane	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
1,1,2-Trichloroethane	0.400 U	0.400	0.120	ug/L	1		10/12/18 17:16
1,1-Dichloroethane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,1-Dichloroethene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,1-Dichloropropene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,2,3-Trichlorobenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,2,3-Trichloropropane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,2,4-Trichlorobenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,2,4-Trimethylbenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,2-Dibromo-3-chloropropane	10.0 U	10.0	3.10	ug/L	1		10/12/18 17:16
1,2-Dibromoethane	0.0750 U	0.0750	0.0180	ug/L	1		10/12/18 17:16
1,2-Dichlorobenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,2-Dichloroethane	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
1,2-Dichloropropane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,3,5-Trimethylbenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,3-Dichlorobenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
1,3-Dichloropropane	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
1,4-Dichlorobenzene	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
2,2-Dichloropropane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
2-Butanone (MEK)	10.0 U	10.0	3.10	ug/L	1		10/12/18 17:16
2-Chlorotoluene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
2-Hexanone	10.0 U	10.0	3.10	ug/L	1		10/12/18 17:16
4-Chlorotoluene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
4-Isopropyltoluene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
4-Methyl-2-pentanone (MIBK)	10.0 U	10.0	3.10	ug/L	1		10/12/18 17:16
Benzene	0.400 U	0.400	0.120	ug/L	1		10/12/18 17:16
Bromobenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Bromochloromethane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Bromodichloromethane	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
Bromoform	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Bromomethane	5.00 U	5.00	1.50	ug/L	1		10/12/18 17:16
Carbon disulfide	10.0 U	10.0	3.10	ug/L	1		10/12/18 17:16
Carbon tetrachloride	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Chlorobenzene	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
Chloroethane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16

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### Results of MW-4

Client Sample ID: **MW-4**  
 Client Project ID: **2018 GW Napa Van Horn**  
 Lab Sample ID: 1189850006  
 Lab Project ID: 1189850

Collection Date: 10/09/18 15:15  
 Received Date: 10/10/18 16:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroform	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Chloromethane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
cis-1,2-Dichloroethene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
cis-1,3-Dichloropropene	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
Dibromochloromethane	0.500 U	0.500	0.150	ug/L	1		10/12/18 17:16
Dibromomethane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Dichlorodifluoromethane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Ethylbenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Freon-113	10.0 U	10.0	3.10	ug/L	1		10/12/18 17:16
Hexachlorobutadiene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Isopropylbenzene (Cumene)	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Methylene chloride	5.00 U	5.00	1.00	ug/L	1		10/12/18 17:16
Methyl-t-butyl ether	10.0 U	10.0	3.10	ug/L	1		10/12/18 17:16
Naphthalene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
n-Butylbenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
n-Propylbenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
o-Xylene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
P & M -Xylene	2.00 U	2.00	0.620	ug/L	1		10/12/18 17:16
sec-Butylbenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Styrene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
tert-Butylbenzene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Tetrachloroethene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Toluene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
trans-1,2-Dichloroethene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
trans-1,3-Dichloropropene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Trichloroethene	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Trichlorofluoromethane	1.00 U	1.00	0.310	ug/L	1		10/12/18 17:16
Vinyl acetate	10.0 U	10.0	3.10	ug/L	1		10/12/18 17:16
Vinyl chloride	0.150 U	0.150	0.0500	ug/L	1		10/12/18 17:16
Xylenes (total)	3.00 U	3.00	1.00	ug/L	1		10/12/18 17:16
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1		10/12/18 17:16
4-Bromofluorobenzene (surr)	100	85-114		%	1		10/12/18 17:16
Toluene-d8 (surr)	102	89-112		%	1		10/12/18 17:16

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## Results of MW-4

Client Sample ID: **MW-4**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850006  
Lab Project ID: 1189850

Collection Date: 10/09/18 15:15  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS18444  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 10/12/18 17:16  
Container ID: 1189850006-C

Prep Batch: VXX33339  
Prep Method: SW5030B  
Prep Date/Time: 10/12/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

## Results of MW-4

Client Sample ID: **MW-4**  
 Client Project ID: **2018 GW Napa Van Horn**  
 Lab Sample ID: 1189850006  
 Lab Project ID: 1189850

Collection Date: 10/09/18 15:15  
 Received Date: 10/10/18 16:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Volatile-SIM

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,3-Trichloropropane	0.0100 U	0.0100	0.00250	ug/L	1		10/21/18 10:53
1,2-Dibromoethane	0.00500 U	0.00500	0.00125	ug/L	1		10/21/18 10:53
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	102	85-114		%	1		10/21/18 10:53
Toluene-d8 (surr)	99.7	89-112		%	1		10/21/18 10:53

## Batch Information

Analytical Batch: VMS18479  
 Analytical Method: SW8260C-SIM  
 Analyst: NRB  
 Analytical Date/Time: 10/21/18 10:53  
 Container ID: 1189850006-F

Prep Batch: VXX33396  
 Prep Method: SW5030B  
 Prep Date/Time: 10/21/18 00:30  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL



## Results of MW-44

Client Sample ID: **MW-44**  
 Client Project ID: **2018 GW Napa Van Horn**  
 Lab Sample ID: 1189850007  
 Lab Project ID: 1189850

Collection Date: 10/09/18 15:25  
 Received Date: 10/10/18 16:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.600 U	0.600	0.180	mg/L	1		10/15/18 14:29
<b>Surrogates</b>							
5a Androstane (surr)	85.2	50-150		%	1		10/15/18 14:29

## Batch Information

Analytical Batch: XFC14708  
 Analytical Method: AK102  
 Analyst: CMS  
 Analytical Date/Time: 10/15/18 14:29  
 Container ID: 1189850007-I

Prep Batch: XXX40721  
 Prep Method: SW3520C  
 Prep Date/Time: 10/13/18 08:13  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL



Results of MW-44

Client Sample ID: MW-44
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850007
Lab Project ID: 1189850

Collection Date: 10/09/18 15:25
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

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Results of MW-44

Client Sample ID: MW-44
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850007
Lab Project ID: 1189850

Collection Date: 10/09/18 15:25
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical parameters like Chloroform, Chloromethane, etc., with their respective values and analysis dates.

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## Results of MW-44

Client Sample ID: **MW-44**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850007  
Lab Project ID: 1189850

Collection Date: 10/09/18 15:25  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS18444  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 10/12/18 17:33  
Container ID: 1189850007-C

Prep Batch: VXX33339  
Prep Method: SW5030B  
Prep Date/Time: 10/12/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

## Results of MW-44

Client Sample ID: **MW-44**  
 Client Project ID: **2018 GW Napa Van Horn**  
 Lab Sample ID: 1189850007  
 Lab Project ID: 1189850

Collection Date: 10/09/18 15:25  
 Received Date: 10/10/18 16:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Volatile-SIM

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,3-Trichloropropane	0.0100 U	0.0100	0.00250	ug/L	1		10/21/18 11:08
1,2-Dibromoethane	0.00500 U	0.00500	0.00125	ug/L	1		10/21/18 11:08
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	102	85-114		%	1		10/21/18 11:08
Toluene-d8 (surr)	99.6	89-112		%	1		10/21/18 11:08

## Batch Information

Analytical Batch: VMS18479  
 Analytical Method: SW8260C-SIM  
 Analyst: NRB  
 Analytical Date/Time: 10/21/18 11:08  
 Container ID: 1189850007-F

Prep Batch: VXX33396  
 Prep Method: SW5030B  
 Prep Date/Time: 10/21/18 00:30  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL



Results of TB-Napa VH

Client Sample ID: TB-Napa VH
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850008
Lab Project ID: 1189850

Collection Date: 10/09/18 09:40
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

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Results of TB-Napa VH

Client Sample ID: TB-Napa VH
Client Project ID: 2018 GW Napa Van Horn
Lab Sample ID: 1189850008
Lab Project ID: 1189850

Collection Date: 10/09/18 09:40
Received Date: 10/10/18 16:59
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

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## Results of TB-Napa VH

Client Sample ID: **TB-Napa VH**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850008  
Lab Project ID: 1189850

Collection Date: 10/09/18 09:40  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS18444  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 10/12/18 15:33  
Container ID: 1189850008-A

Prep Batch: VXX33339  
Prep Method: SW5030B  
Prep Date/Time: 10/12/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL





### Results of TB-Napa VH

Client Sample ID: **TB-Napa VH**  
Client Project ID: **2018 GW Napa Van Horn**  
Lab Sample ID: 1189850008  
Lab Project ID: 1189850

Collection Date: 10/09/18 09:40  
Received Date: 10/10/18 16:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile-SIM

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,3-Trichloropropane	0.0100 U	0.0100	0.00250	ug/L	1		10/21/18 08:32
1,2-Dibromoethane	0.00500 U	0.00500	0.00125	ug/L	1		10/21/18 08:32
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	102	85-114		%	1		10/21/18 08:32
Toluene-d8 (surr)	100	89-112		%	1		10/21/18 08:32

### Batch Information

Analytical Batch: VMS18479  
Analytical Method: SW8260C-SIM  
Analyst: NRB  
Analytical Date/Time: 10/21/18 08:32  
Container ID: 1189850008-D

Prep Batch: VXX33396  
Prep Method: SW5030B  
Prep Date/Time: 10/21/18 00:30  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

Print Date: 11/07/2018 9:29:31AM



### Method Blank

Blank ID: MB for HBN 1787716 [VXX/33339]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1482714

QC for Samples:

1189850004, 1189850005, 1189850006, 1189850007, 1189850008

### Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,1,1,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,1-Trichloroethane	0.500U	1.00	0.310	ug/L
1,1,2,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,2-Trichloroethane	0.200U	0.400	0.120	ug/L
1,1-Dichloroethane	0.500U	1.00	0.310	ug/L
1,1-Dichloroethene	0.500U	1.00	0.310	ug/L
1,1-Dichloropropene	0.500U	1.00	0.310	ug/L
1,2,3-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/L
1,2,4-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,2-Dibromo-3-chloropropane	5.00U	10.0	3.10	ug/L
1,2-Dibromoethane	0.0375U	0.0750	0.0180	ug/L
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,2-Dichloroethane	0.250U	0.500	0.150	ug/L
1,2-Dichloropropane	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichloropropane	0.250U	0.500	0.150	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
2,2-Dichloropropane	0.500U	1.00	0.310	ug/L
2-Butanone (MEK)	5.00U	10.0	3.10	ug/L
2-Chlorotoluene	0.500U	1.00	0.310	ug/L
2-Hexanone	5.00U	10.0	3.10	ug/L
4-Chlorotoluene	0.500U	1.00	0.310	ug/L
4-Isopropyltoluene	0.500U	1.00	0.310	ug/L
4-Methyl-2-pentanone (MIBK)	5.00U	10.0	3.10	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Bromobenzene	0.500U	1.00	0.310	ug/L
Bromochloromethane	0.500U	1.00	0.310	ug/L
Bromodichloromethane	0.250U	0.500	0.150	ug/L
Bromoform	0.500U	1.00	0.310	ug/L
Bromomethane	2.50U	5.00	1.50	ug/L
Carbon disulfide	5.00U	10.0	3.10	ug/L
Carbon tetrachloride	0.500U	1.00	0.310	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Chloroethane	0.500U	1.00	0.310	ug/L
Chloroform	0.500U	1.00	0.310	ug/L

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## Method Blank

Blank ID: MB for HBN 1787716 [VXX/33339]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1482714

QC for Samples:

1189850004, 1189850005, 1189850006, 1189850007, 1189850008

## Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Chloromethane	0.500U	1.00	0.310	ug/L
cis-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
cis-1,3-Dichloropropene	0.250U	0.500	0.150	ug/L
Dibromochloromethane	0.250U	0.500	0.150	ug/L
Dibromomethane	0.500U	1.00	0.310	ug/L
Dichlorodifluoromethane	0.500U	1.00	0.310	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Freon-113	5.00U	10.0	3.10	ug/L
Hexachlorobutadiene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Methylene chloride	2.50U	5.00	1.00	ug/L
Methyl-t-butyl ether	5.00U	10.0	3.10	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
n-Propylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
Styrene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Tetrachloroethene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
trans-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
trans-1,3-Dichloropropene	0.500U	1.00	0.310	ug/L
Trichloroethene	0.500U	1.00	0.310	ug/L
Trichlorofluoromethane	0.500U	1.00	0.310	ug/L
Vinyl acetate	5.00U	10.0	3.10	ug/L
Vinyl chloride	0.0750U	0.150	0.0500	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
<b>Surrogates</b>				
1,2-Dichloroethane-D4 (surr)	102	81-118		%
4-Bromofluorobenzene (surr)	100	85-114		%
Toluene-d8 (surr)	101	89-112		%

## Method Blank

Blank ID: MB for HBN 1787716 [VXX/33339]  
 Blank Lab ID: 1482714

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1189850004, 1189850005, 1189850006, 1189850007, 1189850008

## Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
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### Batch Information

Analytical Batch: VMS18444  
 Analytical Method: SW8260C  
 Instrument: VPA 780/5975 GC/MS  
 Analyst: FDR  
 Analytical Date/Time: 10/12/2018 1:48:00PM

Prep Batch: VXX33339  
 Prep Method: SW5030B  
 Prep Date/Time: 10/12/2018 12:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1189850 [VXX33339]  
 Blank Spike Lab ID: 1482715  
 Date Analyzed: 10/12/2018 14:05

Spike Duplicate ID: LCSD for HBN 1189850 [VXX33339]  
 Spike Duplicate Lab ID: 1482716  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189850004, 1189850005, 1189850006, 1189850007, 1189850008

## Results by SW8260C

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,1,1,2-Tetrachloroethane	30	30.9	103	30	30.0	100	( 78-124 )	3.00	(< 20 )
1,1,1-Trichloroethane	30	28.7	96	30	28.5	95	( 74-131 )	0.56	(< 20 )
1,1,2,2-Tetrachloroethane	30	31.6	105	30	30.3	101	( 71-121 )	4.40	(< 20 )
1,1,2-Trichloroethane	30	30.7	102	30	29.8	99	( 80-119 )	3.10	(< 20 )
1,1-Dichloroethane	30	28.3	94	30	27.9	93	( 77-125 )	1.20	(< 20 )
1,1-Dichloroethene	30	29.0	97	30	28.8	96	( 71-131 )	0.66	(< 20 )
1,1-Dichloropropene	30	29.2	97	30	28.8	96	( 79-125 )	1.40	(< 20 )
1,2,3-Trichlorobenzene	30	31.1	104	30	28.9	96	( 69-129 )	7.20	(< 20 )
1,2,3-Trichloropropane	30	31.2	104	30	30.2	101	( 73-122 )	3.30	(< 20 )
1,2,4-Trichlorobenzene	30	32.0	107	30	29.9	100	( 69-130 )	6.70	(< 20 )
1,2,4-Trimethylbenzene	30	32.5	108	30	31.1	104	( 79-124 )	4.50	(< 20 )
1,2-Dibromo-3-chloropropane	30	31.7	106	30	30.0	100	( 62-128 )	5.70	(< 20 )
1,2-Dibromoethane	30	30.9	103	30	30.6	102	( 77-121 )	0.98	(< 20 )
1,2-Dichlorobenzene	30	30.9	103	30	30.0	100	( 80-119 )	3.10	(< 20 )
1,2-Dichloroethane	30	28.6	95	30	28.3	94	( 73-128 )	1.10	(< 20 )
1,2-Dichloropropane	30	29.3	98	30	28.8	96	( 78-122 )	1.90	(< 20 )
1,3,5-Trimethylbenzene	30	32.3	108	30	30.8	103	( 75-124 )	4.70	(< 20 )
1,3-Dichlorobenzene	30	32.0	107	30	30.6	102	( 80-119 )	4.70	(< 20 )
1,3-Dichloropropane	30	30.6	102	30	30.0	100	( 80-119 )	2.10	(< 20 )
1,4-Dichlorobenzene	30	32.0	107	30	30.3	101	( 79-118 )	5.30	(< 20 )
2,2-Dichloropropane	30	28.0	93	30	28.3	94	( 60-139 )	1.10	(< 20 )
2-Butanone (MEK)	90	90.2	100	90	88.3	98	( 56-143 )	2.10	(< 20 )
2-Chlorotoluene	30	32.0	107	30	30.4	101	( 79-122 )	5.00	(< 20 )
2-Hexanone	90	96.8	108	90	94.0	104	( 57-139 )	2.90	(< 20 )
4-Chlorotoluene	30	31.6	105	30	30.7	102	( 78-122 )	3.00	(< 20 )
4-Isopropyltoluene	30	32.6	109	30	31.3	104	( 77-127 )	4.30	(< 20 )
4-Methyl-2-pentanone (MIBK)	90	93.2	104	90	91.6	102	( 67-130 )	1.80	(< 20 )
Benzene	30	28.7	96	30	28.4	95	( 79-120 )	1.30	(< 20 )
Bromobenzene	30	31.7	106	30	30.1	100	( 80-120 )	5.40	(< 20 )
Bromochloromethane	30	28.5	95	30	28.3	94	( 78-123 )	0.56	(< 20 )
Bromodichloromethane	30	29.5	98	30	29.3	98	( 79-125 )	0.82	(< 20 )
Bromoform	30	32.6	109	30	32.3	108	( 66-130 )	0.92	(< 20 )
Bromomethane	30	26.4	88	30	26.6	89	( 53-141 )	0.91	(< 20 )
Carbon disulfide	45	44.1	98	45	43.6	97	( 64-133 )	1.30	(< 20 )

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### Blank Spike Summary

Blank Spike ID: LCS for HBN 1189850 [VXX33339]  
 Blank Spike Lab ID: 1482715  
 Date Analyzed: 10/12/2018 14:05

Spike Duplicate ID: LCSD for HBN 1189850 [VXX33339]  
 Spike Duplicate Lab ID: 1482716  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189850004, 1189850005, 1189850006, 1189850007, 1189850008

### Results by SW8260C

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Carbon tetrachloride	30	29.9	100	30	29.8	100	( 72-136 )	0.33	(< 20 )
Chlorobenzene	30	29.3	98	30	28.3	94	( 82-118 )	3.30	(< 20 )
Chloroethane	30	31.0	103	30	30.9	103	( 60-138 )	0.26	(< 20 )
Chloroform	30	27.5	92	30	27.3	91	( 79-124 )	0.88	(< 20 )
Chloromethane	30	29.3	98	30	33.0	110	( 50-139 )	11.90	(< 20 )
cis-1,2-Dichloroethene	30	28.4	95	30	28.3	94	( 78-123 )	0.46	(< 20 )
cis-1,3-Dichloropropene	30	29.9	100	30	30.2	101	( 75-124 )	0.93	(< 20 )
Dibromochloromethane	30	31.4	105	30	31.0	103	( 74-126 )	1.40	(< 20 )
Dibromomethane	30	28.6	95	30	28.7	96	( 79-123 )	0.21	(< 20 )
Dichlorodifluoromethane	30	30.8	103	30	30.9	103	( 32-152 )	0.29	(< 20 )
Ethylbenzene	30	30.5	102	30	29.6	99	( 79-121 )	2.70	(< 20 )
Freon-113	45	45.5	101	45	45.1	100	( 70-136 )	1.00	(< 20 )
Hexachlorobutadiene	30	30.7	102	30	29.8	99	( 66-134 )	3.00	(< 20 )
Isopropylbenzene (Cumene)	30	31.4	105	30	30.3	101	( 72-131 )	3.50	(< 20 )
Methylene chloride	30	29.1	97	30	29.1	97	( 74-124 )	0.14	(< 20 )
Methyl-t-butyl ether	45	42.9	95	45	42.9	95	( 71-124 )	0.12	(< 20 )
Naphthalene	30	32.7	109	30	30.7	102	( 61-128 )	6.30	(< 20 )
n-Butylbenzene	30	32.8	109	30	31.3	104	( 75-128 )	5.00	(< 20 )
n-Propylbenzene	30	32.4	108	30	31.0	103	( 76-126 )	4.40	(< 20 )
o-Xylene	30	30.6	102	30	29.9	100	( 78-122 )	2.30	(< 20 )
P & M -Xylene	60	61.8	103	60	59.5	99	( 80-121 )	3.70	(< 20 )
sec-Butylbenzene	30	32.8	109	30	31.0	103	( 77-126 )	5.70	(< 20 )
Styrene	30	31.2	104	30	30.7	102	( 78-123 )	1.50	(< 20 )
tert-Butylbenzene	30	32.5	108	30	30.6	102	( 78-124 )	5.90	(< 20 )
Tetrachloroethene	30	30.7	102	30	29.6	99	( 74-129 )	3.90	(< 20 )
Toluene	30	28.8	96	30	27.7	92	( 80-121 )	3.80	(< 20 )
trans-1,2-Dichloroethene	30	28.3	95	30	28.0	93	( 75-124 )	1.20	(< 20 )
trans-1,3-Dichloropropene	30	31.8	106	30	31.5	105	( 73-127 )	1.10	(< 20 )
Trichloroethene	30	28.9	96	30	28.4	95	( 79-123 )	1.70	(< 20 )
Trichlorofluoromethane	30	29.1	97	30	28.9	96	( 65-141 )	0.72	(< 20 )
Vinyl acetate	30	29.4	98	30	29.6	99	( 54-146 )	0.75	(< 20 )
Vinyl chloride	30	30.0	100	30	30.0	100	( 58-137 )	0.07	(< 20 )
Xylenes (total)	90	92.4	103	90	89.5	99	( 79-121 )	3.20	(< 20 )

Print Date: 11/07/2018 9:29:34AM



## Blank Spike Summary

Blank Spike ID: LCS for HBN 1189850 [VXX33339]  
 Blank Spike Lab ID: 1482715  
 Date Analyzed: 10/12/2018 14:05

Spike Duplicate ID: LCSD for HBN 1189850 [VXX33339]  
 Spike Duplicate Lab ID: 1482716  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189850004, 1189850005, 1189850006, 1189850007, 1189850008

## Results by SW8260C

Parameter	Blank Spike (%)			Spike Duplicate (%)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
<b>Surrogates</b>									
1,2-Dichloroethane-D4 (surr)	30	94.9	95	30	95.9	96	( 81-118 )	1.00	
4-Bromofluorobenzene (surr)	30	104	104	30	101	101	( 85-114 )	2.70	
Toluene-d8 (surr)	30	103	103	30	101	101	( 89-112 )	1.60	

## Batch Information

Analytical Batch: **VMS18444**  
 Analytical Method: **SW8260C**  
 Instrument: **VPA 780/5975 GC/MS**  
 Analyst: **FDR**

Prep Batch: **VXX33339**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **10/12/2018 00:00**  
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL



### Method Blank

Blank ID: MB for HBN 1788127 [VXX/33396]  
Blank Lab ID: 1484510

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1189850002, 1189850003, 1189850004, 1189850005, 1189850006, 1189850007, 1189850008

### Results by SW8260C-SIM

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2,3-Trichloropropane	0.00500U	0.0100	0.00250	ug/L
1,2-Dibromoethane	0.00250U	0.00500	0.00125	ug/L
<b>Surrogates</b>				
4-Bromofluorobenzene (surr)	102	85-114		%
Toluene-d8 (surr)	99.5	89-112		%

### Batch Information

Analytical Batch: VMS18479  
Analytical Method: SW8260C-SIM  
Instrument: VRA Agilent GC/MS 7890B/5977A  
Analyst: NRB  
Analytical Date/Time: 10/21/2018 6:43:00AM

Prep Batch: VXX33396  
Prep Method: SW5030B  
Prep Date/Time: 10/21/2018 12:30:00AM  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

Print Date: 11/07/2018 9:29:36AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1189850 [VXX33396]  
 Blank Spike Lab ID: 1484511  
 Date Analyzed: 10/21/2018 06:59

Spike Duplicate ID: LCSD for HBN 1189850 [VXX33396]  
 Spike Duplicate Lab ID: 1484512  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189850002, 1189850003, 1189850004, 1189850005, 1189850006, 1189850007, 1189850008

## Results by SW8260C-SIM

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2,3-Trichloropropane	0.2	0.202	101	0.2	0.199	99	( 73-122 )	1.30	(< 20 )
1,2-Dibromoethane	0.2	0.200	100	0.2	0.197	99	( 77-121 )	1.50	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene (surr)	30	102	102	30	98.8	99	( 85-114 )	2.80	(< 20 )
Toluene-d8 (surr)	30	100	100	30	100	100	( 89-112 )	0.35	(< 20 )

## Batch Information

Analytical Batch: **VMS18479**  
 Analytical Method: **SW8260C-SIM**  
 Instrument: **VRA Agilent GC/MS 7890B/5977A**  
 Analyst: **NRB**

Prep Batch: **VXX33396**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **10/21/2018 00:30**  
 Spike Init Wt./Vol.: 0.2 ug/L Extract Vol: 25 mL  
 Dupe Init Wt./Vol.: 0.2 ug/L Extract Vol: 25 mL

## Method Blank

Blank ID: MB for HBN 1787681 [XXX/40721]  
Blank Lab ID: 1482533

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1189850004, 1189850005, 1189850006, 1189850007

## Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	0.293J	0.600	0.180	mg/L
<b>Surrogates</b>				
5a Androstane (surr)	93.9	60-120		%

## Batch Information

Analytical Batch: XFC14708  
Analytical Method: AK102  
Instrument: Agilent 7890B F  
Analyst: CMS  
Analytical Date/Time: 10/15/2018 12:03:00PM

Prep Batch: XXX40721  
Prep Method: SW3520C  
Prep Date/Time: 10/13/2018 8:13:06AM  
Prep Initial Wt./Vol.: 250 mL  
Prep Extract Vol: 1 mL

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1189850 [XXX40721]  
 Blank Spike Lab ID: 1482534  
 Date Analyzed: 10/15/2018 12:14

Spike Duplicate ID: LCSD for HBN 1189850 [XXX40721]  
 Spike Duplicate Lab ID: 1482535  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189850004, 1189850005, 1189850006, 1189850007

## Results by AK102

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Diesel Range Organics	20	18.3	91	20	19.1	96	( 75-125 )	4.30	(< 20 )
<b>Surrogates</b>									
5a Androstane (surr)	0.4	98.2	98	0.4	109	109	( 60-120 )	10.20	

## Batch Information

Analytical Batch: **XFC14708**  
 Analytical Method: **AK102**  
 Instrument: **Agilent 7890B F**  
 Analyst: **CMS**

Prep Batch: **XXX40721**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **10/13/2018 08:13**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

REVIEWED KET



- Alaska
- New Jersey
- North Carolina
- West Virginia
- Maryland
- New York
- Indiana
- Kentucky

CLIENT: <u>Nortech</u>					<b>Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.</b>					Page <u>1</u> of <u>1</u>																		
CONTACT: <u>Susan Vost</u>		PHONE NO: <u>907 452-5688</u>			Section 3		Preservative																					
PROJECT NAME: <u>2018 GW Napa Van Horn</u>		PROJECT/PWSID/PERMIT#: <u>17-1001</u>			# CONTAINERS	Type																						
REPORTS TO: <u>s.hammel</u>		E-MAIL: <u>scott.hammel@nortecheng.com</u>				C = COMP		HCl	HCl	none	HCl	REMARKS/ LOC ID																
INVOICE TO: <u>Nortech</u>		QUOTE #: <u>17-1001</u>				G = GRAB		8260 sims	8260 voes	PFCs 537	DRO AK102																	
		P.O. #: <u>17-1001</u>				MI = Multi Incremental Soils																						
RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/MATRIX CODE	#	Type	HCl	HCl	none	HCl	REMARKS/ LOC ID																	
① A-B	HR-1	10/9/18	10:05	WATER	2	grab	-	-	X	-			REMARKS/ LOC ID															
② A-E	mw-2	↓	11:48	↓	5	↓	X	-	X	-					REMARKS/ LOC ID													
③ A-E	mw-1R	↓	12:48	↓	5	↓	X	-	X	-							REMARKS/ LOC ID											
④ A-J	mw-3	↓	1341	↓	10	↓	X	X	X	X									REMARKS/ LOC ID									
⑤ A-J	EB-Napa VH	↓	1404	↓	10	↓	X	X	X	X											REMARKS/ LOC ID							
⑥ A-J	mw-4	↓	1515	↓	10	↓	X	X	X	X													REMARKS/ LOC ID					
⑦ A-J	mw-4H	↓	1525	↓	10	↓	X	X	X	X															REMARKS/ LOC ID			
⑧ A-F	TB-Napa VH	↓	0940	↓	lab prepped		X	X	-	-																	REMARKS/ LOC ID	
⑨ A-B	Field Blank	10/11/18	0945	water	lab prepped		-	-	X	-																		

5 units per page 42 of 77	Relinquished By: (1) <u>Scott Hammel</u>	Date <u>10/9/18</u>	Time <u>1625</u>	Received By: <u>[Signature]</u>	<u>10/9/18</u> <u>1625</u>	Section 4	DOD Project? Yes No	Data Deliverable Requirements:
	Relinquished By: (2) <u>[Signature]</u>	Date <u>10-10-18</u>	Time <u>1400</u>	Received By:		Cooler ID:		
	Relinquished By: (3)	Date	Time	Received By:		Requested Turnaround Time and/or Special Instructions: <u>Std. no J flags.</u> <u>PFCs kept in own cooler.</u> <u>SIMS voes:</u> <u>⑩ 42-608 1,2-dibromoethane</u> <u>- 1,2,5-TEP (4 trichloro propane)</u>		
	Relinquished By: (4) <u>[Signature]</u>	Date <u>10/11/18</u>	Time <u>1630</u>	Received For Laboratory By: <u>[Signature]</u>		Temp Blank °C: or Ambient <u>AT</u>	Chain of Custody Seal: (Circle) INTACT BROKEN <u>ABSENT</u>	

1-F 1-B  
cooler 1: D.6 D23







e-Sample Receipt Form

SGS Workorder #:

1189850



1 1 8 9 8 5 0

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
<b>Chain of Custody / Temperature Requirements</b>		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	YES	1F 1B
COC accompanied samples?	YES	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	YES	Cooler ID: 1 @ 0.6 °C Therm. ID: D23
	YES	Cooler ID: 2 @ 1.5 °C Therm. ID: D36
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
<b>Holding Time / Documentation / Sample Condition Requirements</b>		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	YES	
Do samples <b>match COC</b> ** (i.e., sample IDs, dates/times collected)?	NO	Sample 1 is labelled HR-1 on COC and HW-1 on jar. Collection times are identical. Logged in per COC.
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	YES	
N/A ***Exemption permitted for metals (e.g.200.8/6020A).		
Were proper containers (type/mass/volume/preservative***)used?	YES	
<b>Volatile / LL-Hg Requirements</b>		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	YES	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	YES	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	
<b>Note to Client:</b> Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		
PFCs and Field Blank arrived in Cooler 1. All other samples and trip blanks arrived in Cooler 2.		



### Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1189850001-A	No Preservative Required	OK	1189850007-I	HCL to pH < 2	OK
1189850001-B	No Preservative Required	OK	1189850007-J	HCL to pH < 2	OK
1189850002-A	No Preservative Required	OK	1189850008-A	HCL to pH < 2	OK
1189850002-B	No Preservative Required	OK	1189850008-B	HCL to pH < 2	OK
1189850002-C	HCL to pH < 2	OK	1189850008-C	HCL to pH < 2	OK
1189850002-D	HCL to pH < 2	OK	1189850008-D	HCL to pH < 2	OK
1189850002-E	HCL to pH < 2	OK	1189850008-E	HCL to pH < 2	OK
1189850003-A	No Preservative Required	OK	1189850008-F	HCL to pH < 2	OK
1189850003-B	No Preservative Required	OK	1189850009-A	No Preservative Required	OK
1189850003-C	HCL to pH < 2	OK	1189850009-B	No Preservative Required	OK
1189850003-D	HCL to pH < 2	OK			
1189850003-E	HCL to pH < 2	OK			
1189850004-A	No Preservative Required	OK			
1189850004-B	No Preservative Required	OK			
1189850004-C	HCL to pH < 2	OK			
1189850004-D	HCL to pH < 2	OK			
1189850004-E	HCL to pH < 2	OK			
1189850004-F	HCL to pH < 2	OK			
1189850004-G	HCL to pH < 2	OK			
1189850004-H	HCL to pH < 2	OK			
1189850004-I	HCL to pH < 2	OK			
1189850004-J	HCL to pH < 2	OK			
1189850005-A	No Preservative Required	OK			
1189850005-B	No Preservative Required	OK			
1189850005-C	HCL to pH < 2	OK			
1189850005-D	HCL to pH < 2	OK			
1189850005-E	HCL to pH < 2	OK			
1189850005-F	HCL to pH < 2	OK			
1189850005-G	HCL to pH < 2	OK			
1189850005-H	HCL to pH < 2	OK			
1189850005-I	HCL to pH < 2	OK			
1189850005-J	HCL to pH < 2	OK			
1189850006-A	No Preservative Required	OK			
1189850006-B	No Preservative Required	OK			
1189850006-C	HCL to pH < 2	OK			
1189850006-D	HCL to pH < 2	OK			
1189850006-E	HCL to pH < 2	OK			
1189850006-F	HCL to pH < 2	OK			
1189850006-G	HCL to pH < 2	OK			
1189850006-H	HCL to pH < 2	OK			
1189850006-I	HCL to pH < 2	OK			
1189850006-J	HCL to pH < 2	OK			
1189850007-A	No Preservative Required	OK			
1189850007-B	No Preservative Required	OK			
1189850007-C	HCL to pH < 2	OK			
1189850007-D	HCL to pH < 2	OK			
1189850007-E	HCL to pH < 2	OK			
1189850007-F	HCL to pH < 2	OK			
1189850007-G	HCL to pH < 2	OK			
1189850007-H	HCL to pH < 2	OK			

Container Id

Preservative

Container  
Condition

Container Id

Preservative

Container  
Condition

#### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates that an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

The results set forth herein are provided by SGS North America Inc.

**e-Hardcopy 2.0**  
**Automated Report**

## Technical Report for

SGS North America, Inc

1189850

SGS Job Number: FA58382

Sampling Date: 10/09/18

Report to:

SGS North America, Inc  
200 W Potter Dr  
Anchorage, AK 99518  
julie.shumway@sgs.com

ATTN: Julie Shumway

Total number of pages in report: **31**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

A handwritten signature in black ink that reads "Caitlin Brice".

Caitlin Brice, M.S.  
General Manager

Client Service contact: Heather Wandrey 407-425-6700

Certifications: FL(E83510), LA(03051), KS(E-10327), IL(200063), NC(573), NJ(FL002), NY(12022), SC(96038001)  
DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177),  
AK, AR, IA, KY, MA, MS, ND, NH, NV, OK, OR, UT, WA, WV

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Test results relate only to samples analyzed.

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## Sample Summary

SGS North America, Inc  
1189850

Job No: FA58382

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
FA58382-1	10/09/18	10:05 JS	10/13/18	AQ	Water	HR-1
FA58382-2	10/09/18	11:48 JS	10/13/18	AQ	Ground Water	MW-2
FA58382-3	10/09/18	12:48 JS	10/13/18	AQ	Ground Water	MW-1R
FA58382-4	10/09/18	13:41 JS	10/13/18	AQ	Ground Water	MW-3
FA58382-5	10/09/18	14:04 JS	10/13/18	AQ	Water	EB-NAPA VH
FA58382-6	10/09/18	15:15 JS	10/13/18	AQ	Ground Water	MW-4
FA58382-7	10/09/18	15:25 JS	10/13/18	AQ	Ground Water	MW-44
FA58382-8	10/09/18	09:45 JS	10/13/18	AQ	Field Blank Water	FIELD BLANK

## SAMPLE DELIVERY GROUP CASE NARRATIVE

2

**Client:** SGS North America, Inc

**Job No:** FA58382

**Site:** 1189850

**Report Date:** 11/6/2018 8:18:11

7 Sample(s) and 1 Field Blank(s) were collected on 10/09/2018 and were received at SGS North America Inc - Orlando on 10/13/2018 properly preserved, at 1.9 Deg. C and intact. These Samples received an SGS Orlando job number of FA58382. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

### MS Semi-volatiles By Method EPA 537 MOD

**Matrix:** AQ

**Batch ID:** OP72261

All samples were extracted within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA58428-2MS were used as the QC samples indicated.

Sample(s) FA58382-3, FA58382-4, FA58382-7, FA58382-2, FA58382-6 have surrogates outside control limits.

FA58382-2 for 13C2-PFDA: Outside control limits due to dilution.

FA58382-2 for 13C2-PFHxA: Outside control limits due to dilution.

FA58382-2 for d5-NEtFOSAA: Outside control limits due to dilution.

FA58382-2 for d5-NEtFOSAA: Outside control limits.

FA58382-2: Confirmed by re-extraction and reanalysis.

FA58382-2: Confirmed by re-extraction and reanalysis.

FA58382-3 for 13C2-PFDA: Outside control limits due to dilution.

FA58382-3 for 13C2-PFHxA: Outside control limits due to dilution.

FA58382-3 for d5-NEtFOSAA: Outside control limits due to dilution.

FA58382-4 for 13C2-PFDA: Outside control limits due to dilution.

FA58382-4 for 13C2-PFHxA: Outside control limits due to dilution.

FA58382-4 for d5-NEtFOSAA: Outside control limits due to dilution.

FA58382-6 for 13C2-PFDA: Outside control limits.

FA58382-6 for d5-NEtFOSAA: Outside control limits.

FA58382-6 for d5-NEtFOSAA: Outside control limits.

FA58382-6: Confirmed by re-extraction and reanalysis.

FA58382-6: Confirmed by re-extraction and reanalysis.

FA58382-7 for d5-NEtFOSAA: Outside control limits due to dilution.

**Matrix:** AQ

**Batch ID:** OP72428

FA58382-2 for 13C2-PFDA: Outside control limits due to dilution.

FA58382-2 for 13C2-PFHxA: Outside control limits due to dilution.

FA58382-2 for d5-NEtFOSAA: Outside control limits due to dilution.

FA58382-2: Confirmation run.

FA58382-2: Confirmation run.

FA58382-6: Confirmation run.

FA58382-6: Confirmation run.

SGS Orlando certifies that this report meets the project requirements for analytical data produced for the samples as received at SGS Orlando and as stated on the COC. SGS Orlando certifies that the data meets the Data Quality Objectives for precision, accuracy and completeness as specified in the SGS Orlando Quality Manual except as noted above. This report is to be used in its entirety. SGS Orlando is not responsible for any assumptions of data quality if partial data packages are used.

*Narrative prepared by:*

*Kim Benham, Client Services (signature on file)*

## Summary of Hits

**Job Number:** FA58382  
**Account:** SGS North America, Inc  
**Project:** 1189850  
**Collected:** 10/09/18



Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
---------------	------------------	--------------------	----	-----	-------	--------

**FA58382-1 HR-1**

Perfluorobutanoic acid	0.00555 J	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluoropentanoic acid	0.00534 J	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluorohexanoic acid	0.00895	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluorooctanoic acid	0.00553 J	0.0080	0.0020	ug/l	EPA 537 MOD
Perfluorononanoic acid	0.00417 J	0.0080	0.0020	ug/l	EPA 537 MOD
Perfluorobutanesulfonic acid	0.0151	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluoropentanesulfonic acid	0.0108	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluorohexanesulfonic acid	0.0523	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid	0.0677	0.0080	0.0020	ug/l	EPA 537 MOD

**FA58382-2 MW-2**

Perfluorobutanoic acid <sup>a</sup>	0.305	0.080	0.040	ug/l	EPA 537 MOD
Perfluoropentanoic acid <sup>a</sup>	0.532	0.080	0.040	ug/l	EPA 537 MOD
Perfluorohexanoic acid <sup>a</sup>	1.89	0.080	0.040	ug/l	EPA 537 MOD
Perfluoroheptanoic acid <sup>a</sup>	0.365	0.080	0.040	ug/l	EPA 537 MOD
Perfluorooctanoic acid <sup>a</sup>	1.05	0.080	0.020	ug/l	EPA 537 MOD
Perfluorononanoic acid <sup>a</sup>	0.0283 J	0.080	0.020	ug/l	EPA 537 MOD
Perfluorobutanesulfonic acid <sup>a</sup>	3.04	0.080	0.040	ug/l	EPA 537 MOD
Perfluoropentanesulfonic acid <sup>a</sup>	3.97	0.80	0.40	ug/l	EPA 537 MOD
Perfluorohexanesulfonic acid <sup>a</sup>	23.5	0.80	0.40	ug/l	EPA 537 MOD
Perfluoroheptanesulfonic acid <sup>a</sup>	2.19	0.080	0.040	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid <sup>a</sup>	24.8	0.80	0.20	ug/l	EPA 537 MOD
6:2 Fluorotelomer sulfonate <sup>a</sup>	0.531	0.20	0.080	ug/l	EPA 537 MOD

**FA58382-3 MW-1R**

Perfluorobutanoic acid	0.0661 J	0.077	0.038	ug/l	EPA 537 MOD
Perfluoropentanoic acid	0.153	0.077	0.038	ug/l	EPA 537 MOD
Perfluorohexanoic acid	0.249	0.077	0.038	ug/l	EPA 537 MOD
Perfluoroheptanoic acid	0.0793	0.077	0.038	ug/l	EPA 537 MOD
Perfluorooctanoic acid	0.461	0.077	0.019	ug/l	EPA 537 MOD
Perfluorononanoic acid	0.123	0.077	0.019	ug/l	EPA 537 MOD
Perfluoroundecanoic acid	0.0465 J	0.077	0.038	ug/l	EPA 537 MOD
Perfluorobutanesulfonic acid	0.479	0.077	0.038	ug/l	EPA 537 MOD
Perfluoropentanesulfonic acid	0.336	0.077	0.038	ug/l	EPA 537 MOD
Perfluorohexanesulfonic acid	5.59	0.77	0.38	ug/l	EPA 537 MOD
Perfluoroheptanesulfonic acid	2.27	0.077	0.038	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid	23.8	0.77	0.19	ug/l	EPA 537 MOD
6:2 Fluorotelomer sulfonate	0.355	0.19	0.077	ug/l	EPA 537 MOD

## Summary of Hits

**Job Number:** FA58382  
**Account:** SGS North America, Inc  
**Project:** 1189850  
**Collected:** 10/09/18



Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
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### FA58382-4 MW-3

Perfluorobutanoic acid	0.522	0.15	0.077	ug/l	EPA 537 MOD
Perfluoropentanoic acid	0.537	0.15	0.077	ug/l	EPA 537 MOD
Perfluorohexanoic acid	1.54	0.15	0.077	ug/l	EPA 537 MOD
Perfluoroheptanoic acid	0.174	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorooctanoic acid	0.0635	0.0077	0.0019	ug/l	EPA 537 MOD
Perfluorononanoic acid	0.0137	0.0077	0.0019	ug/l	EPA 537 MOD
Perfluoroundecanoic acid	0.00943	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorotridecanoic acid	0.0114	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorobutanesulfonic acid	4.81	0.15	0.077	ug/l	EPA 537 MOD
Perfluoropentanesulfonic acid	3.74	0.15	0.077	ug/l	EPA 537 MOD
Perfluorohexanesulfonic acid	5.59	0.15	0.077	ug/l	EPA 537 MOD
Perfluoroheptanesulfonic acid	0.0539	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid	0.355	0.0077	0.0019	ug/l	EPA 537 MOD
6:2 Fluorotelomer sulfonate	0.0292	0.019	0.0077	ug/l	EPA 537 MOD

### FA58382-5 EB-NAPA VH

Perfluorooctanesulfonic acid	0.00230 J	0.0080	0.0020	ug/l	EPA 537 MOD
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### FA58382-6 MW-4

Perfluorobutanoic acid <sup>a</sup>	0.0624	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluoropentanoic acid <sup>a</sup>	0.0899	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluorohexanoic acid <sup>a</sup>	0.158	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluoroheptanoic acid <sup>a</sup>	0.0294	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluorooctanoic acid <sup>a</sup>	0.0909	0.0080	0.0020	ug/l	EPA 537 MOD
Perfluorononanoic acid <sup>a</sup>	0.00675 J	0.0080	0.0020	ug/l	EPA 537 MOD
Perfluorobutanesulfonic acid <sup>a</sup>	0.512	0.080	0.040	ug/l	EPA 537 MOD
Perfluoropentanesulfonic acid <sup>a</sup>	0.248	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluorohexanesulfonic acid <sup>a</sup>	1.14	0.080	0.040	ug/l	EPA 537 MOD
Perfluoroheptanesulfonic acid <sup>a</sup>	0.0821	0.0080	0.0040	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid <sup>a</sup>	0.431	0.080	0.020	ug/l	EPA 537 MOD
6:2 Fluorotelomer sulfonate <sup>a</sup>	0.112	0.020	0.0080	ug/l	EPA 537 MOD

### FA58382-7 MW-44

Perfluorobutanoic acid	0.0595	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluoropentanoic acid	0.100	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorohexanoic acid	0.172	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluoroheptanoic acid	0.0308	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorooctanoic acid	0.134	0.0077	0.0019	ug/l	EPA 537 MOD
Perfluorononanoic acid	0.00902	0.0077	0.0019	ug/l	EPA 537 MOD
Perfluorobutanesulfonic acid	0.648	0.077	0.038	ug/l	EPA 537 MOD

## Summary of Hits

**Job Number:** FA58382  
**Account:** SGS North America, Inc  
**Project:** 1189850  
**Collected:** 10/09/18



Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluoropentanesulfonic acid		0.277	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorohexanesulfonic acid		2.15	0.077	0.038	ug/l	EPA 537 MOD
Perfluoroheptanesulfonic acid		0.117	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid		0.772	0.077	0.019	ug/l	EPA 537 MOD
6:2 Fluorotelomer sulfonate		0.167	0.019	0.0077	ug/l	EPA 537 MOD
<b>FA58382-8      FIELD BLANK</b>						
Perfluorononanoic acid		0.00234 J	0.0077	0.0019	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid		0.00440 J	0.0077	0.0019	ug/l	EPA 537 MOD

(a) Confirmed by re-extraction and reanalysis.

Sample Results

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Report of Analysis

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## Report of Analysis

<b>Client Sample ID:</b> HR-1		<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-1		<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD		
<b>Project:</b> 1189850		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q54945.D	1	10/30/18 16:46	NAF	10/19/18 08:30	OP72261	SQ1265
Run #2							

Run #1	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>						
375-22-4	Perfluorobutanoic acid	0.00555	0.0080	0.0040	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00534	0.0080	0.0040	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00895	0.0080	0.0040	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0080	0.0040	ug/l	
335-67-1	Perfluorooctanoic acid	0.00553	0.0080	0.0020	ug/l	J
375-95-1	Perfluorononanoic acid	0.00417	0.0080	0.0020	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0080	0.0040	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0080	0.0040	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0080	0.0040	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0080	0.0040	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>						
375-73-5	Perfluorobutanesulfonic acid	0.0151	0.0080	0.0040	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0108	0.0080	0.0040	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0523	0.0080	0.0040	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0080	0.0040	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0677	0.0080	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0080	0.0040	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>						
754-91-6	PFOSA	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>						
2355-31-9	MeFOSAA	ND	0.020	0.0080	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0080	ug/l	
<b>FLUOROTELOMER SULFONATES</b>						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



4.1  
4

## Report of Analysis

<b>Client Sample ID:</b> HR-1	<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-1	<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD	
<b>Project:</b> 1189850	

4.1  
4

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	79%		61-134%
	13C2-PFDA	82%		62-128%
	d5-EtFOSAA	69%		57-135%

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b> MW-2		<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-2		<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD		
<b>Project:</b> 1189850		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	Q54946.D	10	10/30/18 17:06	NAF	10/19/18 08:30	OP72261	SQ1265
Run #2 <sup>a</sup>	Q54947.D	100	10/30/18 17:26	NAF	10/19/18 08:30	OP72261	SQ1265
Run #3 <sup>b</sup>	Q55080.D	10	11/01/18 22:30	NAF	10/31/18 08:00	OP72428	SQ1267
Run #4 <sup>b</sup>	Q55081.D	100	11/01/18 22:50	NAF	10/31/18 08:00	OP72428	SQ1267

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	250 ml	1.0 ml
Run #3	250 ml	1.0 ml
Run #4	250 ml	1.0 ml

## PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>						
375-22-4	Perfluorobutanoic acid	0.305	0.080	0.040	ug/l	
2706-90-3	Perfluoropentanoic acid	0.532	0.080	0.040	ug/l	
307-24-4	Perfluorohexanoic acid	1.89	0.080	0.040	ug/l	
375-85-9	Perfluoroheptanoic acid	0.365	0.080	0.040	ug/l	
335-67-1	Perfluorooctanoic acid	1.05	0.080	0.020	ug/l	
375-95-1	Perfluorononanoic acid	0.0283	0.080	0.020	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.080	0.040	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.080	0.040	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.080	0.040	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.080	0.040	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.080	0.040	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>						
375-73-5	Perfluorobutanesulfonic acid	3.04	0.080	0.040	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	3.97 <sup>c</sup>	0.80	0.40	ug/l	
355-46-4	Perfluorohexanesulfonic acid	23.5 <sup>c</sup>	0.80	0.40	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	2.19	0.080	0.040	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	24.8 <sup>c</sup>	0.80	0.20	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.080	0.040	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.080	0.040	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>						
754-91-6	PFOSA	ND	0.080	0.040	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>						
2355-31-9	MeFOSAA	ND	0.20	0.080	ug/l	
2991-50-6	EtFOSAA	ND	0.20	0.080	ug/l	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> MW-2	<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-2	<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD	
<b>Project:</b> 1189850	

4.2  
4

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>FLUOROTELOMER SULFONATES</b>						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.20	0.080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.531	0.20	0.080	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.20	0.080	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C2-PFHxA	96%	0% <sup>d</sup>	97%	61-134%
	13C2-PFDA	67%	0% <sup>d</sup>	89%	62-128%
	d5-EtFOSAA	44% <sup>e</sup>	0% <sup>d</sup>	68%	57-135%

- (a) Confirmed by re-extraction and reanalysis.
- (b) Confirmation run.
- (c) Result is from Run# 2
- (d) Outside control limits due to dilution.
- (e) Outside control limits.

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b> MW-1R		<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-3		<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD		
<b>Project:</b> 1189850		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q54928.D	10	10/30/18 10:55	NAF	10/19/18 08:30	OP72261	SQ1264
Run #2	Q54948.D	100	10/30/18 17:46	NAF	10/19/18 08:30	OP72261	SQ1265

	Initial Volume	Final Volume
Run #1	260 ml	1.0 ml
Run #2	260 ml	1.0 ml

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>						
375-22-4	Perfluorobutanoic acid	0.0661	0.077	0.038	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.153	0.077	0.038	ug/l	
307-24-4	Perfluorohexanoic acid	0.249	0.077	0.038	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0793	0.077	0.038	ug/l	
335-67-1	Perfluorooctanoic acid	0.461	0.077	0.019	ug/l	
375-95-1	Perfluorononanoic acid	0.123	0.077	0.019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.077	0.038	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0465	0.077	0.038	ug/l	J
307-55-1	Perfluorododecanoic acid	ND	0.077	0.038	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.077	0.038	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.077	0.038	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>						
375-73-5	Perfluorobutanesulfonic acid	0.479	0.077	0.038	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.336	0.077	0.038	ug/l	
355-46-4	Perfluorohexanesulfonic acid	5.59 <sup>a</sup>	0.77	0.38	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	2.27	0.077	0.038	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	23.8 <sup>a</sup>	0.77	0.19	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.077	0.038	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.077	0.038	ug/l	
<b>PERFLUOROOCETANESULFONAMIDES</b>						
754-91-6	PFOSA	ND	0.077	0.038	ug/l	
<b>PERFLUOROOCETANESULFONAMIDOACETIC ACIDS</b>						
2355-31-9	MeFOSAA	ND	0.19	0.077	ug/l	
2991-50-6	EtFOSAA	ND	0.19	0.077	ug/l	
<b>FLUOROTELOMER SULFONATES</b>						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.19	0.077	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.355	0.19	0.077	ug/l	

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.3  
4

## Report of Analysis

<b>Client Sample ID:</b> MW-1R		<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-3		<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD		
<b>Project:</b> 1189850		

4.3  
4

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.19	0.077	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	102%	0% <sup>b</sup>	61-134%
	13C2-PFDA	96%	0% <sup>b</sup>	62-128%
	d5-EtFOSAA	76%	0% <sup>b</sup>	57-135%

- (a) Result is from Run# 2
- (b) Outside control limits due to dilution.

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound





# Report of Analysis

<b>Client Sample ID:</b> MW-3		<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-4		<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD		
<b>Project:</b> 1189850		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q54949.D	1	10/30/18 18:06	NAF	10/19/18 08:30	OP72261	SQ1265
Run #2	Q54950.D	20	10/30/18 18:25	NAF	10/19/18 08:30	OP72261	SQ1265

Run #	Initial Volume	Final Volume
Run #1	260 ml	1.0 ml
Run #2	260 ml	1.0 ml

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>						
375-22-4	Perfluorobutanoic acid	0.522 <sup>a</sup>	0.15	0.077	ug/l	
2706-90-3	Perfluoropentanoic acid	0.537 <sup>a</sup>	0.15	0.077	ug/l	
307-24-4	Perfluorohexanoic acid	1.54 <sup>a</sup>	0.15	0.077	ug/l	
375-85-9	Perfluoroheptanoic acid	0.174	0.0077	0.0038	ug/l	
335-67-1	Perfluorooctanoic acid	0.0635	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	0.0137	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0038	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.00943	0.0077	0.0038	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0038	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0114	0.0077	0.0038	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>						
375-73-5	Perfluorobutanesulfonic acid	4.81 <sup>a</sup>	0.15	0.077	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	3.74 <sup>a</sup>	0.15	0.077	ug/l	
355-46-4	Perfluorohexanesulfonic acid	5.59 <sup>a</sup>	0.15	0.077	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0539	0.0077	0.0038	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.355	0.0077	0.0019	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0038	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>						
754-91-6	PFOSA	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>						
2355-31-9	MeFOSAA	ND	0.019	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0077	ug/l	
<b>FLUOROTELOMER SULFONATES</b>						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0292	0.019	0.0077	ug/l	

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



4.4  
4

## Report of Analysis

<b>Client Sample ID:</b> MW-3	<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-4	<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD	
<b>Project:</b> 1189850	

4.4  
4

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	74%	0% <sup>b</sup>	61-134%
	13C2-PFDA	79%	0% <sup>b</sup>	62-128%
	d5-EtFOSAA	57%	0% <sup>b</sup>	57-135%

- (a) Result is from Run# 2
- (b) Outside control limits due to dilution.

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b> EB-NAPA VH		<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-5		<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD		
<b>Project:</b> 1189850		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q54927.D	1	10/30/18 10:35	NAF	10/19/18 08:30	OP72261	SQ1264
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>						
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0040	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0080	0.0040	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0080	0.0040	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0080	0.0040	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0080	0.0020	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0080	0.0020	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0080	0.0040	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0080	0.0040	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0080	0.0040	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0080	0.0040	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0080	0.0040	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0080	0.0040	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0080	0.0040	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0080	0.0040	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00230	0.0080	0.0020	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0080	0.0040	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>						
754-91-6	PFOSA	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>						
2355-31-9	MeFOSAA	ND	0.020	0.0080	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0080	ug/l	
<b>FLUOROTELOMER SULFONATES</b>						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



4.5  
4

## Report of Analysis

<b>Client Sample ID:</b> EB-NAPA VH	<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-5	<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD	
<b>Project:</b> 1189850	

4.5  
4

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	97%		61-134%
	13C2-PFDA	95%		62-128%
	d5-EtFOSAA	79%		57-135%

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b> MW-4		<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-6		<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD		
<b>Project:</b> 1189850		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	Q54953.D	1	10/30/18 19:25	NAF	10/19/18 08:30	OP72261	SQ1265
Run #2 <sup>a</sup>	Q54954.D	10	10/30/18 19:45	NAF	10/19/18 08:30	OP72261	SQ1265
Run #3 <sup>b</sup>	Q55082.D	1	11/01/18 23:10	NAF	10/31/18 08:00	OP72428	SQ1267
Run #4 <sup>b</sup>	Q55083.D	10	11/01/18 23:30	NAF	10/31/18 08:00	OP72428	SQ1267

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	250 ml	1.0 ml
Run #3	250 ml	1.0 ml
Run #4	250 ml	1.0 ml

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>						
375-22-4	Perfluorobutanoic acid	0.0624	0.0080	0.0040	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0899	0.0080	0.0040	ug/l	
307-24-4	Perfluorohexanoic acid	0.158	0.0080	0.0040	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0294	0.0080	0.0040	ug/l	
335-67-1	Perfluorooctanoic acid	0.0909	0.0080	0.0020	ug/l	
375-95-1	Perfluorononanoic acid	0.00675	0.0080	0.0020	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0080	0.0040	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0080	0.0040	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0080	0.0040	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0080	0.0040	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>						
375-73-5	Perfluorobutanesulfonic acid	0.512 <sup>c</sup>	0.080	0.040	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.248	0.0080	0.0040	ug/l	
355-46-4	Perfluorohexanesulfonic acid	1.14 <sup>c</sup>	0.080	0.040	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0821	0.0080	0.0040	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.431 <sup>c</sup>	0.080	0.020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0080	0.0040	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>						
754-91-6	PFOSA	ND	0.0080	0.0040	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>						
2355-31-9	MeFOSAA	ND	0.020	0.0080	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0080	ug/l	

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



4.6  
4

## Report of Analysis

<b>Client Sample ID:</b> MW-4	<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-6	<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD	
<b>Project:</b> 1189850	

4.6  
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**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
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**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.112	0.020	0.0080	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C2-PFHxA	92%	86%	96%	61-134%
	13C2-PFDA	69%	56% <sup>d</sup>	128%	62-128%
	d5-EtFOSAA	46% <sup>d</sup>	41% <sup>d</sup>	89%	57-135%

- (a) Confirmed by re-extraction and reanalysis.
- (b) Confirmation run.
- (c) Result is from Run# 2
- (d) Outside control limits.

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound





## Report of Analysis

<b>Client Sample ID:</b> MW-44		<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-7		<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD		
<b>Project:</b> 1189850		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q54955.D	1	10/30/18 20:05	NAF	10/19/18 08:30	OP72261	SQ1265
Run #2	Q54933.D	10	10/30/18 12:36	NAF	10/19/18 08:30	OP72261	SQ1264

	Initial Volume	Final Volume
Run #1	260 ml	1.0 ml
Run #2	260 ml	1.0 ml

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>						
375-22-4	Perfluorobutanoic acid	0.0595	0.0077	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	0.100	0.0077	0.0038	ug/l	
307-24-4	Perfluorohexanoic acid	0.172	0.0077	0.0038	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0308	0.0077	0.0038	ug/l	
335-67-1	Perfluorooctanoic acid	0.134	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	0.00902	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0038	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0038	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0038	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0038	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>						
375-73-5	Perfluorobutanesulfonic acid	0.648 <sup>a</sup>	0.077	0.038	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.277	0.0077	0.0038	ug/l	
355-46-4	Perfluorohexanesulfonic acid	2.15 <sup>a</sup>	0.077	0.038	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.117	0.0077	0.0038	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.772 <sup>a</sup>	0.077	0.019	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0038	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>						
754-91-6	PFOSA	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>						
2355-31-9	MeFOSAA	ND	0.019	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0077	ug/l	
<b>FLUOROTELOMER SULFONATES</b>						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.167	0.019	0.0077	ug/l	

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



4.7  
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## Report of Analysis

<b>Client Sample ID:</b> MW-44	<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-7	<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD	
<b>Project:</b> 1189850	

4.7  
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**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	82%	99%	61-134%
	13C2-PFDA	83%	86%	62-128%
	d5-EtFOSAA	57%	54% <sup>b</sup>	57-135%

- (a) Result is from Run# 2
- (b) Outside control limits due to dilution.

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> FIELD BLANK	<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-8	<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Field Blank Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD	
<b>Project:</b> 1189850	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q54926.D	1	10/30/18 10:15	NAF	10/19/18 08:30	OP72261	SQ1264
Run #2							

Run #1	Initial Volume	Final Volume
Run #1	260 ml	1.0 ml
Run #2		

**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>						
375-22-4	Perfluorobutanoic acid	ND	0.0077	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0077	0.0038	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0077	0.0038	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0077	0.0038	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	0.00234	0.0077	0.0019	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0038	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0038	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0038	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0038	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0038	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0038	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0038	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0038	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00440	0.0077	0.0019	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0038	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>						
754-91-6	PFOSA	ND	0.0077	0.0038	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>						
2355-31-9	MeFOSAA	ND	0.019	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0077	ug/l	
<b>FLUOROTELOMER SULFONATES</b>						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.8  
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## Report of Analysis

<b>Client Sample ID:</b> FIELD BLANK	<b>Date Sampled:</b> 10/09/18
<b>Lab Sample ID:</b> FA58382-8	<b>Date Received:</b> 10/13/18
<b>Matrix:</b> AQ - Field Blank Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537 MOD EPA 537 MOD	
<b>Project:</b> 1189850	

4.8  
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**PFAS List**

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	90%		61-134%
	13C2-PFDA	92%		62-128%
	d5-EtFOSAA	81%		57-135%

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody





## SGS Sample Receipt Summary

Job Number: FA58382

Client: SGS ALASKA

Project: 1189850

Date / Time Received: 10/13/2018 11:00:00 AM

Delivery Method: FX

Airbill #'s: 1za8619w4467046618

Therm ID: <u>IR 1;</u>	Therm CF: <u>-0.2;</u>	# of Coolers: <u>1</u>
Cooler Temps (Raw Measured) °C: Cooler 1: (2.1);		
Cooler Temps (Corrected) °C: Cooler 1: (1.9);		

<u>Cooler Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>
1. Custody Seals Present	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Custody Seals Intact	<input checked="" type="checkbox"/>		<input type="checkbox"/>
3. Temp criteria achieved	<input checked="" type="checkbox"/>		<input type="checkbox"/>
4. Cooler temp verification	<u>IR Gun</u>		
5. Cooler media	<u>Ice (Bag)</u>		

<u>Sample Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Sample labels present on bottles	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
2. Samples preserved properly	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
3. Sufficient volume/containers recvd for analysis:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
4. Condition of sample	<u>Intact</u>			
5. Sample recvd within HT	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
6. Dates/Times/IDs on COC match Sample Label	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
7. VOCs have headspace	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Bottles received for unspecified tests	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
9. Compositing instructions clear	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Voa Soil Kits/Jars received past 48hrs?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
11. % Solids Jar received?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
12. Residual Chlorine Present?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

<u>Trip Blank Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Trip Blank present / cooler	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Trip Blank listed on COC	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<u>W</u>	<u>or</u>	<u>S</u>	<u>N/A</u>
3. Type Of TB Received	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

<u>Misc. Information</u>			
Number of Encores: 25-Gram _____	5-Gram _____	Number of 5035 Field Kits: _____	Number of Lab Filtered Metals: _____
Test Strip Lot #s: pH 0-3 _____	230315 _____	pH 10-12 _____	219813A _____
Residual Chlorine Test Strip Lot #: _____			

Comments SAMPLE # 1 ID STATES ON BOTTLE "HW-1" CHAIN STATES ID "HR-1"

SM001 Rev. Date 05/24/17 Technician: PETERH Date: 10/13/2018 11:00:00 Reviewer: \_\_\_\_\_ Date: \_\_\_\_\_



5.1  
5

MS Semi-volatiles

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QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

# Method Blank Summary

**Job Number:** FA58382  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1189850

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72261-MB	Q54910.D	1	10/30/18	NAF	10/19/18	OP72261	SQ1264

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA58382-1, FA58382-2, FA58382-3, FA58382-4, FA58382-5, FA58382-6, FA58382-7, FA58382-8

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0040	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0080	0.0040	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0080	0.0040	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0080	0.0040	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0080	0.0020	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0080	0.0020	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0080	0.0040	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0080	0.0040	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0080	0.0040	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0080	0.0040	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0080	0.0040	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0080	0.0040	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0080	0.0040	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0080	0.0040	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0080	0.0040	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0080	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0080	0.0040	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0080	0.0040	ug/l	
754-91-6	PFOSA	ND	0.0080	0.0040	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0080	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0080	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	

CAS No.	Surrogate Recoveries	Limits
	13C2-PFHxA	87% 61-134%
	13C2-PFDA	94% 62-128%
	d5-EtFOSAA	80% 57-135%

6.1.1  
6



# Blank Spike Summary

**Job Number:** FA58382  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1189850

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72261-BS	Q54909.D	1	10/30/18	NAF	10/19/18	OP72261	SQ1264

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA58382-1, FA58382-2, FA58382-3, FA58382-4, FA58382-5, FA58382-6, FA58382-7, FA58382-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0753	94	20-120
2706-90-3	Perfluoropentanoic acid	0.08	0.0764	96	40-131
307-24-4	Perfluorohexanoic acid	0.08	0.0701	88	63-146
375-85-9	Perfluoroheptanoic acid	0.08	0.0783	98	71-138
335-67-1	Perfluorooctanoic acid	0.08	0.0789	99	74-137
375-95-1	Perfluorononanoic acid	0.08	0.0672	84	76-140
335-76-2	Perfluorodecanoic acid	0.08	0.0722	90	65-148
2058-94-8	Perfluoroundecanoic acid	0.08	0.0718	90	57-138
307-55-1	Perfluorododecanoic acid	0.08	0.0632	79	58-118
72629-94-8	Perfluorotridecanoic acid	0.08	0.0559	70	52-120
376-06-7	Perfluorotetradecanoic acid	0.08	0.0474	59	49-122
375-73-5	Perfluorobutanesulfonic acid	0.0708	0.0670	95	73-148
2706-91-4	Perfluoropentanesulfonic acid	0.0752	0.0694	92	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0728	0.0682	94	74-142
375-92-8	Perfluoroheptanesulfonic acid	0.076	0.0737	97	74-123
1763-23-1	Perfluorooctanesulfonic acid	0.074	0.0787	106	70-134
68259-12-1	Perfluorononanesulfonic acid	0.0768	0.0657	86	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0772	0.0514	67	56-127
754-91-6	PFOSA	0.08	0.0894	112	40-142
2355-31-9	MeFOSAA	0.08	0.0750	94	57-128
2991-50-6	EtFOSAA	0.08	0.0691	86	55-135
757124-72-44:2	Fluorotelomer sulfonate	0.0748	0.0715	96	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.076	0.0752	99	70-153
39108-34-4	8:2 Fluorotelomer sulfonate	0.0768	0.0860	112	61-154

CAS No.	Surrogate Recoveries	BSP	Limits
	13C2-PFHxA	88%	61-134%
	13C2-PFDA	95%	62-128%
	d5-EtFOSAA	80%	57-135%

\* = Outside of Control Limits.

# Matrix Spike Summary

**Job Number:** FA58382  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1189850

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72261-MS	Q54913.D	1	10/30/18	NAF	10/19/18	OP72261	SQ1264
FA58428-2	Q54912.D	1	10/30/18	NAF	10/19/18	OP72261	SQ1264

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA58382-1, FA58382-2, FA58382-3, FA58382-4, FA58382-5, FA58382-6, FA58382-7, FA58382-8

CAS No.	Compound	FA58428-2 ug/l	Spike Q	MS ug/l	MS %	Limits	
375-22-4	Perfluorobutanoic acid	0.0572		0.154	0.210	99	20-120
2706-90-3	Perfluoropentanoic acid	0.118		0.154	0.272	100	40-131
307-24-4	Perfluorohexanoic acid	0.188		0.154	0.312	81	63-146
375-85-9	Perfluoroheptanoic acid	0.0521		0.154	0.201	97	71-138
335-67-1	Perfluorooctanoic acid	0.138		0.154	0.296	103	74-137
375-95-1	Perfluorononanoic acid	0.00579 J		0.154	0.141	88	76-140
335-76-2	Perfluorodecanoic acid	0.015 U		0.154	0.151	98	65-148
2058-94-8	Perfluoroundecanoic acid	0.015 U		0.154	0.145	94	57-138
307-55-1	Perfluorododecanoic acid	0.015 U		0.154	0.141	92	58-118
72629-94-8	Perfluorotridecanoic acid	0.015 U		0.154	0.140	91	52-120
376-06-7	Perfluorotetradecanoic acid	0.015 U		0.154	0.121	79	49-122
375-73-5	Perfluorobutanesulfonic acid	0.0601		0.136	0.192	97	73-148
2706-91-4	Perfluoropentanesulfonic acid	0.0591		0.145	0.189	90	70-130
355-46-4	Perfluorohexanesulfonic acid	0.661		0.14	0.806	104	74-142
375-92-8	Perfluoroheptanesulfonic acid	0.0148 J		0.146	0.159	99	74-123
1763-23-1	Perfluorooctanesulfonic acid	0.452		0.142	0.623	120	70-134
68259-12-1	Perfluorononanesulfonic acid	0.015 U		0.148	0.131	89	70-130
335-77-3	Perfluorodecanesulfonic acid	0.015 U		0.148	0.116	78	56-127
754-91-6	PFOSA	0.015 U		0.154	0.155	101	40-142
2355-31-9	MeFOSAA	0.038 U		0.154	0.148	96	57-128
2991-50-6	EtFOSAA	0.038 U		0.154	0.142	92	55-135
757124-72-44:2	Fluorotelomer sulfonate	0.038 U		0.144	0.131	91	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.0629		0.146	0.210	101	70-153
39108-34-4	8:2 Fluorotelomer sulfonate	0.038 U		0.148	0.148	100	61-154

CAS No.	Surrogate Recoveries	MS	FA58428-2	Limits
	13C2-PFHxA	86%	92%	61-134%
	13C2-PFDA	97%	103%	62-128%
	d5-EtFOSAA	81%	82%	57-135%

\* = Outside of Control Limits.

**Laboratory Data Review Checklist**

Completed By:

Scott Hummel

Title:

Chemist

Date:

November 15, 2018

CS Report Name:

2018 GW Napa Van Horn

Report Date:

November 7, 2018

Consultant Firm:

*NORTECH*, Inc.

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1189850

ADEC File Number:

100.38.242

Hazard Identification Number:

25865



1. Laboratory

- a. Did an ADEC CS approved laboratory receive and
- perform
- all of the submitted sample analyses?

 Yes  No

Comments:

- 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:

Samples that were submitted for perfluorinated compounds (PFCs) were transferred to, and analyzed, by SGS-Orlando. Other analyses were analyzed by SGS North America, Inc., in Anchorage, Alaska.

2. Chain of Custody (CoC)

- a. CoC information completed, signed, and dated (including released/received by)?

 Yes  No

Comments:

Private well, HW-1, was identified and reported as *HR-1*. An additional COC was prepared by SGS for the PFC sample transfer, and that was completed correctly.

- 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:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

 Yes  No

Comments:

- 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:

Both sample receipt forms identify discrepancies between sample labels and COC for HW-1 which was written on the COC as *HR-1*. Samples for HW-1 are reported as *HR-1*.

- e. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

#### 4. Case Narrative

- a. Present and understandable?

Yes  No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

Yes  No

Comments:

There are no discrepancies or issues identified in the case narrative for SGS North America, in Anchorage, Alaska.

The case narrative for SGS-Orlando is extensive, noting that surrogate recoveries are outside of control limits due to dilution, and some samples were re-extracted for confirmation analysis.

- c. Were all corrective actions documented?

Yes  No

Comments:

Dilution and re-extraction were documented.

- d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not identify any effect on data quality or usability.

#### 5. Samples Results

- a. Correct analyses performed/reported as requested on COC?

Yes  No

Comments:

b. All applicable holding times met?

Yes  No

Comments:

c. All soils reported on a dry weight basis?

Yes  No

Comments:

There were no soil samples submitted in 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:

LOQs exceed the ADEC cleanup level for the VOC analyte 1,2,3-trichloropropane, however their detection limits did not exceed the cleanup level.

e. Data quality or usability affected?

Yes  No

Comments:

Data quality or usability are 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 diesel range organics (DRO) method blank has a J-flag detection of 0.293 mg/L, below the LOQ.

iii. If above LOQ, what samples are affected?

Comments:

No samples are affected. The method blank detection was below the LOQ.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

There are no affected samples. No data flags are required.

v. Data quality or usability affected?

Comments:

Data quality and 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:

No metals or inorganic analyses were requested in 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:

Reported %R and RPD meet acceptance limits for quality control samples. No samples are affected.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

No data flags are required.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

Yes  No

Comments:

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:

PFC analysis for samples: *MW-1R*, *MW-2*, *MW-3*, *MW-4*, and *MW-44* have reported surrogate recoveries outside of laboratory criteria due to sample dilution.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

No data flags are required.

iv. Data quality or usability affected?

Comments:

Sample dilution does not affect data quality or usability. Samples which required dilution exceed the ADEC Action Levels.

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:

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:

iii. All results less than LOQ?

Yes  No

Comments:

iv. If above LOQ, what samples are affected?

Comments:

There were no detections in the trip blank. No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes  No

Comments:

ii. Submitted blind to lab?

Yes  No

Comments:

Replicate sample pair *MW-4/MW-44* was submitted in this work order.

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:

PFC results for perfluorooctanoic acid, perfluorohexanesulfonic acid, perfluorheptanesulfonic acid, perfluorooctanesulfonic acid, and 6:2 fluorotelomer sulfonate exceed RPD criteria.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Duplicate samples were diluted for reported values, which increases percent error at part per trillion (PPT) sensitivity. Sample results exceed ADEC Action Levels. Data quality and usability are not affected.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

Yes    No    Not Applicable

Sample *EB-Napa VH* was submitted in this work order.

i. All results less than LOQ?

Yes    No

Comments:

Toluene was detected in the equipment blank above the LOQ. Toluene was not detected in project samples.

Perfluorooctanesulfonic acid was detected below the LOQ in the EB. It was also detected in the laboratory-supplied *Field Blank*.

ii. If above LOQ, what samples are affected?

Comments:

No samples had a detected toluene result. No samples are affected.

iii. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes    No

Comments:

There are no additional data flags or qualifiers in the laboratory reports.





## Laboratory Report of Analysis

To: Nortech  
2450 College Road  
Fairbanks, AK 99709  
(907)452-5688

Report Number: **1199048**

Client Project: **NAPA-Van Horn 17-1001**

Dear Scott Hummel,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Jennifer at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

Alaska Division Technical Director

Stephen Ede

2019.03.06

10:46:57 -09'00'

Jennifer Dawkins  
Project Manager  
Jennifer.Dawkins@sgs.com

Date

### Case Narrative

SGS Client: **Nortech**  
SGS Project: **1199048**  
Project Name/Site: **NAPA-Van Horn 17-1001**  
Project Contact: **Scott Hummel**

Refer to sample receipt form for information on sample condition.

**MW-4 (1199048001) PS**

EPA 537 MOD- AFCEE PFAS23 was analyzed by SGS of Orlando, FL.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 03/06/2019 10:32:33AM

### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
MW-4	1199048001	02/13/2019	02/15/2019	Water (Surface, Eff., Ground)
MW-3	1199048002	02/13/2019	02/15/2019	Water (Surface, Eff., Ground)
MW-33	1199048003	02/13/2019	02/15/2019	Water (Surface, Eff., Ground)
EB-1	1199048004	02/13/2019	02/15/2019	Water (Surface, Eff., Ground)
MW-1R	1199048005	02/13/2019	02/15/2019	Water (Surface, Eff., Ground)
Field Blank-1	1199048006	02/13/2019	02/15/2019	Water (Surface, Eff., Ground)
MW-2	1199048007	02/13/2019	02/15/2019	Water (Surface, Eff., Ground)

Method

Method Description



SGS North America Inc.  
CHAIN OF CUSTODY RECORD

1199048



Locations Nationwide  
Alaska  
Maryland  
New Jersey  
New York  
North Carolina  
Indiana  
West Virginia  
Kentucky  
www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out.  
Omissions may delay the onset of analysis.

Page 1 of 1

CLIENT: **NORTECH**  
 PROJECT: **Susan Vogt** PHONE NO: **907-452-5688**  
 CONTACT: **Scott Hummel** PROJECT PWSID/ PERMIT#: **17-1001**  
 NAME: **NAPA-Van Horn**  
 REPORTS TO: **Scott Hummel** E-MAIL: **scott.hummel@ndpotterdrives.com**  
**Susan Vogt**  
 INVOICE TO: **NORTECH** QUOTE #: **17-1001**  
 P.O. #: **17-1001**

Section 3		Preservative		REMARKS/ LOC ID
#	CONTAINERS	Type	Matrix Code	
1	2	G	Water	
2	2	G		
3	2	G		
4	2	G		
5	2	G		
6	2	G		
7	2	G		

Notes: None  
 PFCs 67  
 EPA 537

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE
1A-B	MW-4	02/13/19	1157	Water
2A-B	MW-3	02/13/19	1304	
3A-B	MW-33	02/13/19	1306	
4A-B	EB-1	02/13/19	1340	
5A-B	MW-1R	02/13/19	1434	
6A-B	Field Blank-1	02/13/19	1400	
7A-B	MW-2	02/13/19	1526	

Relinquished By: (1)	Date	Time	Received By:	Time
<i>[Signature]</i>	2/14/19	14:00	<i>[Signature]</i>	14:00
Relinquished By: (2)	Date	Time	Received By:	Time
<i>[Signature]</i>	2-14-19	1500		
Relinquished By: (3)	Date	Time	Received By:	Time
	2/15/19	1117	<i>[Signature]</i>	
Relinquished By: (4)	Date	Time	Received For Laboratory By:	Time
			<i>[Signature]</i>	

Section 4  
 Cooler ID:  
 Requested Turnaround Time and/or Special Instructions:  
 Arr same list as 2018 1189850  
 Temp Blank °C: 3.7°C  
 or Ambient [ ]  
 Chain of Custody Seal: (Circle)  
 INTACT  BROKEN  ABSENT  
 (See attached Sample Receipt Form) (See attached Sample Receipt Form)



1199048



### FAIRBANKS SAMPLE RECEIPT FORM

Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Review Criteria:	Condition:	Comments/Actions Taken
Were custody seals intact? Note # & location, if applicable. COC accompanied samples?	Yes No <del>N/A</del> <del>Yes</del> No <del>N/A</del>	<del>Exemption permitted if sampler hand carries/delivers.</del>
Temperature blank compliant* (i.e., 0-6°C) If >6°C, were samples collected <8 hours ago? If <0°C, were all sample containers ice free?	<del>Yes</del> No <del>N/A</del> Yes No <del>N/A</del> Yes No <del>N/A</del>	<input type="checkbox"/> Exemption permitted if chilled & collected <8hrs ago
Cooler ID: @ 3.7°C w/Therm. ID: 030 Cooler ID: @ w/Therm. ID: _____ Cooler ID: @ w/Therm. ID: _____ Cooler ID: @ w/Therm. ID: _____ Cooler ID: @ w/Therm. ID: _____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank and "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note ambient ( ) or chilled ( ). Please check one.		Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.
Delivery Method: <input checked="" type="radio"/> (hand carried) Other: _____	Tracking/AB# : Or see attached Or <del>N/A</del>	
→ For samples received with payment, note amount (\$) and whether cash / check / CC (circle one) was received.		
Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other: _____	<del>Yes</del> No N/A	Note: some samples are sent to Anchorage without inspection by SGS Fairbanks personnel.
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes No <del>N/A</del>	
For RUSH/SHORT Hold Time, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No <del>N/A</del> Yes No <del>N/A</del>	
Additional notes (if applicable):		
Profile #: 362417		
Note to Client: any "no" circled above indicates non-compliance with standard procedures and may impact data quality.		



e-Sample Receipt Form

SGS Workorder #:

1199048



1 1 9 9 0 4 8

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
<b>Chain of Custody / Temperature Requirements</b>		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1-F, 1-B
COC accompanied samples?	Yes	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 0.6 °C Therm. ID: D56
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
<b>Holding Time / Documentation / Sample Condition Requirements</b>		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples <b>match COC**</b> (i.e., sample IDs, dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	Yes	
Were proper containers (type/mass/volume/preservative***) used?	Yes	N/A ***Exemption permitted for metals (e.g.200.8/6020A).
<b>Volatile / LL-Hg Requirements</b>		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	
<b>Note to Client:</b> Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		



## Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1199048001-A	No Preservative Required	OK			
1199048001-B	No Preservative Required	OK			
1199048002-A	No Preservative Required	OK			
1199048002-B	No Preservative Required	OK			
1199048003-A	No Preservative Required	OK			
1199048003-B	No Preservative Required	OK			
1199048004-A	No Preservative Required	OK			
1199048004-B	No Preservative Required	OK			
1199048005-A	No Preservative Required	OK			
1199048005-B	No Preservative Required	OK			
1199048006-A	No Preservative Required	OK			
1199048006-B	No Preservative Required	OK			
1199048007-A	No Preservative Required	OK			
1199048007-B	No Preservative Required	OK			

### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.



The results set forth herein are provided by SGS North America Inc.

**e-Hardcopy 2.0**  
Automated Report

## Technical Report for

SGS North America, Inc

1199048

SGS Job Number: FA61698

Sampling Date: 02/13/19

### Report to:

SGS North America, Inc  
200 W Potter Dr  
Anchorage, AK 99518  
julie.shumway@sgs.com

ATTN: Julie Shumway

Total number of pages in report: **32**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Caitlin Brice, M.S.  
General Manager

Client Service contact: Andrea Colby 407-425-6700

Certifications: FL(E83510), LA(03051), KS(E-10327), IL(200063), NC(573), NJ(FL002), NY(12022), SC(96038001)  
DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177),  
AK, AR, IA, KY, MA, MS, ND, NH, NV, OK, OR, UT, WA, WV

This report shall not be reproduced, except in its entirety, without the written approval of SGS.

Test results relate only to samples analyzed.

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## Sample Summary

SGS North America, Inc

Job No: FA61698

1199048

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
FA61698-1	02/13/19	11:57 JS	02/19/19	AQ	Ground Water	MW-4
FA61698-2	02/13/19	13:04 JS	02/19/19	AQ	Ground Water	MW-3
FA61698-3	02/13/19	13:06 JS	02/19/19	AQ	Ground Water	MW-33
FA61698-4	02/13/19	13:40 JS	02/19/19	AQ	Equipment Blank	EB-1
FA61698-5	02/13/19	14:34 JS	02/19/19	AQ	Ground Water	MW-1R
FA61698-6	02/13/19	14:00 JS	02/19/19	AQ	Field Blank Water	FIELD BLANK-1
FA61698-7	02/13/19	15:26 JS	02/19/19	AQ	Ground Water	MW-2

## SAMPLE DELIVERY GROUP CASE NARRATIVE

**Client:** SGS North America, Inc

**Job No** FA61698

**Site:** 1199048

**Report Date** 3/1/2019 10:18:51

6 Samples and 1 Field Blank(s) were collected on 02/13/2019 and were received at SGS North America Inc - Orlando on 02/19/2019 properly preserved, at 3.1 Deg. C and intact. These samples received an SGS Orlando job number of FA61698. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section. Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

### MS Semi-volatiles By Method EPA 537 MOD

**Matrix:** AQ

**Batch ID:** OP73880

All samples were extracted within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA61695-1MS, FA61697-1DUP, FA61695-1MS were used as the QC samples indicated.

Matrix Spike Recovery(s) for 4:2 Fluorotelomer sulfonate, 6:2 Fluorotelomer sulfonate, 8:2 Fluorotelomer sulfonate, EtFOSAA, MeFOSAA, Perfluorobutanesulfonic acid, Perfluorobutanoic acid, Perfluorodecanesulfonic acid, Perfluorodecanoic acid, Perfluorododecanoic acid, Perfluoroheptanesulfonic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonic acid, Perfluorohexanoic acid, Perfluorononanesulfonic acid, Perfluorononanoic acid, Perfluorooctanesulfonic acid, Perfluorooctanoic acid, Perfluoropentanesulfonic acid, Perfluoropentanoic acid, Perfluorotetradecanoic acid, Perfluorotridecanoic acid, Perfluoroundecanoic acid, PFOSA are outside control limits.

Sample(s) FA61698-5, FA61698-7 have surrogates outside control limits.

FA61698-5 for 13C2-PFDA: Outside control limits due to dilution.

FA61698-5 for 13C2-PFHxA: Outside control limits due to dilution.

FA61698-5 for d5-NEtFOSAA: Outside control limits due to dilution.

FA61698-7 for 13C2-PFDA: Outside control limits due to dilution.

FA61698-7 for 13C2-PFDA: Outside control limits due to dilution.

FA61698-7 for 13C2-PFHxA: Outside control limits due to dilution.

FA61698-7 for 13C2-PFHxA: Outside control limits due to dilution.

FA61698-7 for d5-NEtFOSAA: Outside control limits due to dilution.

FA61698-7 for d5-NEtFOSAA: Outside control limits due to dilution.

**Matrix:** AQ

**Batch ID:** OP73950

All samples were extracted within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA61698-2, FA61698-3 have surrogates outside control limits.

OP73950-BS: Insufficient sample for MS/MSD.

FA61698-2 for 13C2-PFDA: Outside control limits due to dilution.

FA61698-2 for 13C2-PFHxA: Outside control limits due to dilution.

FA61698-2 for 13C3-HFPO-DA: Outside control limits due to dilution.

FA61698-2 for 13C3-HFPO-DA: Outside control limits due to dilution.

FA61698-2 for d5-NEtFOSAA: Outside control limits due to dilution.

FA61698-3 for 13C2-PFDA: Outside control limits due to dilution.

FA61698-3 for 13C2-PFHxA: Outside control limits due to dilution.

FA61698-3 for 13C3-HFPO-DA: Outside control limits due to dilution.

FA61698-3 for 13C3-HFPO-DA: Outside control limits due to dilution.

FA61698-3 for d5-NEtFOSAA: Outside control limits due to dilution.

FA61698-3 for d5-NEtFOSAA: Outside control limits due to dilution.

SGS Orlando certifies that this report meets the project requirements for analytical data produced for the samples as received at SGS Orlando and as stated on the COC. SGS Orlando certifies that the data meets the Data Quality Objectives for precision, accuracy and completeness as specified in the SGS Orlando Quality Manual except as noted above. This report is to be used in its entirety. SGS Orlando is not responsible for any assumptions of data quality if partial data packages are used.

Narrative prepared by:

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Ariel Hartney, Client Services (*Signature on File*)

## Summary of Hits

**Job Number:** FA61698  
**Account:** SGS North America, Inc  
**Project:** 1199048  
**Collected:** 02/13/19



Lab Sample ID	Client Sample ID	Result/ Analyte	LOQ	LOD	Units	Method
<b>FA61698-1</b>		<b>MW-4</b>				
		Perfluorobutanoic acid	0.0544	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluoropentanoic acid	0.0882	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorohexanoic acid	0.114	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluoroheptanoic acid	0.0286	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorooctanoic acid	0.0885	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorononanoic acid	0.00313 J	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorobutanesulfonic acid	0.523	0.077	0.038	ug/l EPA 537 MOD
		Perfluoropentanesulfonic acid	0.171	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorohexanesulfonic acid	0.887	0.077	0.038	ug/l EPA 537 MOD
		Perfluoroheptanesulfonic acid	0.119	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorooctanesulfonic acid	0.705	0.077	0.038	ug/l EPA 537 MOD
		6:2 Fluorotelomer sulfonate	0.0952	0.019	0.015	ug/l EPA 537 MOD
<b>FA61698-2</b>		<b>MW-3</b>				
		Perfluorobutanoic acid	0.342	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluoropentanoic acid	0.464	0.077	0.038	ug/l EPA 537 MOD
		Perfluorohexanoic acid	1.22	0.077	0.038	ug/l EPA 537 MOD
		Perfluoroheptanoic acid	0.200	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorooctanoic acid	0.0588	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorononanoic acid	0.00319 J	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorobutanesulfonic acid	3.51	0.077	0.038	ug/l EPA 537 MOD
		Perfluoropentanesulfonic acid	3.05	0.077	0.038	ug/l EPA 537 MOD
		Perfluorohexanesulfonic acid	6.00	0.15	0.077	ug/l EPA 537 MOD
		Perfluoroheptanesulfonic acid	0.0152	0.0077	0.0038	ug/l EPA 537 MOD
		Perfluorooctanesulfonic acid	0.0552	0.0077	0.0038	ug/l EPA 537 MOD
<b>FA61698-3</b>		<b>MW-33</b>				
		Perfluorobutanoic acid	0.349	0.0080	0.0040	ug/l EPA 537 MOD
		Perfluoropentanoic acid	0.402	0.080	0.040	ug/l EPA 537 MOD
		Perfluorohexanoic acid	1.06	0.080	0.040	ug/l EPA 537 MOD
		Perfluoroheptanoic acid	0.204	0.0080	0.0040	ug/l EPA 537 MOD
		Perfluorooctanoic acid	0.0632	0.0080	0.0040	ug/l EPA 537 MOD
		Perfluorononanoic acid	0.00321 J	0.0080	0.0040	ug/l EPA 537 MOD
		Perfluorobutanesulfonic acid	3.10	0.080	0.040	ug/l EPA 537 MOD
		Perfluoropentanesulfonic acid	2.62	0.080	0.040	ug/l EPA 537 MOD
		Perfluorohexanesulfonic acid	5.74	0.16	0.080	ug/l EPA 537 MOD
		Perfluoroheptanesulfonic acid	0.0161	0.0080	0.0040	ug/l EPA 537 MOD
		Perfluorooctanesulfonic acid	0.0580	0.0080	0.0040	ug/l EPA 537 MOD

## Summary of Hits

**Job Number:** FA61698  
**Account:** SGS North America, Inc  
**Project:** 1199048  
**Collected:** 02/13/19



Lab Sample ID	Client Sample ID	Result/ Analyte	LOQ	LOD	Units	Method
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**FA61698-4 EB-1**

No hits reported in this sample.

**FA61698-5 MW-1R**

Perfluorobutanoic acid	0.143	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluoropentanoic acid	0.194	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorohexanoic acid	0.340	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluoroheptanoic acid	0.0668	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorooctanoic acid	0.222	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorononanoic acid	0.0132	0.0077	0.0038	ug/l	EPA 537 MOD
Perfluorobutanesulfonic acid	1.38	0.038	0.019	ug/l	EPA 537 MOD
Perfluoropentanesulfonic acid	0.599	0.038	0.019	ug/l	EPA 537 MOD
Perfluorohexanesulfonic acid	4.13	0.38	0.19	ug/l	EPA 537 MOD
Perfluoroheptanesulfonic acid	0.830	0.038	0.019	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid	16.9	0.38	0.19	ug/l	EPA 537 MOD
6:2 Fluorotelomer sulfonate	0.202	0.019	0.015	ug/l	EPA 537 MOD

**FA61698-6 FIELD BLANK-1**

No hits reported in this sample.

**FA61698-7 MW-2**

Perfluorobutanoic acid	0.467	0.042	0.021	ug/l	EPA 537 MOD
Perfluoropentanoic acid	0.566	0.042	0.021	ug/l	EPA 537 MOD
Perfluorohexanoic acid	1.88	0.042	0.021	ug/l	EPA 537 MOD
Perfluoroheptanoic acid	0.396	0.042	0.021	ug/l	EPA 537 MOD
Perfluorooctanoic acid	0.853	0.042	0.021	ug/l	EPA 537 MOD
Perfluorononanoic acid	0.0261 J	0.042	0.021	ug/l	EPA 537 MOD
Perfluorobutanesulfonic acid	5.02	0.42	0.21	ug/l	EPA 537 MOD
Perfluoropentanesulfonic acid	3.89	0.42	0.21	ug/l	EPA 537 MOD
Perfluorohexanesulfonic acid	19.0	2.1	1.0	ug/l	EPA 537 MOD
Perfluoroheptanesulfonic acid	2.15	0.42	0.21	ug/l	EPA 537 MOD
Perfluorooctanesulfonic acid	42.2	2.1	1.0	ug/l	EPA 537 MOD
6:2 Fluorotelomer sulfonate	0.257	0.10	0.083	ug/l	EPA 537 MOD



Sample Results

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Report of Analysis

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# Report of Analysis

<b>Client Sample ID:</b> MW-4		
<b>Lab Sample ID:</b> FA61698-1		<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Ground Water		<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q57888.D	1	02/22/19 14:15	NAF	02/20/19 09:30	OP73880	SQ1320
Run #2	Q57903.D	10	02/25/19 08:30	NAF	02/20/19 09:30	OP73880	SQ1321

Run #	Initial Volume	Final Volume
Run #1	260 ml	1.0 ml
Run #2	260 ml	1.0 ml

**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>							
375-22-4	Perfluorobutanoic acid	0.0544	0.0077	0.0038	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0882	0.0077	0.0038	0.0019	ug/l	
307-24-4	Perfluorohexanoic acid	0.114	0.0077	0.0038	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0286	0.0077	0.0038	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	0.0885	0.0077	0.0038	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	0.00313	0.0077	0.0038	0.0019	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>							
375-73-5	Perfluorobutanesulfonic acid	0.523 <sup>a</sup>	0.077	0.038	0.019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.171	0.0077	0.0038	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.887 <sup>a</sup>	0.077	0.038	0.019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.119	0.0077	0.0038	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.705 <sup>a</sup>	0.077	0.038	0.019	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>							
754-91-6	PFOSA	0.0038 U	0.0077	0.0038	0.0019	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>							
2355-31-9	MeFOSAA	0.015 U	0.019	0.015	0.0077	ug/l	
2991-50-6	EtFOSAA	0.015 U	0.019	0.015	0.0077	ug/l	
<b>FLUOROTELOMER SULFONATES</b>							
757124-72-4	4:2 Fluorotelomer sulfonate	0.015 U	0.019	0.015	0.0077	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0952	0.019	0.015	0.0077	ug/l	

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.1  
4



# Report of Analysis

<b>Client Sample ID:</b> MW-4		
<b>Lab Sample ID:</b> FA61698-1		<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Ground Water		<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048		

4.1  
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**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.015 U	0.019	0.015	0.0077	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	88%	115%	61-134%
	13C2-PFDA	113%	93%	62-128%
	d5-EtFOSAA	77%	85%	57-135%

(a) Result is from Run# 2

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

# Report of Analysis

<b>Client Sample ID:</b> MW-3		
<b>Lab Sample ID:</b> FA61698-2		<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Ground Water		<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q57936.D	1	02/27/19 14:38	NG	02/26/19 08:30	OP73950	SQ1322
Run #2	Q57937.D	10	02/27/19 14:53	NG	02/26/19 08:30	OP73950	SQ1322
Run #3	Q57938.D	20	02/27/19 15:08	NG	02/26/19 08:30	OP73950	SQ1322

Run #1	Initial Volume	Final Volume
Run #1	260 ml	1.0 ml
Run #2	260 ml	1.0 ml
Run #3	260 ml	1.0 ml

**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>							
375-22-4	Perfluorobutanoic acid	0.342	0.0077	0.0038	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	0.464 <sup>a</sup>	0.077	0.038	0.019	ug/l	
307-24-4	Perfluorohexanoic acid	1.22 <sup>a</sup>	0.077	0.038	0.019	ug/l	
375-85-9	Perfluoroheptanoic acid	0.200	0.0077	0.0038	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	0.0588	0.0077	0.0038	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	0.00319	0.0077	0.0038	0.0019	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>							
375-73-5	Perfluorobutanesulfonic acid	3.51 <sup>a</sup>	0.077	0.038	0.019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	3.05 <sup>a</sup>	0.077	0.038	0.019	ug/l	
355-46-4	Perfluoroheptanesulfonic acid	6.00 <sup>b</sup>	0.15	0.077	0.038	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0152	0.0077	0.0038	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0552	0.0077	0.0038	0.0019	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>							
754-91-6	PFOSA	0.0038 U	0.0077	0.0038	0.0019	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>							
2355-31-9	MeFOSAA	0.015 U	0.019	0.015	0.0077	ug/l	
2991-50-6	EtFOSAA	0.015 U	0.019	0.015	0.0077	ug/l	

**FLUOROTELOMER SULFONATES**

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.2  
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# Report of Analysis

<b>Client Sample ID:</b> MW-3			
<b>Lab Sample ID:</b> FA61698-2		<b>Date Sampled:</b> 02/13/19	
<b>Matrix:</b> AQ - Ground Water		<b>Date Received:</b> 02/19/19	
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a	
<b>Project:</b> 1199048			

**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	0.015 U	0.019	0.015	0.0077	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.015 U	0.019	0.015	0.0077	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	0.015 U	0.019	0.015	0.0077	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C2-PFHxA	81%	105%	0% <sup>c</sup>	61-134%
	13C2-PFDA	98%	91%	0% <sup>c</sup>	62-128%
	d5-EtFOSAA	77%	86%	0% <sup>c</sup>	57-135%
	13C3-HFPO-DA	0%	0% <sup>c</sup>	0% <sup>c</sup>	60-140%

- (a) Result is from Run# 2
- (b) Result is from Run# 3
- (c) Outside control limits due to dilution.

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



4.2  
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# Report of Analysis

<b>Client Sample ID:</b> MW-33		
<b>Lab Sample ID:</b> FA61698-3		<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Ground Water		<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q57939.D	1	02/27/19 15:23	NG	02/26/19 08:30	OP73950	SQ1322
Run #2	Q57940.D	10	02/27/19 15:38	NG	02/26/19 08:30	OP73950	SQ1322
Run #3	Q57941.D	20	02/27/19 15:53	NG	02/26/19 08:30	OP73950	SQ1322

Run #1	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	250 ml	1.0 ml
Run #3	250 ml	1.0 ml

### PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>							
375-22-4	Perfluorobutanoic acid	0.349	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.402 <sup>a</sup>	0.080	0.040	0.020	ug/l	
307-24-4	Perfluorohexanoic acid	1.06 <sup>a</sup>	0.080	0.040	0.020	ug/l	
375-85-9	Perfluoroheptanoic acid	0.204	0.0080	0.0040	0.0020	ug/l	
335-67-1	Perfluorooctanoic acid	0.0632	0.0080	0.0040	0.0020	ug/l	
375-95-1	Perfluorononanoic acid	0.00321	0.0080	0.0040	0.0020	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
307-55-1	Perfluorododecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>							
375-73-5	Perfluorobutanesulfonic acid	3.10 <sup>a</sup>	0.080	0.040	0.020	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	2.62 <sup>a</sup>	0.080	0.040	0.020	ug/l	
355-46-4	Perfluorohexanesulfonic acid	5.74 <sup>b</sup>	0.16	0.080	0.040	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0161	0.0080	0.0040	0.0020	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0580	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>							
754-91-6	PFOSA	0.0040 U	0.0080	0.0040	0.0020	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>							
2355-31-9	MeFOSAA	0.016 U	0.020	0.016	0.0080	ug/l	
2991-50-6	EtFOSAA	0.016 U	0.020	0.016	0.0080	ug/l	

### FLUOROTELOMER SULFONATES

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.3  
4



# Report of Analysis

<b>Client Sample ID:</b> MW-33		
<b>Lab Sample ID:</b> FA61698-3		<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Ground Water		<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048		

**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C2-PFHxA	79%	89%	0% <sup>c</sup>	61-134%
	13C2-PFDA	90%	71%	0% <sup>c</sup>	62-128%
	d5-EtFOSAA	60%	53% <sup>c</sup>	0% <sup>c</sup>	57-135%
	13C3-HFPO-DA	0%	0% <sup>c</sup>	0% <sup>c</sup>	60-140%

- (a) Result is from Run# 2
- (b) Result is from Run# 3
- (c) Outside control limits due to dilution.

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



4.3  
4



# Report of Analysis

<b>Client Sample ID:</b> EB-1	
<b>Lab Sample ID:</b> FA61698-4	<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Equipment Blank	<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q57887.D	1	02/22/19 14:01	NAF	02/20/19 09:30	OP73880	SQ1320
Run #2							

Run #	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

## PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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### PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
307-24-4	Perfluorohexanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-67-1	Perfluorooctanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
375-95-1	Perfluorononanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-76-2	Perfluorodecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
307-55-1	Perfluorododecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	

### PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	

### PERFLUOROCTANESULFONAMIDES

754-91-6	PFOSA	0.0040 U	0.0080	0.0040	0.0020	ug/l	
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### PERFLUOROCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.016 U	0.020	0.016	0.0080	ug/l	
2991-50-6	EtFOSAA	0.016 U	0.020	0.016	0.0080	ug/l	

### FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.4  
4



## Report of Analysis

<b>Client Sample ID:</b> EB-1		
<b>Lab Sample ID:</b> FA61698-4		<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Equipment Blank		<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048		

**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	101%		61-134%
	13C2-PFDA	112%		62-128%
	d5-EtFOSAA	100%		57-135%

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> MW-1R	
<b>Lab Sample ID:</b> FA61698-5	<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Ground Water	<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q57891.D	1	02/22/19 15:00	NAF	02/20/19 09:30	OP73880	SQ1320
Run #2	Q57906.D	5	02/25/19 09:15	NAF	02/20/19 09:30	OP73880	SQ1321
Run #3	Q57907.D	50	02/25/19 09:30	NAF	02/20/19 09:30	OP73880	SQ1321

Run #	Initial Volume	Final Volume
Run #1	260 ml	1.0 ml
Run #2	260 ml	1.0 ml
Run #3	260 ml	1.0 ml

**PFAS List**

CAS No. Compound Result LOQ LOD DL Units Q

**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.143	0.0077	0.0038	0.0019	ug/l
2706-90-3	Perfluoropentanoic acid	0.194	0.0077	0.0038	0.0019	ug/l
307-24-4	Perfluorohexanoic acid	0.340	0.0077	0.0038	0.0019	ug/l
375-85-9	Perfluoroheptanoic acid	0.0668	0.0077	0.0038	0.0019	ug/l
335-67-1	Perfluorooctanoic acid	0.222	0.0077	0.0038	0.0019	ug/l
375-95-1	Perfluorononanoic acid	0.0132	0.0077	0.0038	0.0019	ug/l
335-76-2	Perfluorodecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l
2058-94-8	Perfluoroundecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l
307-55-1	Perfluorododecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l
72629-94-8	Perfluorotridecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l
376-06-7	Perfluorotetradecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	1.38 <sup>a</sup>	0.038	0.019	0.0096	ug/l
2706-91-4	Perfluoropentanesulfonic acid	0.599 <sup>a</sup>	0.038	0.019	0.0096	ug/l
355-46-4	Perfluorohexanesulfonic acid	4.13 <sup>b</sup>	0.38	0.19	0.096	ug/l
375-92-8	Perfluoroheptanesulfonic acid	0.830 <sup>a</sup>	0.038	0.019	0.0096	ug/l
1763-23-1	Perfluorooctanesulfonic acid	16.9 <sup>b</sup>	0.38	0.19	0.096	ug/l
68259-12-1	Perfluorononanesulfonic acid	0.019 U <sup>a</sup>	0.038	0.019	0.0096	ug/l
335-77-3	Perfluorodecanesulfonic acid	0.019 U <sup>a</sup>	0.038	0.019	0.0096	ug/l

**PERFLUOROCTANESULFONAMIDES**

754-91-6	PFOSA	0.0038 U	0.0077	0.0038	0.0019	ug/l
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**PERFLUOROCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	0.015 U	0.019	0.015	0.0077	ug/l
2991-50-6	EtFOSAA	0.015 U	0.019	0.015	0.0077	ug/l

**FLUOROTELOMER SULFONATES**

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.5  
4



# Report of Analysis

<b>Client Sample ID:</b> MW-1R		
<b>Lab Sample ID:</b> FA61698-5		<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Ground Water		<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048		

**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	0.015 U	0.019	0.015	0.0077	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.202	0.019	0.015	0.0077	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	0.015 U	0.019	0.015	0.0077	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C2-PFHxA	94%	106%	0% <sup>c</sup>	61-134%
	13C2-PFDA	112%	91%	0% <sup>c</sup>	62-128%
	d5-EtFOSAA	58%	62%	0% <sup>c</sup>	57-135%

- (a) Result is from Run# 2
- (b) Result is from Run# 3
- (c) Outside control limits due to dilution.

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.5  
4

# Report of Analysis

<b>Client Sample ID:</b> FIELD BLANK-1	
<b>Lab Sample ID:</b> FA61698-6	<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Field Blank Water	<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q57886.D	1	02/22/19 13:45	NAF	02/20/19 09:30	OP73880	SQ1320
Run #2							

Run #	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

**PFAS List**

**CAS No. Compound Result LOQ LOD DL Units Q**

**PERFLUOROALKYLCARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
307-24-4	Perfluorohexanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-67-1	Perfluorooctanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
375-95-1	Perfluorononanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-76-2	Perfluorodecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
307-55-1	Perfluorododecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	

**PERFLUOROALKYLSULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	

**PERFLUOROCTANESULFONAMIDES**

754-91-6	PFOSA	0.0040 U	0.0080	0.0040	0.0020	ug/l	
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**PERFLUOROCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	0.016 U	0.020	0.016	0.0080	ug/l	
2991-50-6	EtFOSAA	0.016 U	0.020	0.016	0.0080	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.6  
4



# Report of Analysis

<b>Client Sample ID:</b> FIELD BLANK-1		
<b>Lab Sample ID:</b> FA61698-6		<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Field Blank Water		<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048		

4.6  
4

**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.016 U	0.020	0.016	0.0080	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	13C2-PFHxA	100%		61-134%
	13C2-PFDA	101%		62-128%
	d5-EtFOSAA	92%		57-135%

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

# Report of Analysis

<b>Client Sample ID:</b> MW-2	
<b>Lab Sample ID:</b> FA61698-7	<b>Date Sampled:</b> 02/13/19
<b>Matrix:</b> AQ - Ground Water	<b>Date Received:</b> 02/19/19
<b>Method:</b> EPA 537 MOD EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> 1199048	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q57908.D	5	02/25/19 09:44	NAF	02/20/19 09:30	OP73880	SQ1321
Run #2	Q57909.D	50	02/25/19 09:59	NAF	02/20/19 09:30	OP73880	SQ1321
Run #3	Q57910.D	250	02/25/19 10:23	NAF	02/20/19 09:30	OP73880	SQ1321

Run #1	Initial Volume	Final Volume
Run #1	240 ml	1.0 ml
Run #2	240 ml	1.0 ml
Run #3	240 ml	1.0 ml

### PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
<b>PERFLUOROALKYLCARBOXYLIC ACIDS</b>							
375-22-4	Perfluorobutanoic acid	0.467	0.042	0.021	0.010	ug/l	
2706-90-3	Perfluoropentanoic acid	0.566	0.042	0.021	0.010	ug/l	
307-24-4	Perfluorohexanoic acid	1.88	0.042	0.021	0.010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.396	0.042	0.021	0.010	ug/l	
335-67-1	Perfluorooctanoic acid	0.853	0.042	0.021	0.010	ug/l	
375-95-1	Perfluorononanoic acid	0.0261	0.042	0.021	0.010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.021 U	0.042	0.021	0.010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.021 U	0.042	0.021	0.010	ug/l	
307-55-1	Perfluorododecanoic acid	0.021 U	0.042	0.021	0.010	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.021 U	0.042	0.021	0.010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.021 U	0.042	0.021	0.010	ug/l	
<b>PERFLUOROALKYLSULFONATES</b>							
375-73-5	Perfluorobutanesulfonic acid	5.02 <sup>a</sup>	0.42	0.21	0.10	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	3.89 <sup>a</sup>	0.42	0.21	0.10	ug/l	
355-46-4	Perfluorohexanesulfonic acid	19.0 <sup>b</sup>	2.1	1.0	0.52	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	2.15 <sup>a</sup>	0.42	0.21	0.10	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	42.2 <sup>b</sup>	2.1	1.0	0.52	ug/l	
68259-12-1	Perfluoronanesulfonic acid	0.21 U <sup>a</sup>	0.42	0.21	0.10	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.21 U <sup>a</sup>	0.42	0.21	0.10	ug/l	
<b>PERFLUOROCTANESULFONAMIDES</b>							
754-91-6	PFOSA	0.021 U	0.042	0.021	0.010	ug/l	
<b>PERFLUOROCTANESULFONAMIDOACETIC ACIDS</b>							
2355-31-9	MeFOSAA	0.083 U	0.10	0.083	0.042	ug/l	
2991-50-6	EtFOSAA	0.083 U	0.10	0.083	0.042	ug/l	

### FLUOROTELOMER SULFONATES

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

4.7  
4





# Report of Analysis

<b>Client Sample ID:</b> MW-2			
<b>Lab Sample ID:</b> FA61698-7		<b>Date Sampled:</b> 02/13/19	
<b>Matrix:</b> AQ - Ground Water		<b>Date Received:</b> 02/19/19	
<b>Method:</b> EPA 537 MOD EPA 537 MOD		<b>Percent Solids:</b> n/a	
<b>Project:</b> 1199048			

**PFAS List**

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	0.083 U	0.10	0.083	0.042	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.257	0.10	0.083	0.042	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	0.083 U	0.10	0.083	0.042	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C2-PFHxA	110%	0% <sup>c</sup>	0% <sup>c</sup>	61-134%
	13C2-PFDA	113%	0% <sup>c</sup>	0% <sup>c</sup>	62-128%
	d5-EtFOSAA	64%	0% <sup>c</sup>	0% <sup>c</sup>	57-135%

- (a) Result is from Run# 2
- (b) Result is from Run# 3
- (c) Outside control limits due to dilution.

U = Not detected      LOD = Limit of Detection      J = Indicates an estimated value  
 LOQ = Limit of Quantitation      DL = Detection Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



4.7  
4

Misc. Forms

Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody



SGS North America Inc.  
CHAIN OF CUSTODY RECORD



1 1 9 9 0 4 8

**FA61698**

Locations Nationwide

- Alaska Florida
  - New Jersey Colorado
  - Texas North Carolina
  - Virginia Louisiana
- [www.us.sgs.com](http://www.us.sgs.com)

CLIENT: <b>SGS North America Inc. - Alaska Division</b>					SGS Reference: <b>SGS Orlando, FL</b>					Page 1 of 1	
CONTACT: <b>Julie Shumway</b> PHONE NO: <b>(907) 562-2343</b>					Additional Comments: <b>All soils report out in dry weight unless otherwise requested.</b>						
PROJECT NAME: <b>1199048</b>		PWSID#:			CONTAINER	Preservative Used:	None	MS	MSD	SGS lab #	Location ID
REPORTS TO:		NPDL#:									
INVOICE TO:		E-MAIL: <b>Julie.Shumway@sgs.com</b>			EPA 821 MOD. / PCCE PFAS23	TYPE	E = COMP G = GRAB Multi Incremental Soils				
SGS - Alaska		QUOTE #:									
P.O. #:		<b>1199048</b>									
RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HHMM	MATRIX/MATRIX	#	G	=	X			
	MW-4	2/13/2019	11:57	Water	2	G	=	X			1199048001
1	MW-3	2/13/2019	13:04	Water	2	G	=	X			1199048002
2	MW-33	2/13/2019	13:06	Water	2	G	=	X			1199048003
3	EB-1	2/13/2019	13:40	Water	2	G	=	X			1199048004
4	MW-1R	2/13/2019	14:34	Water	2	G	=	X			1199048005
5	Field Blank-1	2/13/2019	14:00	Water	2	G	=	X			1199048006
6	MW-2	2/13/2019	15:26	Water	2	G	=	X			1199048007
7											
Relinquished By: (1)		Date	Time	Received By:	DOD Project?		NO		Data Deliverable Requirements:		
<i>J. Shumway</i>		<i>2/19/19</i>	<i>1047</i>	<i>VPS</i>	Report to DL (J Flags)?		NO		Level 2 w/SGS EDD		
Relinquished By: (2)		Date	Time	Received By:	Report as DL/LOD/LOQ?		YES		Requested Turnaround Time and/or Special Instructions:		
<i>VPS</i>									Report in ug/L. Reference FA58382		
Relinquished By: (3)		Date	Time	Received By:	Cooler ID:				Chain of Custody Seal: (Circle)		
									Temp Blank °C: <i>3.1</i>		
Relinquished By: (4)		Date	Time	Received For Laboratory By:	or Ambient [ ]				INTACT BROKEN ABSENT		
				<i>Feltz</i>							

X | 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301  
 | 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1803 Fax: (910) 350-1557

[http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm)

REVIEWED *AK*

F088\_COC\_REF\_LAB\_20181120.xl4

**FA61698: Chain of Custody**  
**Page 1 of 2**



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## SGS Sample Receipt Summary

Job Number: FA61698

Client: SGS ALASKA

Project: 1199048

Date / Time Received: 2/19/2019 9:30:00 AM

Delivery Method: UPS

Airbill #'s: 1za8619w0167306275

Therm ID: <u>IR 1;</u>	Therm CF: <u>-0.2;</u>	# of Coolers: <u>1</u>
Cooler Temps (Raw Measured) °C: Cooler 1: (3.3);		
Cooler Temps (Corrected) °C: Cooler 1: (3.1);		

<u>Cooler Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>
1. Custody Seals Present	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Custody Seals Intact	<input checked="" type="checkbox"/>		<input type="checkbox"/>
3. Temp criteria achieved	<input checked="" type="checkbox"/>		<input type="checkbox"/>
4. Cooler temp verification	<u>IR Gun</u>		
5. Cooler media	<u>Ice (Bag)</u>		

<u>Sample Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Sample labels present on bottles	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
2. Samples preserved properly	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
3. Sufficient volume/containers recvd for analysis:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
4. Condition of sample	<u>Intact</u>			
5. Sample recvd within HT	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
6. Dates/Times/IDs on COC match Sample Label	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
7. VOCs have headspace	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Bottles received for unspecified tests	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
9. Compositing instructions clear	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Voa Soil Kits/Jars received past 48hrs?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
11. % Solids Jar received?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
12. Residual Chlorine Present?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

<u>Trip Blank Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Trip Blank present / cooler	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Trip Blank listed on COC	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<u>W</u>	<u>or</u>	<u>S</u>	<u>N/A</u>
3. Type Of TB Received	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

<u>Misc. Information</u>			
Number of Encores: 25-Gram _____	5-Gram _____	Number of 5035 Field Kits: _____	Number of Lab Filtered Metals: _____
Test Strip Lot #s: pH 0-3 _____	230315 _____	pH 10-12 _____	219813A _____
Residual Chlorine Test Strip Lot #: _____			

Comments

SM001 Rev. Date 05/24/17 Technician: PETERH Date: 2/19/2019 9:30:00 AM Reviewer: \_\_\_\_\_ Date: \_\_\_\_\_

**FA61698: Chain of Custody**  
**Page 2 of 2**

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MS Semi-volatiles

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QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

# Method Blank Summary

**Job Number:** FA61698  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1199048

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73880-MB	Q57879.D	1	02/22/19	NAF	02/20/19	OP73880	SQ1320

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA61698-1, FA61698-4, FA61698-5, FA61698-6, FA61698-7

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0080	0.0020	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0080	0.0020	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0080	0.0020	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0080	0.0020	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0080	0.0020	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0080	0.0020	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0080	0.0020	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0080	0.0020	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0080	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0080	0.0020	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0080	0.0020	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0080	0.0020	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0080	0.0020	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0080	0.0020	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0080	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0080	0.0020	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0080	0.0020	ug/l	
754-91-6	PFOSA	ND	0.0080	0.0020	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0080	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0080	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.020	0.0080	ug/l	

CAS No.	Surrogate Recoveries	Limits	
	13C2-PFHxA	115%	61-134%
	13C2-PFDA	113%	62-128%
	d5-EtFOSAA	105%	57-135%

6.1.1  
6



# Method Blank Summary

**Job Number:** FA61698  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1199048

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73950-MB	Q57935.D	1	02/27/19	NG	02/26/19	OP73950	SQ1322

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA61698-2, FA61698-3

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0077	0.0019	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0077	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0077	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0019	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0019	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0077	0.0019	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0019	ug/l	
754-91-6	PFOSA	ND	0.0077	0.0019	ug/l	
2355-31-9	MeFOSAA	ND	0.019	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0077	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.019	0.0077	ug/l	

CAS No.	Surrogate Recoveries	Limits	
	13C2-PFHxA	117%	61-134%
	13C2-PFDA	112%	62-128%
	d5-EtFOSAA	102%	57-135%
	13C3-HFPO-DA	0%*	60-140%



# Blank Spike Summary

**Job Number:** FA61698  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1199048

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73880-BS	Q57878.D	1	02/22/19	NAF	02/20/19	OP73880	SQ1320

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA61698-1, FA61698-4, FA61698-5, FA61698-6, FA61698-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0900	113	20-120
2706-90-3	Perfluoropentanoic acid	0.08	0.0864	108	40-131
307-24-4	Perfluorohexanoic acid	0.08	0.0832	104	63-146
375-85-9	Perfluoroheptanoic acid	0.08	0.0871	109	71-138
335-67-1	Perfluorooctanoic acid	0.08	0.0833	104	74-137
375-95-1	Perfluorononanoic acid	0.08	0.0871	109	76-140
335-76-2	Perfluorodecanoic acid	0.08	0.0844	106	65-148
2058-94-8	Perfluoroundecanoic acid	0.08	0.0751	94	57-138
307-55-1	Perfluorododecanoic acid	0.08	0.0630	79	58-118
72629-94-8	Perfluorotridecanoic acid	0.08	0.0644	81	52-120
376-06-7	Perfluorotetradecanoic acid	0.08	0.0615	77	49-122
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0875	109	73-148
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0924	116	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0819	102	74-142
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0860	108	74-123
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0792	99	70-134
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0837	105	70-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0661	83	56-127
754-91-6	PFOSA	0.08	0.0820	103	40-142
2355-31-9	MeFOSAA	0.08	0.0760	95	57-128
2991-50-6	EtFOSAA	0.08	0.0741	93	55-135
757124-72-44:2	Fluorotelomer sulfonate	0.08	0.0879	110	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0908	114	70-153
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0830	104	61-154

CAS No.	Surrogate Recoveries	BSP	Limits
	13C2-PFHxA	114%	61-134%
	13C2-PFDA	109%	62-128%
	d5-EtFOSAA	100%	57-135%

\* = Outside of Control Limits.

# Blank Spike Summary

**Job Number:** FA61698  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1199048

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73950-BS <sup>a</sup>	Q57934.D	1	02/27/19	NG	02/26/19	OP73950	SQ1322

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA61698-2, FA61698-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.0769	0.0831	108	20-120
2706-90-3	Perfluoropentanoic acid	0.0769	0.0805	105	40-131
307-24-4	Perfluorohexanoic acid	0.0769	0.0769	100	63-146
375-85-9	Perfluoroheptanoic acid	0.0769	0.0848	110	71-138
335-67-1	Perfluorooctanoic acid	0.0769	0.0785	102	74-137
375-95-1	Perfluorononanoic acid	0.0769	0.0849	110	76-140
335-76-2	Perfluorodecanoic acid	0.0769	0.0790	103	65-148
2058-94-8	Perfluoroundecanoic acid	0.0769	0.0734	95	57-138
307-55-1	Perfluorododecanoic acid	0.0769	0.0629	82	58-118
72629-94-8	Perfluorotridecanoic acid	0.0769	0.0656	85	52-120
376-06-7	Perfluorotetradecanoic acid	0.0769	0.0626	81	49-122
375-73-5	Perfluorobutanesulfonic acid	0.0769	0.0821	107	73-148
2706-91-4	Perfluoropentanesulfonic acid	0.0769	0.0807	105	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0769	0.0783	102	74-142
375-92-8	Perfluoroheptanesulfonic acid	0.0769	0.0847	110	74-123
1763-23-1	Perfluorooctanesulfonic acid	0.0769	0.0732	95	70-134
68259-12-1	Perfluorononanesulfonic acid	0.0769	0.0713	93	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0769	0.0608	79	56-127
754-91-6	PFOSA	0.0769	0.0731	95	40-142
2355-31-9	MeFOSAA	0.0769	0.0753	98	57-128
2991-50-6	EtFOSAA	0.0769	0.0715	93	55-135
757124-72-44:2	Fluorotelomer sulfonate	0.0769	0.0871	113	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.0769	0.0864	112	70-153
39108-34-4	8:2 Fluorotelomer sulfonate	0.0769	0.0819	106	61-154

CAS No.	Surrogate Recoveries	BSP	Limits
	13C2-PFHxA	120%	61-134%
	13C2-PFDA	118%	62-128%
	d5-EtFOSAA	110%	57-135%
	13C3-HFPO-DA	0%*	60-140%

(a) Insufficient sample for MS/MSD.

\* = Outside of Control Limits.

6.2.2  
6



# Matrix Spike Summary

**Job Number:** FA61698  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1199048

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73880-MS	Q57920.D	200	02/25/19	NAF	02/20/19	OP73880	SQ1321
FA61695-1 <sup>a</sup>	Q57915.D	100	02/25/19	NAF	02/20/19	OP73880	SQ1321
FA61695-1 <sup>a</sup>	Q57919.D	200	02/25/19	NAF	02/20/19	OP73880	SQ1321

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA61698-1, FA61698-4, FA61698-5, FA61698-6, FA61698-7

CAS No.	Compound	FA61695-1 ug/l	Spike Q	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	1.5 U	0.154	ND	0*	20-120
2706-90-3	Perfluoropentanoic acid	3.1 U <sup>b</sup>	0.154	ND	0*	40-131
307-24-4	Perfluorohexanoic acid	1.5 U	0.154	ND	0*	63-146
375-85-9	Perfluoroheptanoic acid	1.5 U	0.154	ND	0*	71-138
335-67-1	Perfluorooctanoic acid	1.5 U	0.154	ND	0*	74-137
375-95-1	Perfluorononanoic acid	1.5 U	0.154	ND	0*	76-140
335-76-2	Perfluorodecanoic acid	1.5 U	0.154	ND	0*	65-148
2058-94-8	Perfluoroundecanoic acid	1.5 U	0.154	ND	0*	57-138
307-55-1	Perfluorododecanoic acid	1.5 U	0.154	ND	0*	58-118
72629-94-8	Perfluorotridecanoic acid	1.5 U	0.154	ND	0*	52-120
376-06-7	Perfluorotetradecanoic acid	1.5 U	0.154	ND	0*	49-122
375-73-5	Perfluorobutanesulfonic acid	1.5 U	0.154	ND	0*	73-148
2706-91-4	Perfluoropentanesulfonic acid	3.1 U <sup>b</sup>	0.154	ND	0*	70-130
355-46-4	Perfluorohexanesulfonic acid	1.5 U	0.154	ND	0*	74-142
375-92-8	Perfluoroheptanesulfonic acid	1.5 U	0.154	ND	0*	74-123
1763-23-1	Perfluorooctanesulfonic acid	1.5 U	0.154	ND	0*	70-134
68259-12-1	Perfluorononanesulfonic acid	1.5 U	0.154	ND	0*	70-130
335-77-3	Perfluorodecanesulfonic acid	1.5 U	0.154	ND	0*	56-127
754-91-6	PFOSA	1.5 U	0.154	ND	0*	40-142
2355-31-9	MeFOSAA	3.8 U	0.154	ND	0*	57-128
2991-50-6	EtFOSAA	3.8 U	0.154	ND	0*	55-135
757124-72-44:2	Fluorotelomer sulfonate	3.8 U	0.154	ND	0*	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	3.8 U	0.154	ND	0*	70-153
39108-34-4	8:2 Fluorotelomer sulfonate	3.8 U	0.154	ND	0*	61-154

CAS No.	Surrogate Recoveries	MS	FA61695-1	FA61695-1	Limits
	13C2-PFHxA	0%* <sup>c</sup>	0%* <sup>c</sup>	0%* <sup>c</sup>	61-134%
	13C2-PFDA	0%* <sup>c</sup>	0%* <sup>c</sup>	0%* <sup>c</sup>	62-128%
	d5-EtFOSAA	0%* <sup>c</sup>	0%* <sup>c</sup>	0%* <sup>c</sup>	57-135%

- (a) Dilution required due to matrix interference (internal standard failure).
- (b) Result is from Run #2.
- (c) Outside control limits due to dilution.

\* = Outside of Control Limits.

# Duplicate Summary

**Job Number:** FA61698  
**Account:** SGSAKA SGS North America, Inc  
**Project:** 1199048

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73880-DUP	Q57918.D	100	02/25/19	NAF	02/20/19	OP73880	SQ1321
FA61697-1 <sup>a</sup>	Q57917.D	100	02/25/19	NAF	02/20/19	OP73880	SQ1321

The QC reported here applies to the following samples:

Method: EPA 537 MOD

FA61698-1, FA61698-4, FA61698-5, FA61698-6, FA61698-7

CAS No.	Compound	FA61697-1 DUP		Q	RPD	Limits
		ug/l	ug/l			
375-22-4	Perfluorobutanoic acid	1.5 U	ND		nc	30
2706-90-3	Perfluoropentanoic acid	1.5 U	ND		nc	30
307-24-4	Perfluorohexanoic acid	1.5 U	ND		nc	30
375-85-9	Perfluoroheptanoic acid	1.5 U	ND		nc	30
335-67-1	Perfluorooctanoic acid	1.5 U	ND		nc	30
375-95-1	Perfluorononanoic acid	1.5 U	ND		nc	30
335-76-2	Perfluorodecanoic acid	1.5 U	ND		nc	30
2058-94-8	Perfluoroundecanoic acid	1.5 U	ND		nc	30
307-55-1	Perfluorododecanoic acid	1.5 U	ND		nc	30
72629-94-8	Perfluorotridecanoic acid	1.5 U	ND		nc	30
376-06-7	Perfluorotetradecanoic acid	1.5 U	ND		nc	30
375-73-5	Perfluorobutanesulfonic acid	1.5 U	ND		nc	30
2706-91-4	Perfluoropentanesulfonic acid	1.5 U	ND		nc	30
355-46-4	Perfluorohexanesulfonic acid	1.5 U	ND		nc	30
375-92-8	Perfluoroheptanesulfonic acid	1.5 U	ND		nc	30
1763-23-1	Perfluorooctanesulfonic acid	1.5 U	ND		nc	30
68259-12-1	Perfluorononanesulfonic acid	1.5 U	ND		nc	30
335-77-3	Perfluorodecanesulfonic acid	1.5 U	ND		nc	30
754-91-6	PFOSA	1.5 U	ND		nc	30
2355-31-9	MeFOSAA	3.8 U	ND		nc	30
2991-50-6	EtFOSAA	3.8 U	ND		nc	30
757124-72-44:2	Fluorotelomer sulfonate	3.8 U	ND		nc	30
27619-97-2	6:2 Fluorotelomer sulfonate	3.8 U	ND		nc	30
39108-34-4	8:2 Fluorotelomer sulfonate	3.8 U	ND		nc	30

CAS No.	Surrogate Recoveries	DUP	FA61697-1	Limits
	13C2-PFHxA	0%* b	0%* b	61-134%
	13C2-PFDA	0%* b	0%* b	62-128%
	d5-EtFOSAA	0%* b	0%* b	57-135%

- (a) Dilution required due to matrix interference (internal standard failure).
- (b) Outside control limits due to dilution.

\* = Outside of Control Limits.

**Laboratory Data Review Checklist**

Completed By:

Scott Hummel

Title:

Chemist

Date:

March 14, 2019

CS Report Name:

2019 GW Napa Van Horn [Onsite MWs]

Report Date:

March 6, 2019

Consultant Firm:

*NORTECH*, Inc.

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1199048

ADEC File Number:

100.38.242

Hazard Identification Number:

25865

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and
- perform
- all of the submitted sample analyses?

 Yes  No

Comments:

- 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:

Samples were submitted for perfluorinated compounds (PFCs) and were transferred to, and analyzed by, SGS-Orlando. Samples were hand-delivered to SGS North America, Inc., in Fairbanks, Alaska.

2. Chain of Custody (CoC)

- a. CoC information completed, signed, and dated (including released/received by)?

 Yes  No

Comments:

An additional COC was prepared by SGS for the sample transfer, and that was completed correctly.

- 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 three sample receipt forms confirm samples met integrity QC from field to analytical laboratory.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

 Yes  No

Comments:

PFC analysis only requires temperature preservation.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

 Yes  No

Comments:

Sample containers were noted to be 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:

No discrepancies were noted or documented by the laboratory.

- e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

#### 4. Case Narrative

- a. Present and understandable?

Yes  No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

Yes  No

Comments:

The case narrative for SGS-Orlando is extensive, noting that quality control performance was met for this work order except were detailed in the case narrative.

The case narrative stated that surrogate recoveries are outside of control limits due to dilution for MW-1R, MW-2, MW-3, and MW-33 (dup). The matrix spike had recoveries outside of laboratory control limits, and the parent sample was not analyzed from project samples associated with this work order.

- c. Were all corrective actions documented?

Yes  No

Comments:

No corrective actions were necessary.

- d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not identify any effect upon data quality or usability.

#### 5. Samples Results

- a. Correct analyses performed/reported as requested on COC?

Yes  No

Comments:



b. All applicable holding times met?

Yes  No

Comments:

c. All soils reported on a dry weight basis?

Yes  No

Comments:

There were no soil samples submitted in 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:

For target analytes of concern at this site the LOQ is impacted by dilution factor, analytical sensitivity can be used to evaluate concentrations for this project.

e. Data quality or usability affected?

Yes  No

Comments:

Data quality or usability are not affected.

## 6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes  No

Comments:

An additional blank sample was prepared in the field using laboratory supplied "PFC-free water." This sample is identified as *Field Blank-1* for this work order.

ii. All method blank results less than limit of quantitation (LOQ)?

Yes  No

Comments:

Method Blanks associated with this work order were reported as non-detect.

iii. If above LOQ, what samples are affected?

Comments:

No samples are affected.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

There are no affected samples, no data flags are required.

v. Data quality or usability affected?

Comments:

Data quality 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:

An LCS was reported for each batch associated with this work order.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes  No

Comments:

No metals or inorganic analyses requested in 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:

LCS recovery meets data quality objectives.

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:

There is no LCSD reported with this work order. MS/MSD %R and RPD did not meet control limits due to sample dilution and matrix interference.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

Reported %R for LCS samples meet acceptable limits for laboratory prepared quality control samples. No samples are affected.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

No data flags are required.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality 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:

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:

PFC analysis for samples: *MW-1R*, *MW-2*, *MW-3*, and *MW-33* have reported surrogate recoveries outside of laboratory criteria due to sample dilution.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

iv. Data quality or usability affected?

Comments:

Sample dilution does not affect data quality or usability. Samples which required dilution exceed the current EPA Human Health Advisory Lifetime Limits.

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:

No trip blank was required for these analytical methods.

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; no trip blank is necessary.

iii. All results less than LOQ?

Yes  No

Comments:

N/A; see above.

iv. If above LOQ, what samples are affected?

Comments:

No samples are affected, a trip blank was not required.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes  No

Comments:

ii. Submitted blind to lab?

Yes  No

Comments:

Replicate sample pair *MW-3/MW-33* was submitted in this work order.

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:

Laboratory results for the duplicate pair identified above meet reproducibility standards, where calculable.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

Yes    No    Not Applicable

Sample *EB-1* was submitted in this work order.

i. All results less than LOQ?

Yes    No                      Comments:

ii. If above LOQ, what samples are affected?

Comments:

No samples are affected, equipment blank results were non-detect.

iii. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes    No                      Comments:

There are no additional data flags or qualifiers not identified in the laboratory reports.